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**The Impact of a School-wide High School Advanced Placement Program and Culture on Participating Students' High School Achievement and Engagement Outcomes and First Year University Academic Success**

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The Impact of a School-wide High School Advanced Placement Program and Culture on  
Participating Students' High School Achievement and Engagement Outcomes and First  
Year University Academic Success

By

Gregory E. Tiemann

Presented to the Faculty of

The Graduate College of the University of Nebraska

for the requirements of the degree

Doctor of Education

In Educational Administration

Omaha, Nebraska

September, 2011

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The Impact of a School-wide High School Advanced Placement Program and Culture on Participating Students' High School Achievement and Engagement Outcomes and First Year University Academic Success.

Gregory Tiemann

University of Nebraska at Omaha, 2011

Advisor: Dr. Peter J. Smith

**Abstract**

Along with a high grade point average and high standardized test scores, access and success in higher education is impacted by the courses on a student's transcript. Advanced Placement (AP) courses have set up a cooperative endeavor between secondary schools and colleges, increasing the likelihood of higher levels of educational attainment and early college success. An AP culture which challenges high school students in taking more advanced placement courses can serve as the greatest impact for them as they are bound for college and academic success. This study examined the relationship of AP courses and student achievement as measured by (1) advanced placement course grades, (2) advanced placement test scores, (3) average weighted Grade Point Averages, (4) college entrance ACT scores and (5) engagement as measured by high school participation in (a) athletics, (b) performing arts, and (c) clubs. The study also measured first year university achievement by (1) end of first year university overall grade point averages (2) end of first year university credit hours earned, and (3) continued enrollment for a second year of university studies. Overall findings indicate that students who took advantage of the AP culture provided by this high school and completed a higher number of AP courses achieved a higher rate of academic success and

engagement in high school and also were set for a more academically successful first year of university studies.

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## **Chapter One**

### **Introduction**

Throughout the United States, comprehensive high schools are upgrading curriculum with more rigor and almost every state has called for increasing graduation requirements. As more students than ever in history plan to go to college, greater preparations are being made by students through the courses they complete in high school. Along with a high grade point average and high standardized test scores, access to higher education, especially to highly selective colleges, is impacted by the courses recorded on the student's transcript. At the high school level, the Advanced Placement (AP) courses represent some of the most rigorous courses available to students. Through a cooperative endeavor between secondary schools and colleges, the Advanced Placement Program of the College Board increases the likelihood of higher levels of educational attainment and early college success (Adelman, 1999; Geiser & Santelices, 2004).

While there is a great deal of progress to be made, education reform has broadened access and more high school students are taking AP courses. The standardized movement through federal and state legislation has accelerated more access by greater teacher training, better instructional materials, and sanctioning teacher credentials, thus challenging students to a higher standard level. Because of increasing college admission standards, the AP Program has grown dramatically, with figures showing the rate of increase from 133,702 students in 1980-81 to 1,845,046 students in 2009-2010 (College Board, 2010). With more students taking advantage in maximizing

their learning opportunities, along with more colleges giving benefit to students taking AP courses and tests, the feasibility of the program and its role in the secondary school is strengthened.

With more access to Advanced Placement courses and more colleges opening admissions due to students taking the courses, an examination of each course in its college preparation and the overall success of students after they enter college must be considered. Studies from the College Board and the Educational Testing Service (ETS) reinforce that a student with AP experience should be better prepared for college and have a greater success rate than a student without a similar experience (Morgan and Maneckshana, 2000). A conjecture may be made that the effectiveness of the AP Program at improving college admission and outcomes comes due to the nature of the students taking the courses, the family and socioeconomic backgrounds of the AP students, and other motivational factors impacting a student notwithstanding the AP program. One researcher suggests the effectiveness of the AP Program in preparing and ensuring college success has not been rigorously tested (Klopenstein, 2005). Peer reviewed articles are few, and most of the research is conducted by the College Board (McCauley, 2007). Further research into the relationship between AP participation and performance and postsecondary academic outcomes is important because increasing governmental emphasis and resources are being placed into expanding the program.

### **Background of the Problem**

In recent years, the case for raising standards can most likely point back to the attention given in a 1983 education commission publication titled “A Nation of Risk:

The Imperative For Educational Reform”. The report, which gave the sense that American schools were failing, called for reform to the “cafeteria – style” curriculum allowing students to go through high school without being challenged. The publication recommended four years of English and at least three years of social studies, science, and math. Following this publication nearly every state responded by increasing its academic rigor in the core academic areas.

Through the 1980s and 1990s, American education policies gave attention to tests of international measures and how U.S. students compared to students around the world. With a focus of being internationally competitive and protecting our future economy, national and state government education officials have taken results from the STEM test (Science, Technology, Engineering, and Mathematics) and argue that U.S. students are falling behind other industrialized nations . Of particular concern with global competitiveness is the vast industry and high-performance careers related to technology, mathematics, and science. In one alarming report, among 15 year old students taking a similar assessment in science proficiency, U.S. students ranked 36<sup>th</sup> among industrial nations in the United States and were 34<sup>th</sup> on average in comparison to other countries (Achieve, 2010). These reports evoked fear and called for change in academic rigor and higher standards.

The issue of students transitioning to and having success in college impacted the argument for higher standards. Of great concern is a national trend with students dropping out of college and completing their degree. Studies have indicated that students are not prepared due to the standards and requirements coming out of K-12 education. These studies further conclude students taking an intensive academic curriculum in high

schools are one of the best predictors on whether students ultimately earn a bachelor's degree (Adelman, 2006). Specifically in its report, 79 % of college students who had to write multiple papers, term papers, and research reports say they were more prepared for college-level writing (Habash, 2008).

The perception of high school in the importance of a college education among high school students is high and many students aspire to attend institutions of higher education. As many studies indicate, the curriculum path from high schools into college indicates a “disconnect”, and many students find themselves unprepared (Kirst & Venezia, 2001). While many would argue the standard high school graduation requirements are sufficient for students meeting college acceptance, there are many students not meeting degree completion due to academic inexperience and lack of curricular articulation between the high school and college. Most recent census figures between one in three students will drop out of college and most make the decision to drop out after their freshmen year.

The Commission on Access, Admissions, and Success in Higher Education convened in the fall of 2008 releasing disheartening trends and recognized the challenges to those students who aspire to enroll and succeed in college (College Board, 2010). In their study, while industrialized nations depend heavily on college level careers for economic and industrial vitality, the United States ranked 6<sup>th</sup> in degree attainment among 25 to 64 year olds. Among their recommendations for changing this trend was to align the K-12 educational system with international standards and college admission expectations (pg. 55). In their general findings in 2009, only 34.8% of schools in the United States offered AP or IB courses in the four core subject areas (i.e. English language arts, mathematics,

science, and social studies). Also in their report, in 2000, 26.0 % of students across the nation who entered a college or university as freshmen were in remedial classes. The College Board is nationally recognized for its standardized curriculum and examinations, allowing student access to curriculum that ensures they are ready for college and required college-level careers after leaving high school.

Based on the research and the rapid trends in AP growth, more research may be done on high school practices and initiatives to spur the growth in establishing an AP Culture. In many states, legislation and policies have supported growth by paying exam fees for low-income students and covering the professional development costs for AP teachers. In Texas, growth in the AP programs has been established in recent years from their AP Incentive Program which has included (a) exam fee reductions for low-income students, (b) training subsidies for AP teachers, (c) equipment grants to schools offering AP courses, and (d), monetary awards to schools for students earning AP Exam grades of 3-5 (Texas Education Agency, 2005). Other initiative developments in establishing an AP culture is the AP Equity and Access program established by the College Board, giving specific emphasis on student diversity and offering incentives for students in financial need. With all these new initiatives and rapid expansion, various studies have been conducted (Geiser & Santelics, 2004; Klopfenstein, 2004) have questioned whether the AP course quality is being maintained and the AP program's access to a diversity of students.

The definition of AP culture is not clearly defined and most local schools or districts outline their own program definition. Among most goals in establishing an AP culture simply include (1) increasing student enrollment in AP courses, (2) increasing the

number of students taking the AP test, and (3) increasing the scores on the AP test. To pursue these goals, schools with an established AP culture provide (1) ongoing staff development, (2) a pre-AP program that establishes through its honors program or other courses introductory AP level thinking skills, (3) a standardized test (typically the PSAT) that will measure student readiness for AP, (4) incentives for students through “weighted” GPAs or bonus grades so students challenge themselves while preserving their grades, and (5) informational and promotional programs for students and parents.

### **Purpose of the Study**

The purpose of this study is to determine the effects of an AP culture in high school and on early college success through the freshmen year. The AP culture is conceptualized to help students adjust to the academic challenges they will face as they take college level courses and later transition to full time college status. The AP culture in this study consists of its own individualized school program (AP staff development, student academic skill development, parent and family support and informational meetings, promotional programs, weighted grades, and financial assistance) providing students with support and guiding them through courses.

The students in the program are typically 11th and 12th grade students who chose courses from their strengths, interests, and college requirements. As 9th and 10th grade students, students considered Pre-AP take honors course(s) as preparation and learn of the study skills and commitment involved in a future AP course. The school strongly recommends every student planning on going to a four year college taking at least one AP course in high school. The amount of courses taken is based on the individual

students' abilities and study habits. Because AP was the dependent value, this study excluded students who chose not to take any AP courses in high school. Instead, this study included students with different quantities of AP courses taken as the independent variables.

The study of high school completion used dependent variables of achievement as measured by (1) advanced placement course grades from the following completed academic courses in (a) English, (b) math, (c) science, (d) social studies, and (e) world language. (2) Achievement as measured by advanced placement test scores. (3) Achievement as measured by average weighted Grade Point Averages. (4) Achievement as measured by the highest college entrance ACT scores. (5) engagement as measured by high school participation in (a) athletics, (b) performing arts, and (c) clubs. The study also used a posttest-posttest dependent measure of first year university completion by (1) achievement as measured by end of first year university completed coursework overall grade point averages, (2) achievement as measured by end of first year university completed coursework credit hours earned, (3) achievement as measured by continued enrollment for a second year of university studies.

### **Research Questions**

The following research question was asked about student achievement as measured by advanced placement course grades.

**Research Question #1.** Did students who completed nine or more semesters of advanced placement courses, students who completed six to eight semesters of advanced placement courses, or students who completed one to five semesters of advanced

placement courses have different or congruent end of 12<sup>th</sup> grade advanced placement course grades? These courses may include English, math, science, social studies, and world languages. The GPA for these courses only was used for analyses.

The following research question was asked about student achievement as measured by advanced placement test scores.

**Research Question #2.** Did students who completed nine or more semesters of advanced placement courses, students who completed six to eight semesters of advanced placement courses, or students who completed one to five semesters of advanced placement courses have different or congruent overall combined advanced placement test score averages? These courses may include English, math, science, social studies, and world languages. The advanced placement test score averages for these courses only were used for analyses.

The following research question was asked about student achievement as measured by weighted mark points.

**Question #3.** Did students who completed nine or more semesters of advanced placement courses, students who completed six to eight semesters of advanced placement courses, or students who completed one to five semesters of advanced placement courses have different or congruent observed overall weighted grade point average scores at graduation?

The following research question was asked about student achievement as measured by ACT composite scores.

**Overarching Research Question #4.** Did students who completed nine or more semesters of advanced placement courses, students who completed six to eight semesters

of advanced placement courses, or students who completed one to five semesters of advanced placement courses, have different or congruent college entrance ACT composite scores and how did each of these groups compare to average state and national composite averages?

**Subquestion #4 a** Did students who completed nine or more semesters of advanced placement courses, students who completed six to eight semesters of advanced placement courses, or students who completed one to five semesters of advanced placement courses have different or congruent college entrance ACT composite scores?

**Subquestions #4 b** Did students who completed nine or more semesters of advanced placement courses, students who completed six to eight semesters of advanced placement courses, or students who completed one to five semesters of advanced placement courses, have different or congruent college entrance ACT composite scores compared to state and national averages?

The following research question was asked about student engagement as measured by high school participation in (a) athletics, (b) performing arts, and (c) clubs.

**Research Question #5.** Did students who completed nine or more semesters of advanced placement courses, students who completed six to eight semesters of advanced placement courses, or students who completed one to five semesters of advanced placement courses have different or congruent levels of engagement as measured by high school observed frequencies for participation in (a) athletics, (b) performing arts, and (c) clubs?

The following research questions were asked about first year university students as measured by their overall grade point average at the end of their first year of university completed coursework.

**Research Question #6.** Did university level students who completed nine or more advanced placement courses in high school, students who completed six to eight semesters of advanced placement courses in high school, or students who completed one to five semesters of advanced placement courses in high school have different or congruent overall grade point average scores following completion of their first year of university coursework?

**Research Question #7.** Did university level students who completed nine or more semesters of advanced placement courses in high school, students who completed six to eight semesters of advanced placement courses in high school, or students who completed one to five semesters of advanced placement courses in high school have different or congruent end of first year university credit hours earned after one year?

**Research Question #8.** Did university level students who complete 13 or more advanced placement courses in high school, students who completed seven to 12 advanced placement courses in high school, or students who completed one to six advanced placement courses in high school have different or congruent second year university studies sophomore status?

### **Importance of the Study**

This study has the potential to contribute to research, practice, and policy. It is of particular interest to researchers, school personnel, and policy makers who are charged with the responsibility of providing college-level course work to 11<sup>th</sup> and 12<sup>th</sup> grade

students, as well as dual credit opportunities, to assist students as they transition successfully into the post-secondary level. The implementation of an AP culture, developed through district and school strategic and site plans, is an initiative for the purposes in fostering greater success in high school and in the early years of college. By understanding the results of this study, incoming students to the program, their parents, and school district personnel will have a valuable piece of information available to them when deciding on the AP program option and how many courses they should select during the course registration process.

### **Assumptions**

Recommendations from the College Board and the United States Department of Education have encouraged states and local schools districts to increase the enrollment of all students in AP classes. The school district has specifically addressed the necessity of increasing the number of students from the school through its district strategic plan. The school board and central office administration has set specific objectives and action plans on establishing an AP culture and growing the number of students in the AP program. The parents of the school site, who give approval to the courses selected from their student, are assumed to encourage their students to learn and take advantage of the AP options and courses. The school staff has a strong understanding of the benefits of the AP program and its benefit to students' academic potential, study habits, and preparation for their college futures. The school site selected for this study has over 90% of its students aspiring to continue on to a four year university.

The researcher assumed all data gathered from the university is valid. Students included in this study have graduated from high school, been accepted to the selected

university, and completed their freshmen year. It was assumed the students in this study had similar college experiences in relation to their preparation and took advantage of the opportunities that the select college had to offer. It was assumed students in their freshmen year had similar content courses and professors of such courses had similar or related standards of expectations.

### **Delimitations**

This study was delimited to a suburban public high school serving roughly 2,150 students in grades 9 through 12 in a mid-western metropolitan community. Student participants were delimited to 11<sup>th</sup> and 12<sup>th</sup> grade students who were in attendance and graduated among the class of 2009 and who were in attendance at the selected university during the 2009-10 school year.

The posttest measures for this study were based on the end of 12th-grade advanced placement course grades in (a) English, (b) math, (c) science, (d) social studies, and (e) world languages. Other posttest measures measured overall weighted grade point average scores at graduation. A standardized assessment instrument was developed by ACT and used to assess students' skills in a composite score combining reading, English, math, and science.

Data on levels of engagement as measured by high school observed frequencies for participation in (a) athletics, (b) performing arts, and (c) clubs was tallied from the school data by the researcher. The results, conclusions, and discussions were confined to only these students and not generalized to other high school students participating in school activities.

## **Limitations**

Several limitations deserve note. A possible contribution to outcome variance in this study may be due, in part, to family background and parent support at home and expectations for home study habits and participation during high school. The students' course grades in high school and college were subject to the professional practice and judgment of staff members. The subject was purposeful, in that the researcher sought a high school that offers a wide variety of AP options. Additional factors within the school site may play a role when examining the educational and training level of the AP staff. The total number of students in the study were  $N = 61$ ; therefore, the number of participants had the potential to skew the study results and limit the general findings. These limitations were taken into consideration when analyzing, interpreting, and discussing the results.

## **Definition of Terms**

**Academic core courses** – Academic core courses are class offerings from English, math, science, and social studies required for graduation.

**Accelerated Learning** – Curriculum that challenges students to perform at a high level, as opposed to the regular curriculum.

**ACT** – ACT, formerly known as American College Testing, is a non-profit organization that assesses college readiness and develops education and career planning assessment tools for students and educational institutions. The ACT college entrance exam is used by many post-secondary institutions as an application requirement and a predictor of college preparedness.

**Advanced Placement (AP)** – Established by the College Board in 1955, high school students in the program can enroll in college-level courses taught by high school teachers. By taking the courses students have an opportunity to earn college credit based on their performance on the AP exam. The courses provide higher level analytical and critical thinking skills, helping them for the college rigor level.

**Advanced Placement Course Instructor** – The high school instructor trained by the College Board to incorporate higher level skills and prepare students for the AP exam.

**Advanced Placement Culture** - The definition of AP Culture is not clearly defined and most schools or districts outline their own program definition. Among most goals in establishing an AP culture simply include 1) increasing student enrollment in AP courses, (2) increasing the number of students taking the AP test, and (3) improving the scores of AP tests.

**Advanced Placement Exam** - composed of a multiple-choice section and a free-response section. The free-response section is graded by high school and college teachers after the testing period. In determining a student's performance, the College Board combines the two sections to form a composite scoring range with the following values: five-Extremely well qualified, four-Well qualified, three-Qualified, two-Possibly qualified, one- No recommendation. The AP testing scale is deemed relevant by college faculty so that the AP score of 5 is equivalent to an A in college, the score of 4 is equivalent to the average B, and the 3 is equivalent to the average C. Most post-secondary institutions, including 90 % of four-year institutions in the U.S., grant some

form of credit or advanced course sequence with grades of three or higher (Scott, T. P; Tolson, H.; Lee, Y., 2010).

**College Board** - The College Board officially took over the AP program in 1955, bringing together high school teachers, university professors, and the Educational Testing Service (ETS) to develop detailed course outlines, a series of examinations offered yearly, and a national association to communicate the uniform standards of the program. The College Board is best known for facilitating the Scholastic Aptitude Test (SAT) and the AP national exam.

**College Outcomes** - Examples of college outcomes from studies of AP and non-AP students have included: cumulative grade point averages (GPAs), grades in course sequent to courses skipped because credit by exam was obtained, number of courses in the same discipline of the AP Exam, persistence to sophomore, junior, and senior status, and degree completion.

**College Prep Classes** - General education courses taught at the high school level designed to meet the requirements of four-year colleges and universities. Most high schools offer a mix of college prep and non-college prep classes.

**Course Credit** - Credit hours are points awarded at the end of a semester to students who successfully complete a content area class within the district studies. Credit hours accumulate toward graduation at the rate of five credits per semester.

**Dual Enrollment** - Colleges and universities offer dual credit for AP or other college level courses to enable high school students in becoming familiar with college expectations along with gaining college credit. By participating in dual enrollment

programs, high school students can take college courses from a local community college or university, courses not offered at their high school. The classes can either be taken at the college or university campus or taken on a high school campus taught by a college level instructor who has a masters or doctorate in the course subject.

**Extra - curricular activities** – Activities that are either sanctioned by the Nebraska State Activities Association (NSAA) as competitive opportunities or school-sponsored non-NSAA activities in which students may choose to participate. These activities can be co-curricular and are an extension of academic and/or elective area courses. Examples of co-curricular include: debate, marching band, speech, drama, and DECA. Examples of school sponsored extra-curricular NSAA include athletics and clubs. Students learn skills and compete with other teams, often outside the regular school day. Students' participation in such extra-curricular activities will be included as a dependent measure of engagement for the purposes of this study.

**Excellence and Equity** – Students have equal access and an opportunity to participate in all school programs. The concept applies to the idea involving the open enrollment of AP classes for all students.

**Grade Point Average (GPA)** – Within the High School. in the study, a student's grade point average (GPA) is calculated by dividing the total grade points achieved (standard and weighted) by the total course credits taken. Weighted grade points apply to advanced placement courses.

**Open Enrollment** – All students have the opportunity to enroll in an AP class. Students with aspirations of going to a four year college or university are encouraged to

enroll in one AP course before they graduate. Students enroll in AP classes based on their interest in a given subject.

**Socioeconomic Status** – An individual’s family income level qualifying them for a federal program for free and reduced priced lunches.

### **Contribution to Research**

A large body of research supports the importance of a rigorous high school curriculum, and consequently students are better prepared and achieve a greater outcome in college. A growing body of literature from the College Board and the Educational Testing Service supports that AP students, when compared with non-AP students have better academic records in high school and in college. The results of this study have the potential to further inform theoretical literature on the effectiveness and value of an AP culture and dual enrollment programs. The results of this study have the potential to further inform stakeholders about early college success by the number of AP courses and exams a student takes in high school.

### **Contribution to Practice**

With the recent trend in AP program operation, the results of this study can assist researchers, practitioners, and other stakeholders in furthering the establishment and quality of an AP culture. At the school site, the literature review contained herein and results of this study have the potential to inform all stakeholders of the benefits as fiscal and human resources are considered. The benefits from the AP program will provide relative performances in early college outcomes and with consistency, meet the most critical standard in increasing the overall graduation rate.

**Contribution to Policy**

This study allows policymakers at the local level to better understand whether the AP program warrants continued staffing and funding. With policy initiatives resulting in a rapidly growing pool of college students with AP experience, this study examined the impact made by students increasing the quantity of AP courses in their schedule/transcript.

**Organization of the Study**

Chapter Two explores relevant literature addressing the AP program, policy implementation, and the impact of the AP program in further early college success. Chapter Three outlines the design of this study through the research design, methodology, independent and dependent variables, and procedures used to gather and analyze the study data. This includes a detailed synthesis of the participants, a comprehensive list of the dependent variables and dependent measures. Chapter Four will report the research results and findings for each research question in relation to the data obtained including data analysis, tables, and descriptive statistics. Chapter Five provides conclusions and a discussion of the research findings and implications for practitioners, administrators, policy-makers, and future researchers.

## Chapter Two

### Review of the Literature

#### Introduction

In our current American public education, attention has been given to the importance of challenging students with more rigorous coursework and improving early college outcomes. The initiative to expose students with advanced studies while in high school has found a common avenue by local school districts incorporating honors, Advanced Placement (AP) courses, and the International Baccalaureate Programme in their high school curricular program. A Department of Education study by Adelman (1999) titled *Answers in the Toolbox*, gives credit to students taking AP courses in high school and the stronger correlation it has for students in completing a bachelor's degree. Overall, the Advanced Placement program has had tremendous growth throughout the country; it has been brought to more students than any other program, and represents some of the most rigorous courses taught in high school (Sadler, 2007; Vaughn, 2010).

One may presume that a student will always benefit from a rigorous high school curriculum, and consequently be better prepared and achieve a greater outcome in college. Studies from the College Board (the owner of the AP Program) and the Educational Testing Service (ETS), the agency administering the AP exams, support that an AP student, when compared with non-AP students, fosters greater skills and had better academic records with the demanding coursework (Willingham and Morris, 1986). According to Klopfenstein, the effectiveness of the AP program at improving early college outcomes has not been rigorously tested (Thompson & Trina, 2007; Klopfenstein, 2005). A review of the literature in relation to student achievement through an AP

culture, as well as providing the preparation for college success through resources and programs like dual credit will help in addressing overall articulation and improvement in the transition from high school to college. To facilitate this literature review, the following four key areas have been identified:

1. An examination of the purpose and history of the AP program; the credit benefit given to high school students taking an AP course and exam; and the increasing number of students enrolled in AP classes through dual enrollment credits.
2. An examination into the establishment of AP programs in providing academic preparation for college, the legislative push for more high school students to take college-level curriculum, and the emphasis and purpose in taking the AP yearly exams.
3. An examination into the actual outcome of students enrolling into a four-year institution, how students are selected, continuing in subject areas, and the persistence of students to eventually graduate.
4. An examination of the need for more research given toward the Advanced Placement program and related problems.

### **The History and Purpose of the Advanced Placement Program**

The Advanced Placement (AP) Program is administered by the College Board, a non-profit organization based in New York City. It began as a partnership between elite private high schools and colleges and universities. The AP program began in 1954 under John Kemper of the Andover Academy (MA) as a pilot project for academically able students to obtain college credit while still in high school (Scott, 2010; McCauley, 2007).

Its original premise was capable students could avoid repeating similar courses they had in high school during their introductory courses in college (Santoli, 2002; Willingham, 1986). The College Board officially took over the AP program in 1955, bringing together high school teachers, university professors, and the Educational Testing Service (ETS) to develop detailed course outlines, a series of examinations offered yearly, and a national association to communicate the uniform standards of the program.

When AP was introduced in 1955 there were 11 courses. In 2010 the College Board offered more than 30 courses across multiple subject areas ranging from Studio Art to Chinese Language and Culture. The courses are updated by the AP Development Committee every four to six years, based on surveys sent to colleges and universities (Morgan, 2000). While receiving high school credit, students have the opportunity to earn college credit, based on scores from the AP examination administered each year in May. Students are not required to take the AP course prior to taking the AP test, however the College Board asserts that the AP courses help students develop skills and study habits vital in higher education (Vaughn, 2010).

Each AP Examination (except Studio Art) is composed of a multiple-choice section and a free-response section. The free-response section is graded by high school and college teachers after the testing period. In determining a student's performance, the College Board combines the two sections to form a composite scoring range with the following values: 5-Extremely well qualified, 4-Well qualified, 3-Qualified, 2-Possibly qualified, 1- No recommendation. The AP testing scale is deemed relevant by college faculty so that the AP score of five is equivalent to an A in college, the score of four is equivalent to the average B, and the three is equivalent to the average C. Most post-

secondary institutions, including 90 % of four-year institutions in the U.S., grant credit with grades of three or higher (College Board, 2008; Curry, 2010).

Nationwide, the interest in expanding college admissions has brought a great expansion to the AP program. A large increase in funding from federal, state, and local sources helped in facilitating this growth, mostly towards low income students. The number of high schools participating in the AP program increased by 40 % between 1990 and 2000 (College Board, 2003; Klopfenstein, 2004). One report shows the growth in the program with estimating 10,000 AP exams given out in 1960 and over two million exams taken by students in 2005 (Thompson, Trina, 2007).

Many colleges and universities offer dual credit for AP or other college level courses to enable high school students in becoming familiar with college expectations along with gaining college credit. By taking dual enrollment programs, high school students can take college courses from a local community college or university, or courses not offered at their high school. The classes can either be taken at the college or university campus or taken on a high school campus taught by a college level instructor who has a masters or doctorate in the course subject. In most programs, students are required to earn a grade of “C” or above to receive the college credit to the college or university. Many reports found students in the programs to be better prepared for coursework and success in college (College Board, 2008; Bailey, 2002).

### **Research on the Establishment of AP Programs**

The AP program has many advocates at all educational levels who support the need in providing college-level coursework in high school. The emphasis of bringing AP

in high school practice has recognized that AP courses challenge high ability students and foster their skills (T. Thompson, 2007). In one longitudinal research, the most important variable when determining a student's likelihood of completing college studies was the rigor of the high school curriculum (Adelman, 2006; Burney, 2010). Because AP courses are commonly viewed as more demanding than standard high school offerings, schools even use weighted calculations with grade point averages and class rank for graduating students. The method of "weighting" AP courses has a sizable impact on college admission and financial aid (Sadler, 2007). Students are being increasingly challenged to attempt more rigorous coursework, knowing its impact in college applications and acceptance.

With many advocating the importance of rigor level and aligning high school with college admissions requirements, AP and International Baccalaureate courses are the only national subject based programs that involve a standardized curriculum and external exams. With an extensive collaboration of teachers from the college and high school, the AP program is given validity through a specialist approach in determining the actual content of the courses and examinations, and the standards represented in the 1-5 grade scale (Willingham, 1986). The College Board provides the curriculum, how much will be covered, the depth of the subject, and program effectiveness. AP courses typically mirror the college general education classes (i.e. English Composition) that students will take during their early college years. The AP program also has elective courses that may meet a prerequisite to a particular major (i.e. AP Human Geography).

After the curriculum has been established, the effectiveness of the AP curriculum falls on the high school teachers assigned to the courses. The College Board

recommends that AP teachers have an advanced degree in the AP course subject; however the selection of the instructor is determined by the local administrator (College Board, 2008). The AP program can potentially be advantageous for teaching and learning with teachers learning more rigorous content, attending required high-quality professional development AP workshops and seminars, submitting the syllabi for approval prior to being able to teach courses, measuring each student's achievement through a national exam, and using the curriculum and support materials provided through the College Board (Willingham, 1986). As students grow from their AP experience, teachers also grow as they learn excellence in teaching and learning (Vaughn, 2010).

Advanced rigor in the high school, such as AP courses have expanded in the 2000s due to political mandates, with several states (i.e. Florida, Louisiana, and Utah) offering incentives to have high schools include AP courses (Willingham, 1986; Sadler, 2007). Some states require public high schools to offer a certain number of AP courses (i.e. California and Arkansas), while other states like Florida, Louisiana, and Utah provide grants and other financial incentives for student fees, teacher training, and further staff development (Santoli, 2002). South Carolina has taken a more aggressive step in financing and legislating by requiring all public schools to offer AP courses, all AP students take the national examinations, and public state colleges in South Carolina have placement policies for AP students (Willingham, 1986). In Texas, considerable state funding with AP incentives have included: (1) AP exam fee reductions for financially needy students, (2) paying the AP exam fee for students completing an AP course in the same subject, (3) subsidies for AP teachers (4) grants for equipment to schools offering

AP courses, and (5) rewarding schools for students earning AP exam grades of 3-5 (Hargrove, 2008). Federal subsidies, appropriated through Presidents George W. Bush and Barack Obama, are earmarking more for AP classes, particularly in support of low-income students.

In addition to the establishment of AP course taking in high school, many studies support the importance of demonstrating performance with a score of 3, 4, or 5 on an AP exam (Geiser, 2004; Burney, 2010). One College Board study found that students taking an AP examination in a given subject area were more likely to take college coursework (Willingham, 1986). Because courses can be taught with differing levels of expectation, and every instructor has different skill levels, the AP exam brings a standardized measure to student performance and course/teacher effectiveness (Geiser, 2004). In a statement regarding AP literature, Dougherty, Mellor, and Jian (2006) conclude that

(1)The percent of a school's students who take and pass AP exams is the best AP-related indicator of whether the school is preparing increasing percentages of students to graduate from college and (2) the importance of AP exam results indicates the need for schools and districts to pay close attention not only to the quality of teaching in AP courses but also in improving the academic preparation of students before their enrollment in those courses (2006, pp. 14).

These findings support the importance for AP teachers to hold students to the high AP standards, measure themselves against the national standard, and to know the grading practices of the AP readers.

### **AP Implications for Successful College Selection, Transition, and Outcomes**

A major factor for the growth of the AP program is more and more American students aspire to go on to a four-year university. Many high school students believe a college education has become just as important as a high school diploma when it comes to having a future with high lifetime earnings. Students who intend to go on to universities, have to make themselves not only attractive prospects, but also meet requirements beyond the general high school graduation requirements. Using National Education Statistical data, Bailey, Hughes, and Karp (2002) found that only 33% of high school graduates in 2000 later on attained a bachelor's degree. With roughly two-thirds of high school graduates entering postsecondary schools immediately after high school, one would question the qualifications of students entering college.

The performance of students while in high school continues to rise in importance for students and their parents. Access to higher education, is impacted mostly by standardized tests (i.e. SAT and ACT), GPA, and class rank. A high school transcript with AP courses, especially if schools grant weighted calculations, strengthens the chances for college admission (Casserly, 1986; Willingham, 1986). The AP courses are designed to introduce college rigor and ease the transition to college and eventual student persistence and retention. One statistical finding gives AP scores a greater predictive weight than any other factor other than high-school grades (Geiser, 2004). According to Klopfenstein (2003), college and university admissions look favorably on AP course experience, especially to those students earning passing scores on AP exams.

With statistics indicating more students attending institutions of higher education, there is a concern of a “disconnect” and students do not have the skills to be successful and are unprepared for college courses (Bailey, 2002; McCauley, 2007). According to Kirst and Venezia (2001) factors that contribute to the disconnect are “access to college-prep courses, grade inflation, placement into remedial-level coursework in college, conflicting conceptions of student assessment, special problems endemic to senior year in high school and lack of early and high quality college counseling for all students”. Many students spend their first semester of college taking remedial classes, limiting them from all the other classes they can take and putting themselves behind in their chances of graduating from a four-year college or university (McCauley, 2007). Students with a solid background in rigorous study, years of science study, higher levels of math, and participation in honors courses indicate a level of how much a student is academically prepared for college (Klopfenstein, 2004). Honors and AP courses match the potential rigorous courses students will face in college and give greater advantage through the challenges of pace, course requirements, and tests (Kirst & Venezia, 2001).

Once in college, students who have taken AP courses experience different outcomes and performance levels. In some studies, student performance on college outcomes include (1) first and fourth-year GPAs, (2) first and fourth-year credit hours earned, and (3) four-year graduation status (Hargrove, 2008). Geiser and Santelices (2004) focused on the second year GPA as a criterion measure. Other examples of outcomes have included number of courses in the same discipline as the AP exam, rates of majors and minors are selected off the AP exam, persistence, and cumulative credit (Hargrove, 2008).

Three major studies have measured AP effectiveness across students who varied by their AP experience (course only, exam only, and both course and exam) and non-AP students. Willingham and Morris (1986) examined in an ETS report data from 1,115 students over four years at several colleges who had participated in AP. Their research found what they called the “AP Effect” by AP students more likely to migrate toward majors more typically difficult. They also found AP students more likely than non-AP students to have a double major. Compared to other classmates, AP students, even taking on more difficult majors, earned significantly higher freshmen grades and were more likely to maintain a B average and graduate with honors. Their research went even further with the implications of multiple AP grades, finding the only main difference between students with few and multiple AP grades was the likelihood of graduating earlier.

A second study comparing AP to non AP students was by Patricia Casserly (1986) in her examination of 300 AP students at nine different colleges. After examining the data of AP and non-AP students in advanced courses, Casserly concluded AP students placed out of the introductory course did better in the upper level courses than students who took the introductory course. Her research was confirmed by Dodd et al. (2002), Koch et al. (1988), Geiser & Santelices (2004), and Morgan and Ramist (1998) in similar findings with AP students receiving credit by the AP exam for an initial college course earn equivalent or higher grades than students taking the introductory course. Overall, this study would seem to justify colleges granting credit and placing AP students ahead of non-AP students without great consequence to the AP student.

A third study by Morgan & Ramist (1998) examined in an ETS report students in their first and second years at 21 different colleges. Based on their data from over 66,125 AP and non-AP students, most AP students with AP grades of four and five were significantly better than non-AP students and did extremely well in their initial coursework even after placing out of the introductory course in the same academic discipline. Even students with AP grades of three earned course grade averages higher than students who took the introductory courses. Other studies (i.e. Dodd, Fitzpatrick, De Ayala, & Jennings, 2002; Geiser & Satalices, 2004; & Morgan & Maneckshana, 2000) have also found similar results by examining students who earn AP grades of three or better generally outperform students who do not take the AP exam. This is encouraging research data to support that AP can prepare students compared to students who have already experienced at least the introductory course at the college level.

Some critical analysis to divert from the general studies in comparing AP and non-AP students has been done by Kristin Klopfenstein (2005). Her study found that placing a control study and factoring out a student's high school curriculum, family, and school characteristics, AP students were generally no more likely than non-AP students to return for a second year of college or have a higher first semester GPA. The position of the study was to focus specifically on the quality of the AP Program and not AP exam scores. The results of this study, according to Klopfenstein point to the rapid expansion of the AP Program since 1990, and less attention to the quality of the AP courses.

An additional measure of AP effectiveness is the increase interest in the area of college study as it relates to the AP courses taken in secondary school. Willingham & Morris (1986) in their study of 1,000 AP students in nine colleges found evidence that AP

students enrolled in greater numbers of courses in the areas in which they took AP coursework compared to non-AP students. Morgan & Ramist (1998), Dodd et al. (2002), and Morgan & Maneckshana (2002) found that AP student examinees were more likely to pursue additional coursework in that subject and even complete degrees in the subject discipline. All studies seemed to support the hypotheses that AP seems to encourage students to take advanced coursework after taking the subject area of the AP exam.

In present studies, research has examined whether the AP program was a significant factor in determining graduation from college in four years. The chances of one graduating from a postsecondary education look grim when reading the following statement made from the National Commission on the High School Senior Year (2003): “While 70% of today’s high school graduates go on to some form of postsecondary education, only one-half of those who enroll at a four-year institutions leave with a degree”. Adelman’s study (1999) concluded that the best chances in attaining a bachelor’s degree include a high SAT-type test score, high ranking among the senior class, GPA, and the overall academic intensity in high school. McCauley (2007) found that college readiness through AP coursework to be a significant predictor of graduation from a four year institution. Morgan & Manechshana (2000) also found in their research that AP students were more likely than non-AP students to get their bachelor’s degrees in four years and graduate with a 3.0 or higher grade point average. Willingham and Morris found that the college dropout rate for AP students over four years was significantly lower, 15% as compared to 25% of non-AP students from the same study (Santoli, 2002).

Overall, research of AP students has found they are typically placed ahead of others in college; students who meet a qualifying score of three, four, and five on their AP examination find greater college success and persist through more difficult coursework. The level of rigorous coursework in AP has fostered a smooth transition into postsecondary institutions and more students finish their degree in four years.

### **Further Analysis of AP in High School**

While there are many studies that mention advantages of the overall AP program, there has been concern raised from some of the data analysis. Klopenstein (2004) reports that research from the College Board and Educational Testing Services fails to account for the typical AP student, one who can be bright and motivated and likely to have positive outcomes in spite of the AP experience. Sadler (2007, pg. 2) also contends that the “impact of taking an AP course on these highly motivated and intelligent students cannot be assessed by simply comparing students who take AP with those who don’t”. A greater selection of controls (parent’s education, SAT score, equity, and access to AP courses) is needed to eliminate bias with studies since students attracted to these programs are already high achieving (Bailey, 2002; Klopfenstein, 2005).

Another concern is that while AP classes are widely available across the country, they are not available at every high school and every student. In one report, over 40% of high schools do not offer any AP courses (Thompson, 2007). School size can be a factor due to the cost of an additional AP course and low enrollment of students to create or maintain the class. Schools serving a large percentage of special education, Limited English Proficient (LEP), or low income students and rural schools also have limited AP

courses (Klopfenstein, 2004). Typically, students who have not been academically prepared or exposed to college prep curriculum will not perform as well or be encouraged to take AP classes even when they're offered (Klopfenstein, 2004). Therefore, many schools with low income, African American and Hispanic students often fail to enroll in AP or dual enrollment classes or take less rigorous classes, especially in science or math. Since the 1990s, the College Board has promoted equity and access programs to encourage diversity by providing training for AP teachers, AP exam fee reductions for students in financial need, and other program initiatives (Hargrove, 2008). Federal government funding has also been made specifically for socially and economically disadvantaged students (McCauley, 2007).

The quick increase in the number of high schools participating in the AP program and high emphasis from state and local governments through funding has brought some caution about maintaining the quality of the program. AP is very costly, requiring teacher training, use of college texts, class sizes can start off low requiring extra staffing of teachers who have the college level background, and students must pay for the national exam (Klopfenstein, 2004). With the pressure to offer the courses abruptly, the actual course may not change much except in name, and program quality does not meet its goals (Klopfenstein, 2005; Sadler, 2007). Furthermore, many teachers can try to cover too much material in a limited time, lacking a lot of in depth thinking about the subject material. This criticism leaves question on whether students are academically prepared or are getting a false sense of the gained knowledge (Klopfenstein, 2004). The College Board addresses course quality through the "AP Course Audit" through a set of

expectations set by college and university faculty for college-level courses (College Board, 2007).

The growing emphasis on AP in college admissions has had unintended consequences. Many students (roughly one-third) enroll in AP coursework without taking the AP exams (Geiser, 2004; Wallis, 2004). The College Entrance Examination Board (CEEB) has the position that AP courses should only be certified through an AP exam score (Sadler, 2007). The CEEB has little weight in college admissions and more consideration is given to high school grade point averages as a basis of enrollment in AP courses. The simple reason is many students take AP courses in their senior year and take the AP exams in May long after college admissions decisions are made. Because high schools grant greater credit for AP and other honors courses, concern has been made about grade inflation (Geiser, 2004). With so many students taking AP courses to improve their chances of admission, high school averages have inflated, with unrealistic GPAs. Geiser (2004) gives this example among freshmen admitted to UC Berkeley in 2003, the mean HSGPA was 4.31.

In all the changes with AP emphasis, Willingham (1986, pg.1) asks, “Does one jeopardize normal maturation by moving able students on to college at an early age? Or does one beef up the high school curriculum for those ready for advanced work?” Some educators worry that AP is moving away from its original design to only give students a taste of college, not an alternative curriculum (Wallis, 2004). With so much emphasis on AP exam scores, concern also has been raised at teaching to the test and losing the in-depth thinking or creativity which should come in a college level course. With the new AP expansion and what many fear as a “Credit Arms Race” the overall integrity comes in

question as to whether taking the course is meant for challenging students to think or giving them extra weight in their transcripts (Wallis, 2004).

### **Conclusions about the AP Practice**

Understanding the AP program as it relates to college outcomes is important as legislative and local districts place emphasis and grant resources in the expansion of the program. The AP program is an effective educational strategy and evidence weighs in favor for high school students in using it adequately for college preparation. There is considerable evidence suggesting AP students perform greater than non-AP students, and attain higher overall achievement in their persistence through demanding classes, taking more courses in a subject area, and ultimately graduating in four years. The number of students qualified to receive college course placement or credit is rapidly increasing with higher performances on the AP exam and dual enrollment course offerings. In an effort to know how to prepare more students for college, more studies will have to follow AP students in college by comparing their success with other high achieving students. Also, more studies need to be made of the needs of underrepresented students and opening access beyond the most educationally advantaged students.

## CHAPTER THREE

### Methodology

The study focused on students involved in an Advanced Placement culture at a suburban high school. The students of this study completed at least one of the school's twenty one Advanced Placement courses during their 10th grade to 12th grade school years. Most of the study subjects also completed College Board examinations in the areas of their coursework. This chapter describes the participants, procedures, independent variable descriptions, dependent measures and instrumentation, research questions, and data analysis procedures.

### Participants

The maximum accrual for this study was  $N = 61$ . Of the students who participated in advanced placement coursework and graduated in the spring of 2009,  $n = 12$  (20%) completed nine or more semesters (up to 40) of advanced placement courses and exams during their high school years 10th grade through 12th grade,  $n = 15$  (25%) completed six to eight semesters of advanced placement courses and exams during their high school years 10th grade through 12th grade, and  $n = 34$  (55%) completed one to five semesters of advanced placement courses and exams during their high school years 10th grade through 12th grade.

Of the total number of subjects ( $N = 61$ ) there are thirty ( $n = 30$ ) males and thirty-one ( $n = 31$ ) females. The gender of the study participants is congruent with the research school districts gender demographics for 10th grade through 12th grade students. The age range of the study participants was 17 years to 20 years. The age range of the study

participants is congruent with the research school districts age range demographics for 10<sup>th</sup> grade through 12<sup>th</sup> grade students. Of the total number of subjects for this study who graduated in 2009 ( $N = 61$ ) the racial and ethnic origin was 55 White students, 3 Black students, 1 Hispanic student, and 3 Asian students. The racial and ethnic origin of the study participants is congruent with the research school districts racial and ethnic demographics for 10th-grade through 12th-grade students. Twelfth-grade students who attended the research high school and completed advanced placement coursework and examinations 10th-grade through 12th-grade school years and completed all study assessments participated. Students who did not complete advanced placement coursework and examinations in the 10th-grade through 12th-grade school years were not included in this study. Students who participated in the advanced placement coursework program and completed all advanced placement examinations for completed courses were identified for participation. Additionally, students for participation in this study upon graduation from the research high school enrolled in and completed one year of university studies at the University of Nebraska at Omaha. No individual identifiers were attached to the achievement or behavior data of the 61 participating students in the three groups.

### **Description of Procedures**

**Purpose of the study.** The purpose of the study is to determine the impact of a school-wide high school advanced placement program and culture on participating students' high school achievement and engagement outcomes and first year university academic success.

**Research design.** The posttest, posttest-posttest design extended in time three-group study design is displayed in the following notation.

Group 1  $X_1 Y_1 O_1-O_2$

Group 2  $X_1 Y_2 O_1-O_2$

Group 3  $X_1 Y_3 O_1-O_2$

**Group 1 = Study subjects #1.** Naturally formed group of students ( $n = 12$ ) who graduated from high school May 2009 and completed the first year of university coursework May 2010.

**Group 2 = Study subjects #2.** Naturally formed group of students ( $n = 15$ ) who graduated from high school May 2009 and completed the first year of university coursework May 2010.

**Group 3 = Study subjects #3.** Naturally formed group of students ( $n = 34$ ) who graduated from high school May 2009 and completed the first year of university coursework May 2010.

**$X_1$  = Study constant.** All study subjects participated in and completed advanced placement dual college credit coursework in a suburban high school with a structured advanced placement program supported by the school district strategic plan and upon graduation from the research high school enrolled in and completed one year of university studies at the University of Nebraska at Omaha.

**$Y_1$  = Study independent variable, advanced placement coursework, condition #1.** Students completed nine or more (up to 40) semesters of advanced placement courses during their high school years 10th-grade through 12<sup>th</sup> grade.

**Y<sub>2</sub> = Study independent variable, advanced placement coursework, condition**

#2. Students completed six to eight semesters of advanced placement courses during their high school years 10th-grade through 12<sup>th</sup> grade.

**Y<sub>3</sub> = Study independent variable, advanced placement coursework, condition**

#3. Students completed one to five semesters of advanced placement courses during their high school years 10th-grade through 12th-grade.

**O<sub>1</sub> = Study high school completion posttest dependent measures. (1)**

Achievement as measured by advanced placement course grades from the following completed academic courses including any or all of English, math, science, social studies, and world languages. (2) achievement as measured by advanced placement test scores, (3) achievement as measured by average weighted grade point average, (4) achievement as measured by the highest college entrance ACT score, (5) engagement as measured by high school participation in (a) athletics, (b) performing arts, and (c) clubs.

**O<sub>2</sub> = Study first year university completion posttest-posttest dependent**

**measures.** (1) Achievement as measured by end of first year university completed coursework overall grade point average, (2) achievement as measured by end of first year university completed coursework credit hours earned, (3) achievement as measured by continued enrollment for a second year of university studies.

### **Research Questions and Data Analysis**

The following research question was asked about student achievement as measured by advanced placement course grades.

**Research Question #1.** Did students who completed nine or more semesters of advanced placement courses, students who completed six to eight semesters of advanced

placement courses, or students who completed one to five semesters of advanced placement courses have different or congruent end of 12<sup>th</sup> grade advanced placement course grades? These courses may include English, math, science, social studies, and world languages. The GPA for these courses only was used for analyses.

**Analysis.** Research Question #1, using the GPA for the AP English, math, science, social studies, and world languages was analyzed using a single classification analysis of variance (ANOVA) to determine the main effect congruence or difference between students who completed nine or more semesters of advanced placement courses, students who completed six to eight semesters of advanced placement courses, or students who completed one to five semesters of advanced placement courses end of 12th-grade advanced placement including any or all course grades in English, math, science, social studies, and world language. An  $F$  ratio was calculated and an alpha level of .05 was utilized to control for Type I errors. Follow-up *post hoc* was conducted if a significant  $F$  ratio was observed. Means and standard deviations are displayed in tables.

The following research question was asked about student achievement as measured by advanced placement test scores.

**Research Question #2.** Did students who complete nine or more semesters of advanced placement courses, students who completed six to eight semesters of advanced placement courses, or students who completed one to five semesters of advanced placement courses have different or congruent overall combined advanced placement test score averages? These courses may include English, math, science, social studies, and world languages. The advanced placement test score averages for these courses only were used for analyses.

**Analysis.** Research Question #2, using overall combined advanced placement test score averages in English, math, science, social studies, and world languages was analyzed using a single classification analysis of variance (ANOVA) to determine the main effect congruence or difference between students who completed nine or more semesters of advanced placement courses, students who completed six to eight semesters of advanced placement courses, or students who completed one to five semesters of advanced placement courses end of 12th-grade combined advanced placement test score averages including any or all courses in English, math, science, social studies, and world Language. An  $F$  ratio was calculated and an alpha level of .05 was utilized to control for Type I errors. Follow-up *post hoc* was conducted to determine if a significant  $F$  ratio was observed. Means and standard deviations are displayed in tables.

The following research question was asked about student achievement as measured by weighted mark points:

**Research Question #3.** Did students who completed nine or more semesters of advanced placement courses, students who completed six to eight semesters of advanced placement courses, or students who completed one to five semesters of advanced placement courses have different or congruent observed overall weighted grade point average scores at graduation?

**Analysis.** Research Question #3 were analyzed using a single classification analysis of variance (ANOVA) to determine the main effect congruence or difference between students who completed nine or more advanced placement courses, students who completed six to eight or more semesters of advanced placement courses, or students who completed one to five semesters of advanced placement courses end of 12th-grade overall

weighted grade point average scores. An  $F$  ratio was calculated and an alpha level of .05 was utilized to control for Type I errors. Follow-up *post hoc* were conducted if a significant  $F$  ratio is observed. Means and standard deviations are displayed in tables.

The following research question was asked about student achievement as measured by ACT composite scores.

**Overarching Posttest Research Question #4** Did students who completed nine or more semesters of advanced placement courses, students who completed six to eight semesters of advanced placement courses, or students who completed one to five semesters of advanced placement courses, have different or congruent college entrance ACT composite scores and how did each of these groups compare to average state and national composite averages?

**Subquestion #4 a** Did students who completed nine or more semesters of advanced placement courses, students who completed six to eight semesters of advanced placement courses, or students who completed one to five semesters of advanced placement courses have different or congruent college entrance ACT composite scores?

**Analysis.** Research Question #4 was analyzed using a single classification analysis of variance (ANOVA) to determine the main effect congruence or difference between students who completed nine or more semesters of advanced placement courses, students who completed six to eight semesters of advanced placement courses, or students who completed one to five semesters of advanced placement courses end of 12th-grade overall college entrance ACT composite scores. An  $F$  ratio was calculated and an alpha level of .05 was utilized to control for Type I errors. Follow-up *post hoc*

will be conducted if a significant  $F$  ratio is observed. Means and standard deviations were displayed in tables.

**Subquestion Posttest #4b** Did students who completed nine or more semesters, six to eight semesters of advanced placement courses, or one to five semesters of advanced placement courses, have different or congruent college entrance ACT composite scores compared to State and National Averages?

**Analysis.** One sample  $t$  tests (two-tailed), using alpha level .05 were conducted to determine the significance of the difference between the composite ACT scores of students in each of those groups and state and national composite scores.

The following research question was asked about student engagement as measured by high school participation in (a) athletics, (b) performing arts, and (c) clubs.

**Research Question #5.** Did students who completed nine or more semesters of advanced placement courses, students who completed six to eight semesters of advanced placement courses, or students who completed one to five semesters of advanced placement courses have different or congruent levels of engagement as measured by high school observed frequencies for participation in (a) athletics, (b) performing arts, and (c) clubs?

**Analysis.** The Overarching Posttest Research Question #5 utilized a chi-square test of significance to compare observed vs. expected high school participation in (a) athletics, (b) performing arts, and (c) clubs for students who completed nine or more advanced placement courses, students who completed six to eight semesters of advanced placement courses, or students who completed one to five semesters of advanced

placement courses. Because multiple statistical tests were conducted a .01 alpha level was employed to help control for Type 1 errors. Frequencies and percents are displayed in tables.

The following research questions were asked about first year university students as measured by their overall grade point average at the end of their first year of university completed coursework.

**Research Question #6.** Did university level students who completed nine or more advanced placement courses in high school, students who completed six to eight semesters of advanced placement courses in high school, or students who completed one to five semesters of advanced placement courses in high school have different or congruent overall grade point average scores following completion of their first year of university coursework?

**Analysis.** Research Question #6 was analyzed using a single classification analysis of variance (ANOVA) to determine the main effect congruence or difference between students who completed nine or more semesters of advanced placement courses in high school, students who completed six to eight semesters of advanced placement courses in high school, or students who completed one to five semesters of advanced placement courses in high school end of first year university coursework grade point average scores. An  $F$  ratio was calculated and an alpha level of .05 was utilized to control for Type I errors. Follow-up *post hoc* was conducted to determine if a significant  $F$  ratio was observed. Means and standard deviations are displayed in tables.

**Research Question #7.** Did university level students who completed nine or more semesters of advanced placement courses in high school, students who completed

six to eight semesters of advanced placement courses in high school, or students who completed one to five semesters of advanced placement courses in high school have different or congruent end of first year university credit hours earned after one year?

**Analysis.** Research Question #7 was analyzed using a single classification analysis of variance (ANOVA) to determine the main effect congruence or difference between students who completed nine or more semesters of advanced placement courses in high school, students who completed six to eight semesters of advanced placement courses in high school, or students who completed one to five semesters of advanced placement courses in high school end of first year university credit hours earned. An  $F$  ratio was calculated and an alpha level of .05 was utilized to control for Type I errors. Follow-up *post hoc* was conducted to determine if a significant  $F$  ratio was observed. Means and standard deviations are displayed in tables.

**Research Question #8.** Did university level students who completed 13 or more advanced placement courses in high school, students who completed seven to 12 advanced placement courses in high school, or students who completed one to six advanced placement courses in high school have different or congruent second year university studies sophomore status?

**Analysis.** Research Question #8 utilized a chi-square test of significance to compare observed vs. expected freshmen and sophomore second year university study status for students who completed nine or more semesters of advanced placement courses in high school, students who completed six to eight semesters of advanced placement courses in high school, or students who completed one to five semesters of advanced placement courses in high school. Because multiple statistical tests were conducted a .01

alpha level was employed to help control for Type 1 errors. Frequencies and percents are displayed in tables.

### **Data Collection Procedures**

All study achievement and engagement data were retrospective, archival, and routinely collected school information. Permission from the appropriate school research personnel was obtained. High school and university achievement data was collected for 61 students who completed nine or more semesters of advanced placement courses in high school ( $n = 12$ ), students who completed six to eight semesters of advanced placement courses in high school ( $n = 15$ ), or students who completed one to five advanced placement courses in high school ( $n = 34$ ) were obtained to include achievement and behavioral data. Non-coded numbers were used to display individual de-identified achievement and engagement data. Aggregated group data, descriptive statistics, and parametric statistical analysis were utilized and reported with means and standard deviations on tables.

## CHAPTER FOUR

### Results

#### Purpose of the Study

The chapter presents an analysis of the data collected to help understand whether or not a school-wide high school advanced placement program and culture increased students' high school achievement and engagement outcomes and first year university academic success.

The study's high school completion posttest dependent variables were (1) achievement and (2) engagement. Achievement was analyzed using the following dependent measures: (a) students' advanced placement course grades from the average of completed academic courses in any of the advanced placement courses in English, math, science, social studies, and world languages, (b) students' advanced placement test scores, (3) students' average weighted grade point average, and (4) students' highest college entrance ACT composite score. The second dependent variable, engagement, was analyzed using students' high school participation frequencies in (a) athletics, (b) performing arts, and (c) clubs. The study's first year university completion posttest-posttest dependent measures were (1) Achievement as measured by end of first year university completed coursework overall grade point average, (2) achievement as measured by end of first year university completed coursework credit hours earned, (3) achievement as measured by continued enrollment for a second year of university studies.

### **Research Question # 1**

Did students who completed nine or more semesters of advanced placement courses, students who completed six to eight semesters of advanced placement courses, or students who completed one to five semesters of advanced placement courses have different or congruent end of 12<sup>th</sup> grade advanced placement course grades? These courses may include English, math, science, social studies, and world languages. The GPA for these courses only was used for analyses.

Tables 1-4 display achievement data in response to research question 1, analyzing the dependent measure of students' advanced placement course grades from the Grade Point Average (GPA) of completed academic courses in any of the advanced placement courses in English, math, science, social studies, and world languages.

Table 1 displays students' advanced placement course weighted GPA from students who completed nine or more semesters of advanced placement courses in any advanced placement English, math, science, social studies, and world languages courses. Table 2 displays students' advanced placement weighted GPA from students who completed six to eight semesters of advanced placement courses in any advanced placement English, math, science, social studies, and world languages courses. Table 3 displays students' advanced placement weighted GPA from students who completed one to five semesters of any advanced placement courses in English, math, science, social studies, and world languages. Table 4 displays the analysis of variance (ANOVA), indicating the difference between students who completed nine or more semesters of advanced placement courses ( $Y_1$ ), six to eight semesters of advanced placement courses

( $Y_2$ ), or students who completed one to five semesters of advanced placement courses ( $Y_3$ ). As seen in Table 4 null hypothesis was rejected indicating a difference between groups,  $F(2,58) = 4.08, p = .02$ . Post hoc follow up tests indicate that the GPA for group  $Y_1$  ( $M = 4.20, SD = .48$ ) was statistically significantly higher than the GPA for group  $Y_3$  ( $M = 3.37, SD = 1.06$ ). There was no significant difference between  $Y_1$  and  $Y_2$  or between  $Y_2$  and  $Y_3$ .

### **Research Question #2**

Did students who complete nine or more semesters of advanced placement courses, students who completed six to eight semesters of advanced placement courses, or students who completed one to five semesters of advanced placement courses have different or congruent overall combined advanced placement test score averages? These courses may include English, math, science, social studies, and world languages. The advanced placement test score averages for these courses only were used for analyses.

Overall advanced placement test scores from students who completed nine or more semesters of advanced placement courses in any advanced placement English, math, science, social studies, and world languages courses are contained in Table 5. Table 6 displays students' overall advanced placement test scores from students who completed six to eight semesters of advanced placement courses in any advanced placement English, math, science, social studies, and world languages. Table 7 displays students' overall advanced placement test scores from students who completed one to five semesters of advanced placement courses in any advanced placement English, math, science, social studies, and world languages courses. As seen in Table 8, the analysis of

variance (ANOVA), determining the difference between groups  $F(2,35) = 2.48, p = .10$ , fails to reject the null hypothesis, indicating no significant difference between groups.

### **Research Question #3**

Did students who completed nine or more semesters of advanced placement courses, students who completed six to eight semesters of advanced placement courses, or students who completed one to five semesters of advanced placement courses have different or congruent observed overall weighted grade point average scores at graduation?

Tables 9-12 display achievement data in response to research question 3, analyzing the dependent measure of students' overall weighted Grade Point Average (GPA) at graduation. Table 9 displays the overall weighted GPA from students who completed nine or more semesters of advanced placement courses in any advanced placement English, math, science, social studies, and world languages courses. Table 10 displays the overall weighted GPA from students who completed six to eight semesters of advanced placement courses in any advanced placement English, math, science, social studies, and world languages courses. Table 11 displays the overall weighted GPA from students who completed one to five semesters of any advanced placement courses in English, math, science, social studies, and world languages. Table 12 displays the analysis of variance (ANOVA), indicating the difference between overall GPA for students who completed nine or more semesters of advanced placement courses ( $Y_1$ ), six to eight semesters of advanced placement courses ( $Y_2$ ), or students who completed one to five semesters of advanced placement courses ( $Y_3$ ). As seen in Table 12, the null hypothesis was rejected indicating a difference between groups,  $F(2,58) = 7.60, p = .001$ .

Post hoc follow up tests indicate that there was a statistically significant overall GPA difference between  $Y_1$  ( $M = 3.87$ ,  $SD = 0.20$ ) and  $Y_3$  ( $M = 3.32$ ,  $SD = 1.06$ ). There was no significant overall GPA difference between  $Y_1$  and  $Y_2$  or between  $Y_2$  and  $Y_3$ .

#### **Overarching Research Question #4**

Did students who completed nine or more semesters of advanced placement courses, students who completed six to eight semesters of advanced placement courses, or students who completed one to five semesters of advanced placement courses, have different or congruent college entrance ACT composite scores and how did each of these groups compare to average state and national composite averages?

#### **Research Question #4a**

Did students who completed nine or more semesters of advanced placement courses, students who completed six to eight semesters of advanced placement courses, or students who completed one to five semesters of advanced placement courses have different or congruent college entrance ACT composite scores?

Table 13-18 displays achievement data in response to question 4, analyzing the dependent measure of students' college entrance ACT composite scores. Table 13 displays students' college entrance ACT composite scores from students who completed nine or more semesters of any advanced placement English, math, science, social studies, and world languages courses. Table 14 displays students' college entrance ACT composite scores from students who completed six to eight semesters of any advanced placement English, math, science, social studies, and world languages courses. Table 15

displays students' college entrance ACT composite scores from students who completed one to five semesters of any advanced placement courses in English, math, science, social studies, and world languages. Table 16 displays the analysis of variance (ANOVA), indicating the difference between ACT composite scores for students who completed nine or more semesters of advanced placement courses ( $Y_1$ ), six to eight semesters of advanced placement courses ( $Y_2$ ), or students who completed one to five semesters of advanced placement courses ( $Y_3$ ). As seen in Table 16 the null hypothesis was rejected indicating a difference between groups  $F(2,59) = 16.86, p < .001$ . The post hoc follow up test indicate that  $Y_1$  ( $M = 28.17, SD = 3.51$ ), and  $Y_3$  ( $M = 22.77, SD = 3.67$ ) were significantly different. There was also a statistically significant difference between  $Y_2$  ( $M = 27.73, SD = 2.89$ ) and  $Y_3$  ( $M = 4.96, SD = 1.07$ ). There was not a significant difference between  $Y_1$  and  $Y_2$  on overall students' ACT composite scores.

#### **Subquestion Posttest #4b**

Did students who completed nine or more semesters, six to eight semesters of advanced placement courses, or one to five semesters of advanced placement courses, have different or congruent college entrance ACT composite scores compared to State and National Averages? One sample  $t$  tests (two-tailed), using alpha level .05 were conducted to determine the significance of the difference between the composite ACT scores of students in each of those groups and state and national composite scores.

. As seen in table 17, the composite ACT scores for students who completed nine or more semesters of advanced placement courses ( $M = 28.17, SD = 3.51$ ) were significantly higher than the composite ACT scores for the state ( $M = 22.1$ ),  $t(11) = 5.98$  (two-tailed),  $p < .001, d = 1.73$ . And as seen in Table 18, the composite ACT scores for

students who completed nine or more semesters of advanced placement courses ( $M = 28.17$ ,  $SD = 3.51$ ) were significantly higher than the composite ACT scores for the nation ( $M = 21.1$ ),  $t(11) = 6.97$  (two-tailed),  $p < .001$ ,  $d = 1.73$ .

As seen in table 17, the composite ACT scores for students who completed six to eight semesters of advanced placement courses ( $M = 27.73$ ,  $SD = 2.89$ ) were significantly higher than the composite ACT scores for the State ( $M = 22.10$ ),  $t(14) = 7.55$  (two-tailed),  $p < .001$ ,  $d = 1.95$ . And as seen in Table 18, the composite ACT scores for students who completed six to eight semesters of advanced placement courses ( $M = 27.73$ ,  $SD = 2.89$ ) were significantly higher than the composite ACT scores for the Nation ( $M = 21.10$ ),  $t(14) = 8.89$  (two-tailed),  $p < .001$ ,  $d = 2.29$ .

As seen in table 17, the composite ACT scores for students who completed one to five semesters of advanced placement courses ( $M = 22.77$ ,  $SD = 3.67$ ) were significantly higher than the composite ACT scores for the State ( $M = 22.10$ ),  $t(34) = 1.08$  (two-tailed),  $p = .29$ , *ns*. And as seen in Table 18, the composite ACT scores for students who completed one to five semesters of advanced placement courses ( $M = 22.77$ ,  $SD = 3.67$ ) were significantly higher than the composite ACT scores for the Nation ( $M = 21.10$ ),  $t(34) = 2.69$  (two-tailed),  $p = .01$ ,  $d = 0.46$ .

### **Research Question #5**

Did students who completed nine or more semesters of advanced placement courses, students who completed six to eight semesters of advanced placement courses, or students who completed one to five semesters of advanced placement courses have different or congruent levels of engagement as measured by high school observed frequencies for participation in (a) athletics, (b) performing arts, and (c) clubs?

The fifth hypothesis question displays engagement data through high school observed frequencies from students who completed any of the advanced placement courses in high school. Table 19 displays students' levels of engagement as measured by high school observed frequencies for participation from students who completed nine or more semesters of any advanced placement English, math, science, social studies, or world languages courses. Table 20 displays students' levels of engagement as measured by high school observed frequencies for participation from students who completed six to eight semesters of any advanced placement English, math, science, social studies, or world languages courses. Table 21 displays students' levels of engagement as measured by high school observed frequencies for participation from students who completed one to five semesters of any advanced placement English, math, science, social studies, and world languages. The results of a chi-square ( $X^2$ ) test, measuring the differences in frequencies of student engagement, are displayed in Table 22. As seen in Table 21, there was a statistically significant difference in student engagement ( $X^2(1) = 8.87, p = .01$ ). Students with nine or more semesters were more actively engaged in extracurricular activities.

### **Research Question #6**

Did university level students who completed nine or more advanced placement courses in high school, students who completed six to eight semesters of advanced placement courses in high school, or students who completed one to five semesters of advanced placement courses in high school have different or congruent overall grade point average scores following completion of their first year of university coursework?

The tables for 23-26 reflect the transition of students after finishing the completion of their first year of university coursework, displaying achievement data in response to question 6, analyzing the dependent measure of students' grade point averages. Table 23 displays grade point averages from students who completed nine or more semesters of any advanced placement English, math, science, social studies, and world languages courses. Table 24 displays grade point averages from students who completed six to eight semesters of any advanced placement English, math, science, social studies, and world languages courses. Table 25 displays grade point averages from students who completed one to five semesters of any advanced placement courses in English, math, science, social studies, and world languages. As seen in table 26, the overall GPA, the null hypothesis was rejected indicating a difference between groups,  $F(2,59) = 4.77, p = .012$ . Post hoc follow up tests indicate that there was a statistically significant overall GPA difference between  $Y_1 (M = 3.63, SD = 0.27)$  and  $Y_3 (M = 2.89, SD = 0.75)$  following completion of their first year of university coursework. There was no significant overall GPA difference between  $Y_1$  and  $Y_2$  or between  $Y_2$  and  $Y_3$ .

### **Research Question #7**

Did university level students who completed nine or more semesters of advanced placement courses in high school, students who completed six to eight semesters of advanced placement courses in high school, or students who completed one to five semesters of advanced placement courses in high school have different or congruent end of first year university credit hours earned after one year?

The tables for 27-30 displays achievement data in response to question 7, analyzing the dependent measure of students' total credit upon completion of their first

year of university coursework. Table 27 displays total course credit from students who completed nine or more semesters of any advanced placement English, math, science, social studies, and world languages courses. Table 28 displays total course credit from students who completed six to eight semesters of any advanced placement English, math, science, social studies, and world languages courses. Table 29 displays total course credit from students who completed one to five semesters of any advanced placement English, math, science, social studies, and world languages courses. As seen in Table 30, the null hypothesis was rejected indicating a difference between groups,  $F(2,58) = 8.37, p = .001$ . Post hoc follow up tests indicate that there was a statistically significant overall GPA difference between  $Y_1 (M = 40, SD = 15.20)$ ,  $Y_2 (M = 35.67, SD = 13.15)$  and  $Y_3 (M = 26.71, SD = 7.06)$  following completion of their first year of university coursework. There was no significant overall GPA difference between  $Y_1$  and  $Y_2$ .

### **Research Question #8**

Did university level students who completed 13 or more advanced placement courses in high school, students who completed seven to 12 advanced placement courses in high school, or students who completed one to six advanced placement courses in high school have different or congruent second year university studies sophomore status?

The tables for 27-30 display the frequency of students' class status upon completion of their first year of university coursework. Table 31 displays the analysis of posttest question eight utilizing a chi-square test of significance to compare observed vs. expected freshmen and sophomore second year university study status for students who completed nine or more semesters of advanced placement courses in high school, students who completed six to eight semesters of advanced placement courses in high

school, or students who completed one to five semesters of advanced placement courses in high school. The results of a chi-square ( $X^2$ ) test, measuring the differences in frequencies of student class status, are displayed in Table 31. As seen in Table 31, there was a statistically significant difference in class status ( $X^2 (2) = 6.75, p = .05$ ). Students with nine or more semesters had more frequencies in sophomore status after their first year of university studies. The null hypothesis of no difference or congruence was rejected, indicating a difference between groups.

*Table 1*

*Achievement Information of Students' Course Grades From Completed Advanced Placement In Any English, math, science, social studies, and world languages courses.*

Student	Number of AP Courses	AP Course GPA
Student 1	65	4.46
Student 2	60	3.25
Student 3	60	4.08
Student 4	55	4.0
Student 5	55	4.36
Student 6	55	4.0
Student 7	50	5.0
Student 8	50	5.0
Student 9	45	4.11
Student 10	45	4.22
Student 11	45	3.8
Student 12	45	4.11

Table 2

*Achievement Information of Students' Course Grades From Completed Advanced Placement In Any English, math, science, social studies, and world languages courses.*

Student	Number of AP Courses	AP Course GPA
Student 1	40	3.6
Student 2	40	4.4
Student 3	40	4.0
Student 4	40	3.9
Student 5	40	3.1
Student 6	40	3.4
Student 7	40	2.0
Student 8	40	4.6
Student 9	40	4.0
Student 10	40	4.5
Student 11	35	3.7
Student 12	35	4.6
Student 13	30	3.0
Student 14	30	3.5
Student 15	30	4.2

Table 3

*Achievement Information of Students' Course Grades From Completed Advanced Placement In Any English, math, science, social studies, and world languages courses.*

Student	Number of AP Courses	AP Course GPA
Student 1	25	3.0
Student 2	25	4.0
Student 3	25	4.2
Student 4	25	2.6
Student 5	25	2.8
Student 6	25	2.2
Student 7	25	3.6
Student 8	20	4.0
Student 9	20	3.2
Student 10	20	3.5
Student 11	20	4.3
Student 12	20	4.0
Student 13	20	4.3
Student 14	15	4.0
Student 15	15	2.7
Student 16	10	3.0
Student 17	10	3.0
Student 18	10	3.5
Student 19	10	3.0
Student 20	10	4.5
Student 21	10	4.0
Student 22	10	5.0
Student 23	10	3.0
Student 24	10	5.0
Student 25	10	2.0
Student 26	10	4.0
Student 27	10	3.0
Student 28	10	4.0
Student 29	10	3.5
Student 30	10	2.0
Student 31	10	3.5
Student 32	10	4.0
Student 33	5	0.0
Student 34	5	1.0

*Table 4*  
*Single Classification Analysis of Variance (ANOVA) Determining Differences*  
*Between AP Course GPA With Differing Levels of AP Completion*

AP GPA ANOVA:Single Factor					
Groups	Count	Sum	<i>M</i>	<i>SD</i>	
Over 9 Semesters ( $Y_1$ )	12	50	4.20	0.48	
6-8 Semesters ( $Y_2$ )	15	51	3.77	0.71	
1-5 Semesters ( $Y_3$ )	34	115	3.37	1.06	
ANOVA					
Source of Variation	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between Groups	6.56	2	3.28	4.07	.02
Within Groups	47.48	59	0.81		
Total	54.03	61			

*Table 5*

*Achievement Information of Students' Advanced Placement Test Scores In Any English, math, science, social studies, and world languages courses.*

Student	Number of AP Tests	AP Test Score Average
Student 1	7	2.57
Student 2	5	2.4
Student 3	5	1.8
Student 4	8	1.375
Student 5	6	2.83
Student 6	2	1
Student 7	7	3.14
Student 8	4	3.5
Student 9	5	2.6
Student 10	5	2.6
Student 11	1	1
Student 12	1	1

Table 6

*Achievement Information of Students' Advanced Placement Test Scores In Any English, math, science, social studies, and world languages courses.*

Student	Number of AP Tests	AP Test Score Average
Student 1	4	2
Student 2	4	3.8
Student 3	9	2.25
Student 4	5	1.67
Student 5	7	2.33
Student 6	4	2
Student 7	4	3.25
Student 8	4	3.75
Student 9	0	0
Student 10	2	2
Student 11	3	1.667
Student 12	2	2.5
Student 13	3	2.6
Student 14	0	0
Student 15	0	0

Table 7

*Achievement Information of Students' Advanced Placement Test Scores In Any English, math, science, social studies, and world languages courses.*

Student	Number of AP Tests	AP Test Score Average
Student 1	0	0
Student 2	2	1
Student 3	2	2
Student 4	0	0
Student 5	1	1
Student 6	0	0
Student 7	2	1
Student 8	0	0
Student 9	0	0
Student 10	1	3
Student 11	1	2
Student 12	1	1
Student 13	0	0
Student 14	0	0
Student 15	0	0
Student 16	0	0
Student 17	0	0
Student 18	0	0
Student 19	0	0
Student 20	1	4
Student 21	0	0
Student 22	1	3
Student 23	1	1
Student 24	0	0
Student 25	0	0
Student 26	1	2
Student 27	0	0
Student 28	1	1
Student 29	1	1
Student 30	0	0
Student 31	0	0
Student 32	1	1
Student 33	0	0
Student 34	0	0

*Table 8*  
*Single Classification Analysis of Variance (ANOVA) Determining Differences*

*Between AP Test Score Averages With Differing Levels of AP Completion*

AP Test Score ANOVA:Single Factor					
Groups	Count	Sum	<i>M</i>	<i>SD</i>	
Over 9 Semesters ( $Y_1$ )	12	25.8	2.15	.884	
6-8 Semesters ( $Y_2$ )	12	29.76	2.48	.741	
1-5 Semesters ( $Y_3$ )	14	23.94	1.71	.994	
ANOVA					
Source of Variation	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between Groups	3.89	2	1.945	2.475	.099
Within Groups	27.50	35	.786		
Total	31.39	37			

*Table 9*

*Achievement Information of Students' Overall Grade Point Average Scores at High School Graduation.*

Student	Overall GPA
Student 1	4.1
Student 2	3.43
Student 3	3.94
Student 4	3.64
Student 5	3.92
Student 6	3.87
Student 7	4.15
Student 8	4.08
Student 9	3.86
Student 10	3.82
Student 11	3.78
Student 12	3.82

*Table 10*

*Achievement Information of Students' Overall Grade Point Average Scores at High School Graduation.*

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Student	Number of AP Tests
Student 1	3.69
Student 2	3.51
Student 3	3.91
Student 4	3.62
Student 5	3.44
Student 6	3.56
Student 7	2.9
Student 8	4.01
Student 9	3.68
Student 10	3.91
Student 11	3.65
Student 12	4.03
Student 13	3.12
Student 14	2.75
Student 15	3.71

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*Table 11*

*Achievement Information of Students' Overall Grade Point Average Scores at High School Graduation.*

Student	Overall GPA
Student 1	2.74
Student 2	3.79
Student 3	3.74
Student 4	2.35
Student 5	3.16
Student 6	3.61
Student 7	3.53
Student 8	3.69
Student 9	2.63
Student 10	3.63
Student 11	3.78
Student 12	3.8
Student 13	3.51
Student 14	3.75
Student 15	2.16
Student 16	2.73
Student 17	2.8
Student 18	3.59
Student 19	3.61
Student 20	3.33
Student 21	2.91
Student 22	4.01
Student 23	3.44
Student 24	4.03
Student 25	2.45
Student 26	3.97
Student 27	3.3
Student 28	2.74
Student 29	3.31
Student 30	3.18
Student 31	3.15
Student 32	3.52
Student 33	3.39
Student 34	3.01

*Table 12*  
*Single Classification Analysis of Variance (ANOVA) Determining Differences*  
*Between Overall GPA With Differing Levels of AP Completion*

Overall GPA ANOVA:Single Factor					
Groups	Count	Sum	<i>M</i>	<i>SD</i>	
Over 9 Semesters ( $Y_1$ )	12	46.44	3.87	.200	
6-8 Semesters ( $Y_2$ )	15	53.55	3.57	.381	
1-5 Semesters ( $Y_3$ )	34	112.88	3.32	.499	
ANOVA					
Source of Variation	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between Groups	2.82	2	1.408	7.604	.001
Within Groups	10.92	59	.185		
Total	13.75	61			

*Note.* An *F* ratio was calculated and an alpha level of .05 was utilized to control for Type 1 errors.

*Table 13*

*Single Classification Analysis of Variance (ANOVA) Determining Differences Between ACT Composite Scores With Differing Levels of AP Completion.*

Student	ACT Composite Scores
Student 1	32
Student 2	26
Student 3	30
Student 4	30
Student 5	26
Student 6	21
Student 7	35
Student 8	26
Student 9	28
Student 10	27
Student 11	29
Student 12	28

*Table 14*

*Single Classification Analysis of Variance (ANOVA) Determining Differences Between ACT Composite Scores With Differing Levels of AP Completion.*

Student	ACT Composite Scores
Student 1	30
Student 2	28
Student 3	30
Student 4	30
Student 5	25
Student 6	31
Student 7	28
Student 8	30
Student 9	27
Student 10	30
Student 11	27
Student 12	30
Student 13	24
Student 14	25
Student 15	21

Table 15

*Single Classification Analysis of Variance (ANOVA) Determining Differences Between ACT Composite Scores With Differing Levels of AP Completion.*

Student	ACT Composite Scores
Student 1	26
Student 2	24
Student 3	30
Student 4	19
Student 5	22
Student 6	22
Student 7	25
Student 8	25
Student 9	19
Student 10	25
Student 11	23
Student 12	24
Student 13	30
Student 14	25
Student 15	24
Student 16	20
Student 17	19
Student 18	21
Student 19	25
Student 20	25
Student 21	18
Student 22	25
Student 23	20
Student 24	29
Student 25	17
Student 26	25
Student 27	20
Student 28	22
Student 29	22
Student 30	15
Student 31	25
Student 32	21
Student 33	19
Student 34	18

*Table 16*  
*Single Classification Analysis of Variance (ANOVA) Determining Differences*  
*Between Overall ACT Composite Scores With Differing Levels of AP Completion*

ACT Composite ANOVA:Single Factor					
Groups	Count	Sum	<i>M</i>	<i>SD</i>	
Over 9 Semesters ( $Y_1$ )	12	338.00	28.17	3.51	
6-8 Semesters ( $Y_2$ )	15	416.00	27.73	2.89	
1-5 Semesters ( $Y_3$ )	34	774.23	22.77	3.67	
ANOVA					
Source of Variation	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between Groups	406.21	2	203.106	16.860	.000
Within Groups	710.77	59	12.047		
Total	1116.98	61			

*Note.* An F ratio was calculated and an alpha level of .05 was utilized to control for Type 1 errors.

Table 17

*Differences Between Overall ACT Composite Scores With Differing Levels of AP Completion Compared to the State*

	Study School		State			
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>t</i>	<i>p</i>	<i>d</i>
Over 9 Semesters ( $Y_1$ )	28.17	3.51	22.10	5.98	<.001	1.73
6-8 Semesters ( $Y_2$ )	27.73	2.89	22.10	7.55	<.001	1.95
1-5 Semesters ( $Y_3$ )	22.77	3.67	22.10	1.08	.29	ns
At Least One AP	25.02	4.28	22.10	7.21	<.001	0.68

Table 18

*Differences Between Overall ACT Composite Scores With Differing Levels of AP Completion Compared to the Nation*

	Study School		Nation			
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>t</i>	<i>p</i>	<i>d</i>
Over 9 Semesters ( $Y_1$ )	28.17	3.51	21.10	6.978	<.001	1.73
6-8 Semesters ( $Y_2$ )	27.73	2.89	21.10	8.89	<.001	2.29
1-5 Semesters ( $Y_3$ )	22.77	3.67	21.10	2.69	.01	0.46
At Least One AP	25.02	4.28	21.10	7.21	<.001	0.92

Table 19

*Frequency Of Engagement for participation in (a) athletics, (b) performing arts, and (c) clubs With Differing Levels of AP Completion*

Student	Engagement Frequency
Student 1	2
Student 2	1
Student 3	3
Student 4	0
Student 5	3
Student 6	3
Student 7	8
Student 8	4
Student 9	3
Student 10	3
Student 11	4
Student 12	0

Table 20

*Frequency Of Engagement for participation in (a) athletics, (b) performing arts, and (c) clubs With Differing Levels of AP Completion*

Student	Engagement Frequency
Student 1	1
Student 2	0
Student 3	3
Student 4	0
Student 5	3
Student 6	0
Student 7	3
Student 8	3
Student 9	2
Student 10	0
Student 11	2
Student 12	0
Student 13	0
Student 14	0
Student 15	1

Table 21

*Frequency Of Engagement for participation in (a) athletics, (b) performing arts, and (c) clubs With Differing Levels of AP Completion*

Student	Engagement Frequency
Student 1	0
Student 2	3
Student 3	1
Student 4	1
Student 5	0
Student 6	0
Student 7	0
Student 8	4
Student 9	0
Student 10	0
Student 11	0
Student 12	1
Student 13	0
Student 14	0
Student 15	0
Student 16	0
Student 17	8
Student 18	0
Student 19	0
Student 20	2
Student 21	1
Student 22	0
Student 23	0
Student 24	0
Student 25	0
Student 26	0
Student 27	7
Student 28	0
Student 29	2
Student 30	4
Student 31	0
Student 32	3
Student 33	0
Student 34	0

Table 22

*Frequency Of Engagement for participation in (a) athletics, (b) performing arts, and (c) clubs With Differing Levels of AP Completion*

Frequency	Over 9 Semesters (Y <sub>1</sub> ) N (%)	6-8 Semesters (Y <sub>2</sub> ) N (%)	1-5 Semesters (Y <sub>3</sub> ) N (%)	X <sup>2</sup>
Less than 3	4 (30%)	11 (73%)	28 (82%)	
More than 3	8 (67%)	4 (27%)	6 (18%)	
Total	12 (100%)	15 (100%)	34 (100%)	8.87 <sup>a</sup>

*Note: (a) X<sup>2</sup> is statistically significant for Observed versus Expected cell frequencies with a df=1 and tabled value = 6.63 for alpha level of .01.*

Table 23

*Single Classification Analysis of Variance (ANOVA) Determining Differences of GPA  
After First Year of University Coursework With Differing Levels of AP Completion*

Student	University GPA
Student 1	3.840
Student 2	3.322
Student 3	3.119
Student 4	3.420
Student 5	3.545
Student 6	3.788
Student 7	3.965
Student 8	3.990
Student 9	3.675
Student 10	3.692
Student 11	3.790
Student 12	3.419

Table 24

*Single Classification Analysis of Variance (ANOVA) Determining Differences of GPA  
After First Year of University Coursework With Differing Levels of AP Completion*

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Student	University GPA
Student 1	3.154
Student 2	3.793
Student 3	3.440
Student 4	2.246
Student 5	3.060
Student 6	2.999
Student 7	1.181
Student 8	3.915
Student 9	3.364
Student 10	3.635
Student 11	2.795
Student 12	4.000
Student 13	1.500
Student 14	2.458
Student 15	3.812

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Table 25

*Single Classification Analysis of Variance (ANOVA) Determining Differences of GPA  
After First Year of University Coursework With Differing Levels of AP Completion*

Student	University GPA
Student 1	3.427
Student 2	2.801
Student 3	3.076
Student 4	3.142
Student 5	3.200
Student 6	3.178
Student 7	2.428
Student 8	3.402
Student 9	3.292
Student 10	3.434
Student 11	3.699
Student 12	1.593
Student 13	3.265
Student 14	4.000
Student 15	2.477
Student 16	2.000
Student 17	2.036
Student 18	3.405
Student 19	3.166
Student 20	2.464
Student 21	2.852
Student 22	3.904
Student 23	2.781
Student 24	4.000
Student 25	2.801
Student 26	3.666
Student 27	1.417
Student 28	2.737
Student 29	2.556
Student 30	2.839
Student 31	3.358
Student 32	2.425
Student 33	2.625
Student 34	0.653

Table 26  
*Single Classification Analysis of Variance (ANOVA) Determining Differences  
 Between Overall University GPA With Differing Levels of AP Completion*

University GPA ANOVA:Single Factor					
Groups	Count	Sum	<i>M</i>	<i>SD</i>	
Over 9 Semesters ( $Y_1$ )	12	43.56	3.63	.27	
6-8 Semesters ( $Y_2$ )	15	45.35	3.02	.86	
1-5 Semesters ( $Y_3$ )	34	95.30	2.89	.75	
ANOVA					
Source of Variation	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between Groups	4.90	2	2.45	4.77	.012
Within Groups	29.25	58	.51		
Total	34.15	60			

*Note.* An F ratio was calculated and an alpha level of .05 was utilized to control for Type 1 errors.

Table 27

*Single Classification Analysis of Variance (ANOVA) Determining Differences of Course Credit and Class Status After First Year of University With Differing Levels of AP Completion*

Student	University Credit	Class Status
Student 1	44	Soph
Student 2	31	Soph
Student 3	61	Soph
Student 4	69	Soph
Student 5	44	Soph
Student 6	33	Soph
Student 7	48	Soph
Student 8	36	Soph
Student 9	40	Soph
Student 10	39	Soph
Student 11	19	Frosh
Student 12	16	Frosh

Table 28

*Single Classification Analysis of Variance (ANOVA) Determining Differences of Course Credit and Class Status After First Year of University With Differing Levels of AP Completion*

Student	University Course Credit	Class Status
Student 1	63	Soph
Student 2	50	Soph
Student 3	31	Soph
Student 4	50	Soph
Student 5	27	Frosh
Student 6	38	Soph
Student 7	22	Frosh
Student 8	47	Soph
Student 9	33	Soph
Student 10	43	Soph
Student 11	39	Soph
Student 12	24	Frosh
Student 13	14	Frosh
Student 14	24	Frosh
Student 15	30	Soph

Table 29

*Single Classification Analysis of Variance (ANOVA) Determining Differences of Course Credit and Class Status After First Year of University With Differing Levels of AP Completion*

Student	University Credit	Class Status
Student 1	24	Frosh
Student 2	37	Soph
Student 3	26	Frosh
Student 4	21	Frosh
Student 5	30	Soph
Student 6	28	Frosh
Student 7	21	Frosh
Student 8	24	Frosh
Student 9	24	Frosh
Student 10	30	Soph
Student 11	30	Soph
Student 12	32	Soph
Student 13	39	Soph
Student 14	27	Frosh
Student 15	21	Frosh
Student 16	22	Frosh
Student 17	27	Frosh
Student 18	32	Soph
Student 19	24	Frosh
Student 20	28	Frosh
Student 21	25	Frosh
Student 22	42	Soph
Student 23	32	Soph
Student 24	33	Soph
Student 25	13	Frosh
Student 26	27	Frosh
Student 27	12	Frosh
Student 28	37	Soph
Student 29	27	Frosh
Student 30	27	Frosh
Student 31	13	Frosh
Student 32	32	Soph
Student 33	16	Frosh
Student 34	25	Frosh

Table 30  
*Single Classification Analysis of Variance (ANOVA) Determining Differences  
 Between Course Credit After First Year of University With Differing Levels of AP  
 Completion*

University Credit ANOVA:Single Factor					
Groups	Count	Sum	<i>M</i>	<i>SD</i>	
Over 9 Semesters ( $Y_1$ )	12	480	40	15.20	
6-8 Semesters ( $Y_2$ )	15	535	35.67	13.15	
1-5 Semesters ( $Y_3$ )	34	908	26.71	7.06	
ANOVA					
Source of Variation	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between Groups	1908.82	2	954.41	8.374	.001
Within Groups	6610.39	58	113.97		
Total	8519.21	60			

*Note.* An F ratio was calculated and an alpha level of .05 was utilized to control for Type 1 errors.

Table 31

*Frequency Of Freshmen/Sophomores Status After First Year of University With Differing Levels of AP Completion*

Status	Over 9	6-8 Semesters	1-5 Semesters	$X^2$
	Semesters (Y <sub>1</sub> ) N (%)	(Y <sub>2</sub> ) N (%)	(Y <sub>3</sub> ) N (%)	
Freshmen	2 (17%)	6 (40%)	22 (65%)	
Sophomore	10 (83%)	9 (60%)	12 (35%)	
Total	12 (100%)	15 (100%)	34 (100%)	6.75 <sup>a</sup>

*Note:* See Tables 25-27 for students' class status.

(a)  $X^2$  is statistically significant for Observed versus Expected cell frequencies with a  $df=2$  and tabled value = 5.99 for alpha level of .05.

## **CHAPTER 5**

### **Conclusions and Discussion**

The purpose of this study was to determine the effects of an AP culture in high school and on early college success through the freshmen year. The study school continues its AP culture to help students adjust to the academic challenges they will face as they take college level courses and later transition to full time college status. The AP culture in this study consists of its own individualized school program (AP staff development, student academic skill development, parent and family support and informational meetings, promotional programs, weighted grades, and financial assistance) providing students with support and guiding them through courses.

This study measured the effects of the AP culture through the dependent variables of: (1) advanced placement course grades from the following completed academic courses in (a) English, (b) math, (c) science, (d) social studies, and (e) world language. (2) Achievement as measured by advanced placement test scores. (3) Achievement as measured by average weighted Grade Point Averages. (4) Achievement as measured by the highest college entrance ACT scores. (5) engagement as measured by high school participation in (a) athletics, (b) performing arts, and (c) clubs. The study also used a posttest-posttest dependent measure of first year university completion by (1) achievement as measured by end of first year university completed coursework overall grade point averages, (2) achievement as measured by end of first year university completed coursework credit hours earned, (3) achievement as measured by continued enrollment for a second year of university studies.

The following conclusions may be drawn from the study for each of the eight research questions.

### **Research Question #1 Conclusion**

Overall, the posttest-posttest results indicated the dependent measure of AP course grades from the Grade Point Average (GPA) were statistically significantly different. Students who completed more semesters of AP courses had significantly higher end of 12th grade AP GPA than students who completed less semesters of AP courses. This study of comparing student averages by level of AP course completion puts their performance in perspective. Students with nine or more semesters of AP had a mean average of 4.20 as compared to the students with one to five semesters of AP who had a mean average of 3.37. There was not a significant difference between students with nine or semesters and students with six to eight semesters of AP course completion.

The significant positive difference in advanced placement course GPA suggests that students benefit from a higher AP course completion. It may be speculated that students who completed more courses had a greater aptitude to take on a greater number of courses and achieve a greater GPA. It is also important to suggest that the weighted points applied to AP courses would benefit a student completing more AP courses. The data suggests that providing an AP culture that supports students taking on nine or more semesters is warranted and ultimately benefitted student performance

### **Research Question #2 Conclusion**

Overall, posttest-posttest results indicated the dependent measure of AP test scores had congruent overall combined AP test scores so we do not reject the null hypothesis based on the AP test score results. Comparing the three groups did not support that students who completed more semesters of AP courses had different AP test scores. The mean average was higher for students with nine or more semesters of AP ( $M = 2.15$ ) and students with six to eight semesters of AP ( $M = 2.48$ ) than students with one to five semesters of AP ( $M = 1.71$ ) reflecting some benefit to students.

A closer look at the data reveals a lesser percentage ( $14/34 = 41\%$ ) for students with one to five semesters of AP courses took an AP exam over the other two groups,  $11/12 = 92\%$ , for students with nine or more semesters of AP courses and  $12/15 = 80\%$  for students with six to eight semesters of AP courses. With so few tests in the measurement, the results may be skewed when comparing differences. One conclusion that can be drawn is that more tests are needed across all three groups before more differences are analyzed.

### **Research Question #3 Conclusion**

Overall, the posttest-posttest comparison of students who completed nine or more semesters of AP courses, students who completed six to eight semesters of AP courses and students who completed one to five semesters rejected the null, finding a statistical difference with the overall weighted grade point average (GPA) scores at graduation as a dependent measure. Students who completed more semesters of AP courses had a significantly higher weighted GPA at graduation over students who completed fewer

semesters of AP courses. This study of comparing student averages by level of AP course completion puts their performance in perspective. Students with nine or more semesters of AP had a mean average composite weighted GPA of 28.17 and students with six to eight semesters of AP had a mean average weighted GPA of 27.73. These two groups combined had significantly higher scores than students with one to five semesters of AP who had a mean weighted GPA average ACT score of 22.77.

#### **Research Question #4 Conclusion**

Overall, the posttest-posttest comparison of students who completed nine or more semesters of AP courses, students who completed six to eight semesters of AP courses and students who completed one to five semesters found a statistical difference with the dependent measure of college entrance ACT composite scores. The data would support rejecting the null hypothesis and students who completed more semesters of AP courses had significantly higher ACT composite scores over students who completed fewer semesters of AP courses. The difference in ACT averages puts their performance in perspective as students with nine or more semesters of AP had a mean average of 3.87 as compared to the students with one to five semesters of AP who had a mean average of 3.32. There was not a significant difference between students with nine or semesters and students with six to eight semesters of AP course completion

The ACT, formerly known as American College Testing, assesses college readiness, along with education and career planning. Many post-secondary institutions use this test as an application requirement and a main predictor of college preparedness. The data would support that students with more AP courses had significantly higher

scores on the ACT as more AP classes were completed, thus students were predictably more prepared for college.

Did ACT scores from AP students of the study school class of 2009 significantly differ from other schools in the state and nation? A data analysis was conducted on the ACT scores of the study school's AP students' vs. the computed ACT average of national and state of Nebraska class of 2009 graduates to examine the above question. The average composite ACT score for students who completed at least one semester of AP was 25.02, significantly higher than the composite ACT scores for the State with a mean of 22.10 and the Nation with a mean of 21.10. The data would suggest that providing an AP culture that supports students taking at least one or more semesters of AP is warranted and on average, students with at least one AP course scored higher than other students in the state and nation on the ACT.

#### **Research Question #5 Conclusion**

Overall, the posttest-posttest engagement data comparison of students who completed nine or more semesters of AP courses, students who completed six to eight semesters of AP courses and students who completed one to five semesters rejected the null, indicating a difference between groups. Students who completed more semesters of AP courses had statistically greater levels of engagement than students who completed fewer semesters of AP courses. This study of comparing student engagement levels by level of AP course completion puts engagement in perspective. The data suggests that an AP culture will support students with a higher engagement and participation in athletics, performing arts, and clubs.

**Research Question #6 Conclusion**

Overall, the posttest-posttest comparison of students who completed nine or more semesters of AP courses, students who completed six to eight semesters of AP courses and students who completed one to five semesters rejected the null, finding a statistical difference with the overall grade point average (GPA) scores following completion of their first year of university coursework as a dependent measure. Students who completed more semesters of AP courses had a significantly higher GPA after their first year of university coursework over students who completed fewer semesters of AP courses in high school. Through comparison of students by the level of AP course completion and GPA after the first year of university studies puts their performance in perspective. Students with nine or more semesters of AP had a mean average university GPA of 3.63 was significantly higher than students with one to five semesters of AP who had a mean average university GPA of 2.89. There was not a significant difference between students with nine or semesters and students with six to eight semesters of AP course completion.

The significant positive difference in advanced placement university overall GPA suggests that students had greater success after one year of university studies as a result of higher AP course completion. It may be speculated that students who completed more AP courses had a greater aptitude or intelligence to meet the demands of college level coursework. The data suggests that providing an AP culture that supports students completing greater numbers of AP semesters is warranted and ultimately benefitted in their future performance at the university level.

**Research Question #7 Conclusion**

Overall, the posttest-posttest comparison of students who completed nine or more semesters of AP courses, students who completed six to eight semesters of AP courses and students who completed one to five semesters rejected the null, finding a statistical difference with the total credit earned upon completion of their first year of university coursework as a dependent measure. Students who completed more semesters of AP courses had significantly higher number of credit hours after their first year of university coursework over students who completed fewer semesters of AP courses in high school. Students with nine or more semesters of AP had a coursework completion average of 40, significantly higher than students with six to eight semesters of AP who had a coursework completion average of 35.67 and one to five semesters of AP who had coursework completion average of 26.71.

The positive difference in advanced placement university credit completion is significant suggesting that students had greater success after one year of university studies as a result of completing a greater number of dual credit courses while in high school. Of great benefit to students in this study is dual credit, offered by the university and allowing students to gain many college credit hours before they graduate from high school. This university in particular uses dual credit to enable students in becoming familiar with college expectations while being taught by a college level instructor who has a masters or doctorate in the course subject. The data suggests that an AP culture, in partnership with the local university in providing dual credit, is warranted and ultimately benefitted in their future performance at the university level.

### **Research Question #8 Conclusion**

Overall, the posttest-posttest engagement data comparison of students who completed nine or more semesters of AP courses, students who completed six to eight semesters of AP courses and students who completed one to five semesters rejected the null, indicating a difference between groups. Students who completed more semesters of AP courses had statistically greater frequency of reaching sophomore level status than students who completed fewer semesters of AP courses. The data suggests that an AP culture will support students attending higher education, giving them early access in receiving college credit and putting themselves in a greater position in graduating on pace in a four year college or university.

### **Discussion**

Overall, results from this study provide strong support for a school-wide College Board Advanced Placement Culture for students and their level of high school achievement and engagement and subsequent achievement through their first year of university studies. Students experiencing the AP Culture increased their likelihood of success in high school and in college based on many outcome measures. As our nation's schools need to increase academic achievement and prepare students and eventual graduation, appropriate support should be given for students to pursue the many AP options (Burney, 2010; McCauley, 2004; Morgan and Maneckshana, 2000). While students' performance based on this study's evidence can be biased due to the fact that students attracted to AP are already high achieving and motivated, it can be surmised that an AP culture, providing access and encouragement to college-bound students to enroll and complete more courses, attributed to even greater success.

### **Implications for Practice of an AP Culture**

The definition of an AP culture is mostly defined by local schools and districts. Its unilateral purpose is to help students adjust to the academic challenges they will face as they take college level courses and later transition to full time status. Among the goals for establishing and growing an AP culture include 1) increasing student enrollment in AP courses, (2) increasing the number of students taking the AP test, and (3) increase the scores on the AP test. Obviously, one best practice is for high school counselors or advisors to encourage students to pursue AP courses. Other best practices in establishing an AP culture include providing (1) ongoing staff development and course training, either internally or through the many offerings conducted by the College Board, (2) the establishment of a pre-AP program through an honors program or other AP introductory courses, (3) a standardized test (typically the PSAT) that measures student readiness for college level coursework, (4) incentives for students through “weighted” GPAs or bonus grades so students challenge themselves and preserve their GPA, and (5) informational and promotional programs for students and parents.

This study underscores the notion that students with more AP experience (through coursework, tests, and credits) will determine greater success in high school achievement and engagement, and later a successful transition to full time college status. Educators must explore ways to increase participation in courses and exams, knowing from research that the greater the AP experience and score on the AP exam, the greater the achievement in high school and college (Casserly, 1986; Dodd, 2002; Geiser (2004); Morgan and Maneckshana, 2000; and Willingham and Morris, 1986). In addition to increasing participation, educators need to explore best practices that support students while in the

program, including best instructional methods, study materials, study sessions, tutoring, access to technology with study aids, parental support, and motivational incentives.

### **Implications for Policy**

Based on the research and rapid growth of AP programs in high schools, more research needs to be done on high school policies and initiatives that serve to spurt the growth in establishing an AP culture. This research should be able to back up the belief and possible future policy that every college bound student will experience college level expectations and rigor by taking at least one AP course. A large body of research supports the importance of a rigorous high school curriculum, and consequently students benefit from the advanced studies. In many schools and districts, legislation and policies have supported AP growth with heavy funding, staffing, and training. With these many stakeholders, more research is needed on the fidelity of AP courses and programs and whether AP programs offer access to a diversity of students (Geiser and Santelics, 2004; Klopfenstein, 2004). Other research should evaluate other college outcomes by the AP experience and the rigor of taking more AP courses, including student success in specific college courses or program of study, including college courses within the discipline of their AP coursework.

### **Implications for Research**

This study should serve as a baseline for the study school and its AP Culture. With the further collection of data (AP course GPA, AP test scores, overall GPA, engagement, university GPA, university course credit, and university class status after the first year), for each graduating class and over time, this study can determine the effect of AP participation and program performance. In an effort to know how to prepare more

students for college, more studies will have to follow AP students in college by comparing their success with other high achieving students. Also, more studies need to be made of the needs of underrepresented students and opening access beyond the most educationally advantaged students.

### **Implications for AP Teachers**

The Advanced Placement curriculum and culture are only programs; it is the AP teacher that is often overlooked in making the true difference. AP teachers set the climate for learning and bring the depth needed to help students achieve. The quality of the course depends on the teacher's level of knowledge and use of best instructional practice. As the program expands, greater investment will need to be given to teacher training. The College Board addresses this quality through AP course audits and by offering ongoing training. The research from this study will serve as a way to encourage teachers in the difference their teaching makes to overall student achievement and their college future.

### **Implication for Dual Enrollment Component of AP Culture**

This research study gives greater fidelity to not only AP courses and an AP Culture, but to dual enrollment as well. The dual enrollment program, like other similar programs across the country, have enabled high school students to become exposed to college level expectations and gain college credit. The dual enrollment program offered in this study has rapidly grown over the past decade as the university and participating schools recognize realize the great opportunity given to students. Students benefit by being "college ready" and getting a true picture of college, supported by their teacher holding a Masters or Doctorate degree in the subject (McCauley, 2007).

Further research would benefit the dual enrollment program offered to the high school and university used in this study. In many studies across the nation, graduation rates at four-year institutions are low and students are not successfully completing their coursework (Adelman, 2006, Kirst & Venezia, 2001; Willingham & Morris, 1986). As college admission standards indicate through required scores on entrance exams and GPA, students are required to be academically successful prior to admission. As students are admitted to college, it would benefit the dual enrollment program with further research on how students with more completed semesters in AP were prepared for the intensive curriculum, conducting research, college level writing, and taking exams. Even though socio-economic status was not used in this study, it would benefit the dual enrollment program to know how the cost savings or financial assistance increased the enrollment of students with an economical disadvantage. Overall, the university outcomes from this study indicate that the dual enrollment credit program brought an incentive to many AP students, giving them a step ahead of others as measured by their freshmen GPA and course credit status. Students who took advantage of the dual enrollment program and found success in their AP classes should be encouraged that it is the strongest predictor of later college success.

### **Summary**

Understanding the AP Culture as it relates to college outcomes is important as legislative and local districts place emphasis and grant resources in the expansion of the program. The AP program is an effective educational strategy and the evidence of this study weighs in favor for high school students in using it adequately for college preparation. There is considerable evidence suggesting AP students perform greater

overall achievement in their persistence through demanding classes. The goal of every AP culture is to ultimately bring students to take more challenging courses in a college subject area, and graduate college in four years or less. The number of students qualified to receive college course placement or credit is rapidly increasing with higher performances on the AP exam and dual enrollment course offerings.

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**Appendix A**

School District Letter Authorizing Research

Letter is on file and available upon request.

**Appendix B**

Institutional Review Board for the Protection of Human Subjects Approval Letter  
is on file and available upon request.