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Advanced Placement and Dual Enrollment as Related to College Readiness and Retention at a Tennessee University

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Advanced Placement and Dual Enrollment as Related to College Readiness and Retention at a Tennessee University

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by

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ABSTRACT

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The purpose of this study was to determine if there was a significant relationship between students who entered a Tennessee university for the first time in the fall of 2014 who had earned either Advanced Placement (AP) or dual enrollment credit regarding their college readiness and 1-year college retention. College readiness was defined by students' American College Testing (ACT) sub scores in English, reading, and mathematics. The Tennessee Board of Regents (TBR) regulates the minimum sub score for each sub section that a student must obtain to be deemed college ready. College retention was defined by students who enrolled at the university in the fall of 2014 and reenrolled in the fall of 2015 at the same university.

The independent variables for this study were AP credits received in AP English Language and Composition, AP English Literature and Composition, AP Statistics, AP Calculus AB, AP Calculus BC, and dual enrollment credit received in any course. The dependent variables for this study were college readiness as defined by TBR and fall-to-fall retention. A series of chi-square tests of independence were performed to examine the differences in college readiness and fall-to-fall retention between students who had earned AP or dual enrollment credit and those students who had not.

The quantitative findings revealed that there is a significant relationship between students who enroll in their first college year with AP English or math credit or dual enrollment credit and first year retention rates when compared to students who do not reenroll with AP English or math credit or dual enrollment credit. There was found to be no difference in students who enrolled with AP English or math credit and students who enrolled with dual enrollment credit regarding their fall-to-fall retention rates. It was also found that AP English credit increased the likelihood that a student would be deemed college ready in both English and reading based on TBR

determinations of college readiness. Credit in an AP mathematics course also increased the likelihood that a student would be deemed college ready in math based on TBR determinations of college readiness.

DEDICATION

This work is dedicated to several members of my family without whom I know I would not be where I am today. My grandmother Bowers was a selfless, warm hearted, Godly woman. She took others' children in when they were not cared for even when she did not have the room or money to feed them. She gave me many more aunts and uncles than blood ever could. She had the strength to leave an abusive husband before it was the cultural norm and then find my grandfather who she loved dearly and then losing him while her children were still young. None of this stopped her. I believe she gave me my fight. I will never forget all the Sunday mornings with her, playing in the creek, or her sticking up for me. I hope to be half the woman she was.

My mother and father who have always believed in me and told me I could do whatever I wanted as long as I worked hard. They taught me that a hard day's work would not kill anyone, especially me. Both coming from a meager beginning worked until they had a life that most would dream of that allowed my brother and me to be blest with never wanting for anything we needed. My father taught me to never take someone else's word about someone; always develop your own opinion. He taught me to treat people with kindness and help the people who are less fortunate than me. Hard work and honesty still will get you far in this world.

My brother, you have always put me first in your life. I am blessed to have someone who looks out for me the way you do. I have felt like I had a second father growing up and a best friend my entire life. My sister-in-law who is more like a sister to me; I thank you for putting up with my brother and me for as long as you have. There is not a time I can remember that you have not been part of my life.

Jackson and Gizmo, the best two dogs anyone could ever ask for. If I was in my office, they were both by my side. No matter if it was 5 a.m. before going to work or 3 a.m. from

working through the night; they were there. When I was feeling stressed Jackson would come and put his head under my hand. He knew it was time for me to take a break. Jackson is a therapy dog and knows his role well.

Finally, to my one true love, best friend, and confidante, Josh; I feel like this is the last step in a long road of us making the life we want with one another. We waited to get married until after we had our masters so we would not have to be in school, married, and poor, but we did a horrible job because one of us has been in school all but eight months of our marriage. Thank you for being the shoulder I could cry on when everything was too much, the person who listens to me when I just need to complain, and the encourager when I feel like I have bitten off more than I should have. I love you and thank you for being my rock. We did not come this far to only come this far.

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in a position I aspired to be in, and a woman who people respected. Your encouragement to earn a degree from a quality university has stuck with me through my entire career thus far.

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CHAPTER 1

INTRODUCTION

With 66% of jobs requiring postsecondary education, a high school diploma will no longer get graduates the jobs they aspire to obtain after high school. A postsecondary degree has now taken the place that a high school diploma once held. There will be 47 million jobs created by 2018 from new industry or retirees, 63% of those jobs will require an associate's degree or higher (Klepfer & Hull, 2012; Kuh, Cruce, Shoup, Kinzie, & Gonyea, 2008). In 2003, people with bachelor's degrees earned approximately 230% more money than people who had not obtained a bachelor's degree (Rouse & Barrow, 2006).

Graduating college ready is now more important than ever. Fewer than 60% of Tennessee high school graduates enroll in a postsecondary institution the fall following their high school graduation because they do not feel prepared (Karp, 2013). College readiness is determined by American College Test (ACT) scores by the majority of postsecondary institutions. The ACT is a standardized test consisting of 215 multiple-choice questions that is limited to 2 hours and 55 minutes. The test is broken down into four sub sections that cover math, English, reading, and science. The test has a composite score ranging from 0 to 36 and each sub section is scored within the same range (ACT, 2016). Tennessee Board of Regents (TBR) schools have set a minimum ACT score for each sub section that a student must reach to be deemed college ready: writing 18, reading 19, and mathematics 19; science requires no minimum sub score (Tennessee Board of Regents (TBR), 2014). In the fall of 2014, 33% of TBR university freshmen who enrolled did not reach all three of these benchmarks (Wilson, 2016).

According to the National Center for Educational Statistics (NCES), first year college retention rates are among one of the strongest indicators for a student's probability of finishing

the postsecondary degree that they have set out to obtain (Kena et al., 2016). The average for college retention at a 4-year institution varies with their selectivity of students. For first time, enrolling freshman in the fall of 2014 at highly selective schools, the retention rate was 93%; at schools labeled as open selection, the retention rate was 56%. The national average for all schools was 73.1% (ACT, 2015b). The likelihood of obtaining a degree is decreased for students who do not reenroll for a second year at their postsecondary institution, even for those who were deemed college ready when they entered.

Advanced Placement (AP) courses have shown to positively affect students attending a 4-year college or university regarding college readiness, an increase in second year college retention, and graduation rates (Shaw, Marini, & Mattern, 2013). The College Board oversees the AP program. AP courses have been offered in high schools across the United States since 1955, giving students the opportunity to take rigorous college level courses while still in high school. In 2013, 1.1 million AP exams were administered to 607,505 students (The College Board, 2014). The exam is scored on a 5-point scale with 5 being the highest score awarded. Most postsecondary institutions grant college credit for a score of three or higher (Dodd, Fitzpartrick, De Ayala, & Jennings, 2002).

Dual enrollment courses are another way for high school students to obtain college credit for many courses including the core courses required for many college majors (Ganzert, 2014). Students take college level courses while still in high school and receive both high school and college credit (Karp, 2013). Dual enrollment students have been found to be more emotionally and behaviorally prepared for the transition from high school to college compared to non dual enrollment students (Karp, 2015). Students who take dual enrollment courses have shown to be more likely to earn their college degree, are two times more likely to reenroll for their second

year, and are 12% more likely to enroll in a postsecondary school within 7 months of their high school graduation (Adelman, 2006; O'Brien & Nelson, 2004; Struhl & Vargas, 2012). This study was designed to determine if certain AP courses positively affect college readiness and if certain AP or dual enrollment courses positively affect college retention.

Statement of the Problem

It is not known if some AP courses (AP English Language and Composition, AP English Literature and Composition, AP Statistics, AP Calculus AB, and AP Calculus BC) have a relationship regarding college readiness as defined by the TBR at the participating university. It is also not known if the above stated AP courses and dual enrollment courses have a relationship regarding fall-to-fall retention for first time enrolling freshmen from the fall of 2014 at the participating university. This study served to measure the effects the above stated AP courses have on college readiness and the effects that AP courses and dual enrollment courses have on fall-to-fall retention rates for the participating university.

Research Questions

Seven research questions were developed to guide the study.

RQ1: Is there a significant difference in the fall-to-fall retention rates between students who did not receive AP credit in a mathematics class (AP Statistics, AP Calculus AB, or AP Calculus BC) and students who did receive AP credit in a mathematics class?

RQ2: Is there a significant difference in the fall-to-fall retention rates between students who did not receive AP credit in an English class (AP English Language and Composition or AP English Literature and Composition) and students who did receive AP credit in an English class?

RQ3: Is there a significant difference in the fall-to-fall retention rates between students who did not receive a dual enrollment credit in any course and students who did enter with a dual enrollment credit?

RQ4: Is there a significant difference in the fall-to-fall retention rates between students who received dual enrollment credit and students who received AP credit in English or mathematics?

RQ5: Is there a significant difference in college readiness in English between students who did not receive AP English credit and those who did receive AP English credit?

RQ6: Is there a significant difference in college readiness in reading between students who did not receive AP English credit and those who did receive AP English credit?

RQ7: Is there a significant difference in college readiness in math between students who did not receive AP mathematics credit and those who did receive AP mathematics credit?

Significance of the Study

With 28% of students nationally and 20% of Tennessee students meeting all four college benchmarks set by ACT in 2015, action must be taken to increase this percentage (ACT, 2015a). The Tennessee Board of Regents (TBR) has set additional ACT benchmarks to determine if a student is college ready. In 2014, 33% of all TBR 4-year university incoming freshmen were assigned at least one learning support class (Wilson, 2016). Therefore, college retention is an issue facing colleges and universities today. As reported by ACT (2015b) the national first-to-second year retention rates for 4-year institutions was 73.1% for students who first enrolled in

the fall of 2013. TBR 4-year institutions had a higher rate than the national average for students who first enrolled in the fall of 2013 with a 79% retention rate (Tennessee Higher Education Commission, 2015).

Current research shows that AP courses increase college readiness and college retention. AP courses taken in high school play an important role in a student's effectiveness. According to Mo, Yang, Hu, Calaway, and Nickey (2011), AP English and AP social studies courses do not help with ACT sub scores but tend to increase overall ACT composite scores, whereas, AP math courses help increase all ACT sub scores as well as the overall composite score. Results of the study showed that AP science courses do not increase ACT sub scores or the composite score. AP courses not only help a student reach certain ACT sub score benchmarks but they also increase college retention (Scott, Tolson, & Lee, 2010).

Dual enrollment is another effective tool for increasing college readiness and retention. Fowler and Luna (2009) found that dual enrollment courses kept students engaged during their senior year and enhanced concentration on their postsecondary career. Dual enrollment courses also provide rigorous coursework that will better prepare students for their postsecondary career. Dual enrollment students are two times more likely to achieve fall-to-fall retention than students without dual enrollment (Struhl & Vargas, 2012).

Some studies have shown a positive relationship between AP and dual enrollment courses regarding college readiness and retention; further research should be completed to see if the findings are the same in Tennessee. If so, the implementation of similar AP and dual enrollment programs could be used by colleges and universities to develop partnerships with their secondary schools to ensure that AP and dual enrollment courses are taught. The National Governors

Association and The Commission on the Future of Higher Education have advocated for this type of collaboration (ACT, 2008).

Limitations and Delimitations

This study was limited by the appropriateness of the theory that AP courses increase college readiness and that AP and dual enrollment courses positively affect college retention. Other factors, in addition to AP and dual enrollment courses, may include a positive effect on college readiness and college retention if a positive effect was observed.

It was presumed that students who did not reenroll in the fall following their first year had dropped out of college. However, students may have enrolled in different postsecondary institutions rather than the university that is being studied; but, those data were not available to the researcher. It has been necessary to rely on the Office of Institutional Research Applications at the university being studied to supply valid and reliable data. It is also assumed that the methodology selected has effectively addressed the research questions. It is further assumed that the chi-square of independence tests used have been adequate and revealed significant differences in the groups.

The population of the study consisted entirely of incoming freshmen who first enrolled during the fall of 2014. It was presumed that this cohort of students properly represented all students at the university and in the region being studied.

The study was delimited in that some students entered the university with AP credits other than AP English Language and Composition, AP English Literature and Composition, AP Statistics, AP Calculus AB, or AP Calculus BC. This study was also delimited in that some students who had taken AP English Language and Composition, AP English Literature and Composition, AP Statistics, AP Calculus AB, or AP Calculus BC and scored a 1 or 2 on the AP

exam or did not take the exam. The study was also delimited in that some students had received dual enrollment credit that was not accepted by the university being studied. With these limitations and delimitations, the results cannot be generalized to other students at the university or the region.

Definitions of Terms

Key terms are defined to allow the reader to more easily understand the study. These terms are defined as used in this study.

Advanced Placement (AP): Developed by college faculty and administered by the College Board since 1955, AP classes allow high school students the opportunity to take college level courses taught by high school teachers. These courses offer high school students the opportunity to engage in rigorous course work while earning high school credit and either college credit or course exemption based on the college or universities policy (Shaw et al., 2013).

American College Testing (ACT): "The ACT is a national college admissions examination that consists of subject area tests in: English Mathematics Reading Science" (ACT, 2016, para. 1).

College Ready: The level a student must attain to enroll and succeed at a postsecondary institution without the need for remediation. College readiness can be determined by high school courses taken, high school GPA, and ACT sub scores or composite score (Conley, 2007a). For the purpose of this study the Tennessee Board of Regents minimum ACT scores for each sub section will be used when determining if a student is college ready: writing 18, reading 19, and mathematics 19 (TBR, 2014).

Dual Enrollment: When high schools have students who are enrolled in both a high school and college level course at the same time; students can earn college credit in the process. The course may be taught at the high school the student attends or on a college campus. A college professor or a high school teacher who holds the appropriate credentials teaches the course (Karp, 2013; Karp & Hughes, 2008).

Grade Point Average (GPA): A calculation expressing the average value of the final grade earned in all courses taken at an institution. The most common scale ranges from 0.0 to 4.0. Students with a final course grade of A earn a 4.0, those with a B earn 3.0, students with a grade of C earn 2.0, those with a D earn 1.0, and students with a final course grade of F earn 0.0 (Abbott, 2015). When all final course grades have been assigned a 0.0 to 4.0 value, the values are combined and the calculated average is the GPA.

Learning Support: "Academic support needed by a student to be college ready as established by the ACT college readiness benchmarks and standards" (Tennessee Board of Regents (TBR), 2014, Definitions para. 1).

Remedial Courses: Courses that "target underprepared students with the purpose of improving their abilities to handle college-level material and succeed in college" (Bettinger, Boatman, & Long, 2013, p. 94).

Retention Rate: When a student reenrolls at the same university that they were previously enrolled in, also referred to as institutional retention (Hagedorn, 2012).

Underprepared Students: Students who graduate from high school and do not possess the skills required to complete college level work at an acceptable level (Tierny & Garcia, 2008).

Overview of Study

Chapter 1 contains an introduction to the study, statement of the problem, research questions, significance of the study, definitions of terms need for the study, limitations and delimitations, and an overview of the study. Chapter 2 provides a review of literature related to the study, a review of the history of Advanced Placement (AP), factors that influence students enrolling and excelling in AP courses, factors that influence high schools offering AP courses and causes that allow the schools to excel at those courses, dual enrollment, college readiness, and college retention. Chapter 3 presents the methodology used to conduct the study, research questions and corresponding null hypotheses, the population studied, instruments used, data collection, and data analysis. Chapter 4 is a presentation of the data for each research question and information about the findings of the study. Chapter 5 concludes the study with a summary, conclusions, implications, recommendations for practice, and recommendations for further research.

CHAPTER 2

REVIEW OF RELATED LITERATURE

To better understand how Advanced Placement (AP) courses affect college readiness and how AP courses and dual enrollment courses affect college retention after the first year of college, a review of related literature was completed. This chapter address a review of the history of AP, factors that influence students enrolling and excelling in AP courses, factors that influence high schools offering AP courses, causes that allow schools offering AP courses to excel at those courses, dual enrollment, college readiness, and college retention.

A Review of the History of Advanced Placement (AP)

This section covers the founding and evolution of Advanced Placement (AP), college admission as AP affects it, accessibility of AP courses to all students, and the new age of AP. Advanced Placement courses first took root in 1955 with 11 subjects taught and 532 tests administered (Schneider, 2009; The College Board, 2001). By 2013 there were more than 35 subjects taught and 1.1 million tests administered (The College Board, 2014).

The Founders and Evolution of Advanced Placement

AP courses have become a common occurrence in many high schools across the US with 1.1 million tests administered to 607,505 students in 2013 (The College Board, 2014). Only 532 tests were administered in its first year; AP has evolved greatly from its early beginnings (Schneider, 2009). The School and College Study of Admissions with Advanced Standings (SCSAAS) was composed of two high school teachers and five college professors who were charged to create the course descriptions for each of the subjects that would be taught. “Eleven subjects were selected including English (composition, literature), science (biology, physics,

chemistry), foreign languages (French, Latin, German, Spanish), and [histories]" (Nugent & Karnes, 2002, p. 31). The Fund for the Advancement of Education provided the funds for research and implementation of the program in 18 high schools (Nugent & Karnes, 2002). With success of the program, SCSAAS called on the College Board to take over the program in 1955. After doing so The Ford Foundation for the Advancement of Education sponsored a study in 1957 across three private high schools and three universities. The study recommended that the College Board develop a set of achievement examinations to help colleges and universities in awarding credit (The College Board, 2001).

Shortly after World War II, educational institutions in the United States sought to accommodate high achieving students. AP courses were designed to accelerate these students through college faster. This would allow higher achieving students the opportunity to become the country's leaders faster than ever before (Deaton, 2014; Fowler & Luna, 2009). AP courses provided high school students with a means to earn college credit and avoid repetition of the same content from high school in college. The problem was that AP courses were only available to elite private schools in the beginning. AP courses were designed with two student characteristics in mind: ability and motivation. The courses would build human capital, which the US needed (Klopfenstein & Thomas, 2009). The College Board not only sought to accelerate students through college faster they intended to develop student's skills and study habits that would be vital in higher education (Vaughn, 2010). The College Board encouraged high schools to teach certain courses. To ensure that courses had sufficient depth the College Board offered teachers guidance in instructing the courses. The AP exam was not only created to score the students but was intended to show how students interpreted content and how they made thoughtful judgments (Hacsi, 2004).

College Admission

In the 1980s selective colleges and universities started using AP courses in determining admission. This was due to the increasing number of applicants. AP courses taken, rather than AP exam scores, were used because AP scores were not released in time for admission decisions. This became a driving force for high schools across the country to offer AP courses. Some argued that if AP courses were to be used for admission then maybe there should be a minimum AP exam score required, the school where the AP courses were taken should be considered, and there should be a reduction in the weight an AP course had on the admissions process (Geiser & Santelices, 2004).

Accessibility

With the inclusion of AP course consideration in college admission, where and who was able to take AP courses became important. In 1999, there was a lawsuit in California claiming that minority and economically disadvantaged students did not have the same access or the money to take AP courses or exams. The lawsuit did not go to trial but California established fee waivers for the exam, teacher training, and course development (Shaw et al., 2013). This trend did not stop in California as federal and state policymakers, along with the College Board, started foundations to increase the number of low income students taking AP exams (Klein, 2010). In 2006, President George W. Bush called for 70,000 new AP math and science teachers across the US and the College Board committed to at least 10 AP classes in every high school by 2010 (Cech, 2008). In conjunction with President Bush, the US Department of Education (DOE) launched a grant program to offer funding that expanded AP programs to districts and schools across the country. Most of the grant money provided by the DOE was used for teacher training and classroom supplies (DOE, 2005).

With expansion of the AP program issues arose concerning the purity of course content and offerings (Flores & Gomez, 2011). In 2008, the first AP audit was completed. It included teacher syllabus review, review of course labeling (insuring AP was not placed on classes that were not truly AP), and course content and supply review. The College Board assured teachers and administrators that the audit was intended to provide support in weak areas and not to point fingers at anyone. More than 66% of the syllabi teachers submitted passed the first review. If the syllabus did not pass the first time it was reviewed, the reviewers gave feedback on curricular requirements or lacking supplies such as proper textbooks. The teacher could then resubmit the syllabus with changes. If the syllabus did not pass the second time then a coaching conversation took place between the reviewer and teacher. The audit allowed the College Board to recognize the need for more in person professional development for AP teachers (Cech, 2008).

The New Age of Advanced Placement

The AP program has come a long way from its conception in the 1950s. In 2013 more than 1 million high school graduates had taken at least one AP exam. There were 132,555 teachers who taught at least one AP course resulting in a tremendous number (3,578) of colleges and universities that received AP exam scores (The College Board, 2014). There are 37 course exams administered in May of each year (The College Board, 2016). The exams vary with multiple-choice and free-response to works of art and all are graded on a 5-point scale with 5 being the highest score granted (Dodd et al., 2002). Students who take AP courses are not required to take the AP exam in May; if they choose to take the exam, the cost varies from $30 to $92 depending on the student's socioeconomic status. And to allow access for all students, including those who are homeschooled, the student does not have to take an AP course to take the AP exam in May (The College Board, 2016).

There is still the need for a more diversified testing region. Research shows that higher education is needed the most in areas where agriculture and manufacturing dominate the workforce (Eisen, Jasinowski, & Kleinert, 2005). Students in these areas are still the most underrepresented of the students with access to AP courses. Gagnon and Mattingly (2015) found that 97.4% of urban, 94.6% of suburban, and 79.9% of town schools offer AP courses whereas only 52.8% of rural schools have AP courses.

The majority of students can think more critically and learn far more than generally asked of them; they can learn more than even they realize is possible. The biggest issue preventing students from getting to a place where they realize success is creating a place where they feel like they can succeed. If AP was a reform, like so many that have come and gone, it would have put more challenging academic rigor in classrooms than any other in recent high school history. Even though AP is not a reform, its principles speak to the need for increased rigor in high school classrooms across the US (Powell, 1996).

Factors that Influence Students

Various factors influence students to take AP courses while in high school. They encompass the student's high school career into their college career and plans after college. Park (2014) reviewed 20 relevant articles and found several themes for why students want or enjoy AP courses. Students reported that they are more comfortable in a class with similar students; students who want to do well in school. Students prefer to not have to take classes with lower level students. AP students reported that they have the best teacher in the school and they see the teachers more as mentors. These students reported that other students and teachers defined them as being successful and well rounded. Many students reported that AP courses would expand

their possibilities after high school and they reported that AP courses would better prepare them for post-secondary schooling.

Grade Point Average (GPA) for College Admission

Grade Point Average (GPA) has become a deciding factor for many scholarships and college or university admission. Many school districts give more weight to AP courses than they do to other classes when calculating the student's GPA (Speroni, 2011). If the high school or school district does not give extra weight when calculating GPAs some selective colleges and universities recalculate the student's high school GPA or give the student an extra point on the admissions process for the AP course (Geiser & Santelices, 2004). Woodruff and Ziomek (2004) argued that GPA should not be used because of its steady increase from 1990 to 2000; they claim that the inflation of high school GPAs has rendered them useless. Even if true, many selective colleges and universities across the US use AP courses as a factor in their admissions process (Iatarola, Conger, & Long, 2011). AP courses on a high school transcript show college admission offices that the student has taken the most rigorous courses available (Park, 2014). AP students consistently outperform non AP students in college outcome measures. Many factors could cause this, including that AP students are more motivated, AP students attend higher functioning schools, and AP students are the higher performing students in the school (Keng & Dodd, 2007). Scott et al. (2010) compared AP students to similar non AP students – similar being high school ranking and Scholastic Aptitude Test (SAT) scores prior to taking the AP course – and found that AP students outperformed non AP students when it came to high school GPA, high first year college GPA, and higher SAT and American College Test (ACT) scores.

The College Experience

AP courses not only help students who take them get into the college or university they want but they also prepare them for the college experience. There is a great amount of importance placed on AP exam scores but taking an AP course (no matter the exam score) also provides a benefit to the student. AP courses increase problem solving skills, improve writing skills, and teach students how to study. AP students gain exposure to more rigorous course work, smaller classes, and better teachers. Students are exposed to college level materials in a more supportive and safe setting than if they had waited to take the equivalent course in college. It has also been shown that the AP experience may increase the probability of the student enrolling in a more selective college or university (Flores & Gomez, 2011; Klopfenstein & Thomas, 2009).

College Credit

Students now have to take more standardized tests than at any other time in the past. This fact should deter students from taking the AP exam but the AP exam is unlike other high school standardized test. AP exams provide a benefit for the student because if the student scores high enough they will receive college credit. There is no penalty for receiving a low score, whereas there is a benefit for receiving a high score (Hacsi, 2004). Students who earn college credit by taking an AP exam tend to make higher grades in succeeding courses than dual enrollment students, those students who did not take AP courses, and those who did not take an AP exam. AP students perform at the same rate as students who take the course in college (Dodd et al., 2002). Geiser and Santelices (2004) found that how students perform on the AP exam is strongly related to how they will perform in college. They found that the relationship was only true for how the student performed on the AP exam and not in the AP class. Approximately one third of the students who enroll in AP courses do not take the AP exam.

Students who face more academic rigor in high school have higher first year college GPAs, and higher first year college GPAs help students obtain and keep scholarships (Scafidi & Clark, 2012). One reason many students take AP courses is to help them obtain scholarships, obtain college credit to reduce the number of semesters they have to attend college, and inevitable reduce the cost of college (Iatarola et al., 2011). The need for scholarships has increased with the increased need for a postsecondary degree. Students now have to compete globally for jobs, which was not the case 30 years ago. With advancing technologies and a changing economy higher education is needed in most all workforces (US General Accountability Office (GAO), 2005). In 1979, people in the United States with bachelor's degrees made, on average, 75% more than people without a bachelor's degree; in 2003, people with a bachelor's degree made, on average, 230% more than people without a bachelor's degree (Rouse & Barrow, 2006). With this huge increase, postsecondary education has become even more important and two thirds of future jobs will require some sort of postsecondary education. By 2018, 47 million jobs will be created by new industries and people retiring; 33% will require at least a bachelor's degree and 30% will require an associate's or technical degree (Klepfer & Hull, 2012). AP participation and AP exams positively influence attending a 4-year college, the grade earned in the next class, enrollment in a corresponding major of the AP exam, the first year college GPA, second year college retention, and graduation rates. Students who want a job, want to complete globally, and want to attend college cheaper will find that taking AP courses will help them obtain those goals (Shaw et al., 2013).

Factors that Influence Schools

With all the state and federally mandated regulations handed down to public schools, one must wonder why a school would choose to add AP courses. The reasons must be varied and

beneficial to all involved. Many states have mandated that secondary schools offer AP courses or have offerings in their district. Parents have started putting demands on administrators and districts to offer AP courses because of their weight on college admission (Klopfenstein & Thomas, 2009). Some high schools have offered AP courses to keep higher achieving students from transferring to other public or private high schools in the area (Vaughn, 2010). Newsweek ranks high schools now by the number and type of AP courses they offer. AP programs also attract and retain better teachers (Santoli, 2002).

Teacher Requirements and Needs

AP programs cannot be put into place without the proper teachers. The expected gains will not be there without appropriate teachers. In 2013, the US had 132,555 educators teaching at least one AP course. To succeed in teaching the correct curriculum with the proper rigor there must be many factors in place: professional development, standards alignment, proper equipment, and a course audit. The College Board completes a course audit yearly and, in 2013, it consisted of 5,283 college faculty reviewing all AP teachers' syllabi (The College Board, 2014). All syllabi had to be turned in to the College Board no later than January 31st. AP exams are only administered in May regardless of when or if a student took the AP course. Syllabus checks are the primary way the College Board checks to see if the curriculum assigned to the course is actually taught. Many teachers who have students scoring either a 4 or 5 on average have had to resubmit their syllabus (Cech, 2008).

AP teachers have expressed high stress levels when they feel they do not have the proper supplies or adequate training to teach the AP course they have been assigned. It is a school administrators' responsibility to ensure that proper supplies and training are available to all AP teachers. Administrators must also provide emotional support to these teachers in their first years

teaching AP courses (McCarthy, Lambert, Crowe, & McCarthy, 2010). As tests change, the need for additional training and supplies is needed. It is the AP teacher's, counselor's, and administrator's job to communicate when changes will take place and what is needed. In 2014 the AP chemistry curriculum was changed, which caused a need for new professional development. The professional development provided by the College Board was different whereby teachers were able to engage in discussion on planning and practice tips. The presenters provided information about what students needed to know for the AP exam, goals and curriculum alignment, and subject specific strategies. The teachers were placed in cohorts and encouraged to use one another for resources (Herrington & Yezierski, 2014). For AP chemistry teachers to reach the students with the new curriculum they would have to move more toward open inquiry labs and away from lecturing. It has been found that when science teachers use modeling and collaborative learning it promotes interest in AP course and AP success (Bryan, Glynn, & Kittleson, 2011).

Student Placement

When a school decides to put an AP course in place, the administrators must determine which students should take the course, establish the requirements that must be met before students are allowed to enroll, or determine that everyone should be able to take the course. There is research defending both having requirements and not having requirements. Flores and Gomez (2011) urged not having a list of requirements or test scores for students who want to take AP courses. Schools must understand that AP is not only for the top students in the school. High schools should create the need for AP rigor in all classes so all students are prepared to take AP courses if they choose. If a student is not labeled as an AP, special education, or a response to intervention student then they are often over looked; students in the middle of academic labeling

are often left out. With the proper relationships and encouragement, these students can do well in AP courses. This is not just to increase AP course enrollment but to allow all students the opportunity to have a more rigorous academic high school experience. Teacher leaders and building level administrators are the ones who can make this change.

Iatarola et al. (2011) argued that data should be examined before making the decision about who may take an AP course. There are several tests that can be given to students to predict how well they will perform on an AP exam. AP Potential is a web based tool that allows schools to identify students who are likely to score a 3 or better on an AP exam. It is free to use and can only be accessed by school counselors, teachers, administrators, district personnel, and the state Department of Education (The College Board, 2012). Other tests such as the Preliminary Scholastic Aptitude Test (PSAT) can be administered to see if a student would qualify for AP courses. Vaughn (2010) stated that the PSAT can identify students who might otherwise be overlooked by teachers. There is also research on when a student should take an AP course. Santoli (2002) found that ninth and tenth grade students scored higher on their AP exams than eleventh and twelfth grade students in the same course. A lighter class load and a more serious attitude about their education may explain this phenomenon or the younger students may not have reached the point of being burned out from the high school experience.

Advanced Placement Course Choice

An obstacle facing high schools that plan to offer AP courses is when and what courses they should offer. If rising eighth graders have scores that are far above average then the high school should consider offering AP courses to those students (Iatarola et al., 2011). Administrators also have to consider what type of schedule their high school follows (traditional or block). AP courses are designed to be taught on a traditional bell schedule. High schools on

block scheduling will have to consider that the test is only given in May. Some schools have opted for having AP courses run yearlong by not meeting every day or by labeling the first semester class something different than an AP course. Administrators also have to ensure that AP course are being taught at the required AP course rigor and not just labeled as AP (Santoli, 2002).

Many things must be considered when choosing what AP courses should be taught. One is how the course will affect the school itself and how it will affect the students. Students in Georgia who took AP economics scored higher on the state standardized economics test than the students who took non AP economics. Economics is a state required class in Georgia so AP afforded the school higher test scores on their state mandated test (Clark et al., 2012). AP math courses have been shown to increase the chance of reaching benchmark scores in all ACT sub scores and reaching a 19 composite score (Mo et al., 2011). AP science courses have been shown to increase the chance of reaching any ACT benchmark but have shown to raise the student's college science course grades by 2.4 points on a 100-point scale (Examination of the Advanced Placement Program, 2010). Deaton (2014) found that in rural areas the statistics may not be applicable; for students in a rural setting there is no difference in AP English students versus non AP English students on the students achieving the ACT English benchmark.

Closing the Gap

Secondary school administrators are concerned about rigor in their classrooms, ACT scores, gap closure, and state testing. AP courses have been shown to help with all of the factors that secondary schools face daily. AP students have shown increased ACT and SAT scores after completing an AP course (Scott et al., 2010). Klopfenstein (2004) stated that AP courses provide minority students with exposure to a culture of rigor and support they might not find elsewhere

in their lives or at school. Exposing minority students to this type of rigor early in their high school career may help bridge the education gap among students. It has also been found that AP students score higher on their state standardized tests than do non AP students in the same subject area (Clark, Scafidi, & Swinton, 2012).

Barriers and Change

For the AP program in a high school to be successful schools must understand what they can change, what they cannot change, and what they should change. Controllable factors that can be changed include student's social opportunities, ability grouping, social grouping, and the curriculum. Factors affecting AP programs that schools cannot change include school size, poverty levels, ethnicity of the student body, and funding. The non controllable factors influence AP exam scores by 63% while the controllable factors only influence 17%. The other 20% is student capability and willingness (Burney, 2010). For an AP program to flourish there should be clear communication between middle schools and high schools. A rigorous curriculum must become part of the school system. Students, parents, teachers, and administrators at the school and district level should understand the benefits and encourage each other in the process (Flores & Gomez, 2011).

AP programs can be successful when all parties involved are willing to step outside their comfort zone to make sure that it does. One school in California did just that to maintain the state and federal guidelines and to better prepare their graduates for postsecondary schooling. Flores and Gomez (2011) examined that school and reported their findings on how the changes they made were successful. The school had district support before beginning the program and started actively recruiting upcoming eight graders into the program by having an AP teacher meet-and-greet, placing information about the program on their website, and inviting parents to visit before

the school year began. School administrators expected students to enroll in AP courses and made that known through their morning announcements. How the school chose their AP teachers also changed. In many schools across the US the teachers with the most seniority teach the AP courses, but this school changed that and chose the most motivated highly-trained teachers instead. These teachers had to be team players, understand the necessary rigor needed for AP courses, understand the vision of the school, and be willing to help the non AP teachers increase the rigor in their classrooms. This high school has shown growth on their AP exam scores and state test scores (Flores & Gomez, 2011).

Jackson (2012) analyzed the Advanced Placement Incentive Program (APIP) that Texas put into place in 1996. The program included teacher training, examination of the curriculum being taught, and test preparation sessions for the students. The students only had to pay for half of the AP exam fee and both the teacher and students were paid for scores of 3 or higher on the AP exam. The total cost of the program per school per year ranged from $100-thousand to $200-thousand; 70% of the funding came from private donors while the other 30% came from the school district. It took 2 years to fully implement the program after they began the process. If a school wanted to become an APIP school, they had to contact an AP strategist to be put on the waiting list. Then the strategist would match the school with a private donor. After the private donor was chosen the implementation took place. With the longevity of this program research has been conducted how AP students do while in college and their wages after graduation. AP students from APIP schools in Texas pass more AP exams, are more likely to remain in college, and earn higher wages after graduation (Jackson, 2012).

Dual Enrollment

Dual enrollment is when a student takes a college course while still in high school and receives both high school credit, college credit, and generates a college transcript (Karp, 2013). Dual enrollment dates back as long ago as the 1800s. Many community colleges did not show real interest until the 1930s (Kisker, 2006). The first credit base transition program, Project Advance, was created in 1972 at Syracuse University. Local high school principals, superintendents, and university staff developed Project Advance for seniors in high school who had already earned all credits needed to graduate by their junior year (Syracuse University Project Advance, 2016).

Course Quality

Dual enrollment students use the same syllabus as the college student; they are taught the same content and have the same course work as traditional college students. Courses can be offered on a college campus at normal college times with other college students in the class and they can be offered on the high school campus; either a college professor comes to the high school campus or a high school teacher who is certified as an adjunct college professor teaches the class. There are no standardized tests to earn college credit. Ordinarily a C or better grade earns college credit that can be transferred (Karp & Hughes, 2008; O'Brien & Nelson, 2004). Credits may be given after course completion or awarded after high school graduation (Waits, Setzer, & Lewis, 2005). Dual enrollment programs allow high school students the opportunity to take college course that specifically meet their needs or personal interests (Boswell, 2001). Most students take core courses that are needed no matter their choice of postsecondary institution and will transfer anywhere (Ganzert, 2014). Not only do dual enrollment courses allow students to earn college credit while in high school they also increase academic rigor throughout the school

(Chapman, 2001). Some high schools have taken dual enrollment a step farther whereby a high school student can earn a high school diploma and an associate degree at the same time. These schools are called *Early College High Schools* (Heath, 2008).

Policies

The need for dual enrollment programs in high schools will increase with the further need for a college degree to obtain jobs (Karp & Hughes, 2008). All 50 states have some type of dual enrollment program (Allen, 2010). Of those, 46 states have established dual enrollment policies while only 29 have polices regarding the academic rigor of the courses (Bahr, 2012). The cost of taking a dual enrollment course varies from state to state. In North Carolina, students pay no college tuition but are required to pay administrative fees and for the cost of books no matter the number of courses they take. In Florida, students pay nothing; fees are waived and the high school or college provides books for all dual enrollment courses. In Tennessee, the first two classes are free, the third class is discounted, the fourth class is full price, and any class after that is discounted $100 through the *Dual Enrollment Grant*. For the school year of 2010-2011, Tennessee had more than 130-thousand students receiving money for dual enrollment courses (Karp, 2013; Tennessee Student Assistance Corporation, 2016).

Academic Benefits

Dual enrollment not only allows students to gain college credit but offers many other academic benefits. Dual enrollment students are 4.3% more likely to earn a high school diploma than non dual enrollment students. It has also been found that their first year college GPA is higher than non dual enrollment students (Karp, Calcagno, Hughes, Jeong, & Bailey, 2007). O'Brien and Nelson (2004) found that dual enrollment students were more likely to earn their college degree sooner than non dual enrollment students. They also found that dual enrollment

students were more likely to enroll in a 4-year college or university rather than a community college. There was no GPA difference found between dual enrollment students and traditional college students (Andrews, 2004).

Hughes, Rodriquez, Edwards, and Belfield (2012) researched 10 school districts in California that in 2008 adopted a dual enrollment program. They found that participating students were more likely to graduate from high school, transition to a 4-year university rather than a 2-year college, less likely to need remedial courses, more likely to reenroll in the fall of their second year, and more likely to earn college credit sooner. Hughes et al. (2012) also found that the dual enrollment benefits were found to be more likely with students who attended classes at the college and were in class with traditional college students rather than having the course taught on the high school campus. Another academic benefit that dual enrollment students receive is the reduction of class duplication. Students can take a class once and receive credit for high school and college. Dual enrollment students are challenged more, which makes them better prepared for college. Dual enrollment courses enhance the high school curriculum by allowing students more course offerings (Allen, 2010; Fowler & Luna, 2009; Harris, 2003; Wilber & Chapman, 1977).

Personal and Emotional Benefits

Not only do students receive academic benefits, they also receive personal and emotional benefits, just as colleges, universities, and high schools benefit from dual enrollment programs. Karp (2015) stated that dual enrollment programs help students transition between high school to college and even to graduation. She stated that these students are more behaviorally prepared than other students. Students not only learn college level academics but they also learn how college is different from high school. They are able to see how traditional college students act in

class, their study habits, and attitudes (Karp, 2012). Students receive the support they are accustomed to from the high school experience while learning what will be required of them in college – yet another way that dual enrollment eases the transition (Pennington, 2004). Dual enrollment students have reported that after taking a dual enrollment course they aspire to go to a 4-year university and choose majors they would like to pursue that they would have otherwise not considered (Smith, 2007).

Dual enrollment courses give students a reason to stay academically focused in their senior year because without these courses there may not be a reason for them to do so. Dual enrollment courses also lower the cost of earning a postsecondary degree (Bailey, Hughes, & Karp, 2002). With a lower cost per credit, it is one way for states to help underrepresented students go to college and earn a postsecondary degree. Dual enrollment courses help colleges and universities recruit and retain students who may not have otherwise considered them. If dual enrollment continues to be promoted with students as a way to save money and see how college works, then a larger number of students will likely sign up for the courses, so schools must prepare for this possibility (Allen, 2010; Hoffman, 2005).

Relationships and Accessibility

Dual enrollment courses strengthen the relationship between secondary and postsecondary schools. Both secondary and postsecondary schools must be responsible for students progressing through K-16 education (Hoffman, 2005). Karp (2015) considers dual enrollment a structural reform because high schools, school districts, colleges, and policymakers must adapt and change. Not all students have access to dual enrollment courses, which are usually linked to a 2- or 4-year college. High schools that are located where there is no college in close proximity have a more difficult time offering dual enrollment courses to their students

(Klopfenstein & Lively, 2012). Small rural schools may not have enough college qualified teachers to support the dual enrollment need. If states can help teachers earn their master's degree this would no longer be a problem. Not only would it help with dual enrollment course offerings, it would also strengthen the entire school (Karp, 2013). Rural students may have trouble paying for books, fees, or tuition that is not free. The Bill and Melinda Gates Foundation's Early College Initiative has provided funding to help rural schools with student fees and teacher preparation (Speroni, 2011).

Concerns

There are concerns about dual enrollment courses including whether the courses being taught are the same level as a normal college class, the requirements for students to enroll in dual enrollment courses, the cost to students and colleges, and accessibility. To ensure that the standards and rigor are the same, there is a voluntary accreditation called the National Alliance for Concurrent Enrollment Programs (NACEP). The NACEP created a set of standards to insure that all classes are taught at the college level (Allen, 2010). Taylor, Borden, and Park (2015) stated that high schools should not create their own set of criteria for students enrolling in a dual enrollment course. Rather, the students should have the same requirements as any college. Hughes et al. (2012) recommended that policies be put in place for dual enrollment on top of standardizing requirements for enrollment including removal of funding needs, institutions should not lose money on dual enrollment students, students should not have to pay fees, and a mandate that students receive both high school and college credit for courses. Allen (2010) also stated that there could be a liability issue with underage high school students on a college campus.

Dual enrollment began as only for high achieving students and college preparatory high schools but has now been opened up to a vast majority of students. Dual enrollment classes increase rigor in high schools and provided a wider range of class offerings for rural schools. They also help low achieving students rise to higher standards and prevent high school dropouts. Dual enrollment helps students decided what college to attend, reduces the overall cost, and helps with the transition from high school to college (Karp & Hughes, 2008).

College Readiness

When a student is college ready it means he or she has obtained the knowledge needed to be successful at a postsecondary institution. Colleges and universities use the ACT to determine if a student is college ready. Fewer than 60% of Tennessee high school graduates enroll into a college or university the fall following their senior year because they do not feel they are ready to be successful (Karp, 2013). ACT composite and sub scores range from 0 to 36. Each sub section has a certain benchmark: writing 18, mathematics 22, reading 22, and science 23. If a student obtains the benchmark score, they have a 50% chance of earning a B and a 75% chance of earning a C in that particular college class. The national average composite score for 2015 was 21; for Tennessee it was 19.8. Nationally, 28% of students met all four benchmark scores while only 20% of the 68,737 Tennessee students in 2015 met the four benchmark scores. As for each benchmark set by the ACT, 58% of Tennessee students met the English benchmark, 30% met the math benchmark, 38% met the reading benchmark, and 29% met the science benchmark (ACT, 2015a).

Learning Support: History, Placement, and Requirements

Learning support classes were first called developmental classes and were first offered in 1976. The National Center for Development of Education received a grant from the WK Kellogg

Foundation to create a broad range of courses to help retain and complete postsecondary course preparation. These courses integrated learning strategies, critical thinking, and study skills. Between 1983 and 2000 an average 29% of all first time freshmen were required to take at least one developmental class. The number still held true in 2007 (Boylan & Bonham, 2007). Learning support classes concentrate more on developing the course content that is lacking. Students benefit from these classes and learn content specific material. Even after completion many may still not be at the same level as those students who were not required to take the developmental classes (Johnson & Kuennen, 2004).

Tennessee Board of Regents (TBR) schools have set a minimum set of benchmarks that students must obtain. If they do not achieve these benchmark scores they must take learning support classes during their first semester of college. The benchmarks are: writing 18, reading, 19, mathematics 19, and there is no benchmark for science (TBR, 2014). Dula (2015) found that 57% of students had to enroll in math learning support classes at a university in east Tennessee. Wilson (2016) reported that, in 2014, 68% of community college freshmen and 33% of TBR university freshmen had to enroll in at least one learning support class. These numbers are down from 2011 when 77% of community college freshmen and 43% of TBR university freshmen were required to take learning support classes. Students who are required to take learning support classes are often referred to as underprepared students (Wilson, 2016).

Learning support courses do count toward college credit, financial aid, or housing requirements at a 4-year institution. However, they do not count toward graduation. These courses increase the time students must attend a postsecondary school, which increases the cost of the degree. While 69% of the college students who are not required to take learning support

courses earn the degree they wanted; that number drops to between 30% and 57% if the student had to take a learning support course (Wirt et al., 2004).

Learning support classes must be completed within the student's first semester if that student is attending full time with 15 credit hours. All TBR 4-year universities have to offer college level credit for learning support classes, whereas community colleges do not have to offer credit for learning support classes or remedial courses. Learning support class requirements are determined by the student's ACT or SAT score if they are under the age of 21 and attending a 4-year university. If the student is attending a community college the Computer Adaptive Assessment and Support System or Assessment of Skills for Successful Entry and Transfer test may be substituted (TBR, 2014). The cost for learning support classes was $3.6 billion in the 2007-2008 school year. The cost was shared by the students and colleges (Bettinger et al., 2013). Belfield and Crosta (2012) found that college placement test scores were not the strongest indicator of how well students would do in college. Instead, high school GPA is a must stronger indictor.

Causes for the Need for Learning Support

Many feel that the open door policy of community colleges and some nonselective 4-year institutions gives students the wrong idea about what is required in college (Bailey et al., 2002). Many students are led to believe that nonselective 4-year institutions and community colleges do not have rigorous academic standards that they must follow. Kirst and Bracco (2004) found that 70% of high school graduates attended a postsecondary school within 2 years of graduation and, of those, 85% attended nonselective postsecondary schools. "The bulk of remediation is provided by nonselective public institutions, the point of entry for 80 percent of four-year students and virtually all two-year students" (Bettinger et al., 2013, p. 94).

Kirst and Venezia (2001) report several reasons for learning support classes. One is that high school faculty do not have the proper knowledge of what is expected from students when they enter college. Not only do the teachers not know but also the school counselors and administration does not know what is expected of students. In addition, high school teachers do not have the proper content knowledge to teach the students. Kirst and Venezia (2001) pointed out the lack of communication between public secondary and postsecondary schools. Many first year college students report that if they knew what was going to be expected of them in college they would have taken more rigorous high schools courses (Conley, Aspengren, Stout, & Veach, 2006).

Jenkins, Jaggars, and Roska (2009) looked at the Virginia Community College System (VCCS) and found that 50% of the entering students were recommend but not required to take at least one developmental course. Math being the highest class recommend at 43%. The pass rate for developmental courses was 65% for English and 48% for math. Jenkins et al. (2009) found that 50% to 60% of the students who were recommended to take the remedial class actually did. Students who were recommended and did not take the course had similar pass rates in their English I and math I courses as those students who were recommended and did take the developmental course. The pass rate for both English I and math I in VCCS was 75% (Jenkins et al., 2009).

High School Preparation

There are many things that high schools can put into practice that will help students become college ready. Research has shown that credit based programs such as dual enrollment help smooth the transition from high school to college. Credit based programs better prepare students for the more rigorous course work that will be expected of them in college. The more

rigorous courses also keep students motivated during their senior year and allow them to stay focused on their postsecondary career (Fowler & Luna, 2009). Even when the student does not score a 3 or better on the AP exam, the AP course teaches students how to think critically, interpret, and make judgments about their learning (Hacsi, 2004). Mo et al. (2011) looked at the Memphis, Tennessee, school district for the school years between 2006 and 2008 and found that AP English did not help students reach the ACT English benchmark but did help them receive a 19 ACT composite score. AP math classes increased the chance of reaching all benchmarks and an ACT composite score of 19. AP social studies and AP science courses did not help students reach any ACT benchmarks or achieve a 19 ACT composite (Mo et al., 2011).

Conley (2007b) stated that, to ensure high school graduates are ready for college, high schools must close the gap between secondary and postsecondary schools by aligning the high school curriculum and instruction with college expectations. All high school courses should have a highly developed rigorous syllabus like college courses; incorporate content into high school courses that may not be in the high school standards but is required of college students (Conley, 2007b). High schools should implement a senior seminar to keep students engaged and learning during their senior year. The National Governors Association and The Commission on the Future of Higher Education advocate that if secondary and postsecondary schools would develop a clear line of communication and align their curricula, more high school graduates would be college ready (ACT, 2008).

College Perceptions and Actions

When college professors responded to a survey for Achieve (2005) 42% reported feeling that students were not prepared when they graduated from high school. Seventy percent of the respondents reported having to spend time teaching content that students should already have

known when they entered their class and only 28% of them indicated that high school prepared students for college (Achieve, 2005). The survey from Achieve (2005) also asked students if they would have changed anything about their high school experience and 62% of the students reported that they wished they would have taken more rigorous courses.

Results from The National Survey of Student Engagement (Kuh, 2006) revealed that first year college students were expected to be able to work with others in and out of school. They were also expected to be able to present what they had learned by either writing several well developed papers or by an oral presentation (Kuh, 2006). Students were expected to be independent learners finding help from other students, knowing when to ask the professor for help, or getting help through other resources. In addition, first year college students must be able to think critically, draw inferences, and develop conclusions (Kuh, 2006). Most of these skills are not taught with enough depth at the high school level.

Colleges have taken various stances with the enrollment of an increasing number of underprepared students. Some college and universities have set their admissions standards higher so underprepared students are not granted admission. Other students have learning support classes in place to help them become prepared after arriving at the college or university. The most proactive step is developing a line of communication between the colleges and the secondary schools and developing a partnership whereby students come prepared and not underprepared (Tierney & Garcia, 2008)

College Retention

First year college retention rates are a strong indicator of a student's likelihood for persistence and finishing their degree. The total number of postsecondary institutions for the 2013-2014 school year was 4,294 in the US (2,634 were 4-year colleges or universities and 1,660

were 2-year colleges); the combined enrollment was 17.5 million (10.5 million attended 4-year colleges or universities and seven million attended 2-year colleges) (NCES, 2016b). The national rate for first year full time freshmen enrolling in the fall of 2013 and then reenrollment the following fall of 2014 varied. Students attending 2-year colleges had retention rates that varied from 76% to 54% depending on if they were attending a highly selective or open 2-year institution; the average for 2-year institutions for first time freshmen in the fall of 2014 was 55.2% (ACT, 2015b). Regarding 4-year institution, the first year retention rates were higher with a range of 93% in highly selective schools to 56% in open schools; the average retention rate among all 4-year institutions was 73.1% (ACT, 2015b). The rate was slightly lower at a rural Tennessee university where first time full time freshmen had a 69% retention rate and even lower at 34% for part time freshman students (NCES, 2016). Retention rates have not changed that much in recent years. Barth (2003) found that 25% of first time freshmen at a 4-year institution did not reenroll the following fall and 50% did not reenroll at a 2-year institution. One of the best predictors of whether a student will return for their second year is their composite ACT score. Reason (2003) found that with every point that the student's ACT composite score increased there was a 1.6% chance of retention.

Importance

Retention rates and college graduation rates are becoming more important as the job market and economy changes. A college degree has now taken the place that the high school diploma once held (Kuh et al., 2008). Klepfer and Hull (2012) found that 66% of all future jobs will require some sort of postsecondary education. They also stated that by 2018 there would be 47 million jobs created by either new industries or workers retiring. Of those 47 million jobs, 33% will require a bachelor's degree or higher and 30% will require an associate's degree or

certificate. If students who dropped out of the class of 2011 had instead graduated from a postsecondary institution they would have added $154 billion in income to the economy over their lifetime (Alliance for Excellent Education, 2011).

The National Center for Higher Education Management Systems (NCHEMS) (2016) found that for every 10 students who start high school, fewer than seven students graduate. Of those seven high school graduates, only four enroll at a college or university. Then, only two of those who attend college will graduate with their desired degree within 150% of the time required to obtain that degree. In 1995, the United States had been ranked second in the percentage of students receiving a postsecondary degree; by 2005, the US had fallen to 15 out of 25 countries (Wyatt, Wiley, Camara, & Proestler, 2011). Lauff and Ingles (2014) examined a national random sample and found that while 97% of high school sophomores in 2002 had graduated from high school, only 52% of the graduates had earned a bachelor's degree, associate's degree, or undergraduate certificate within 10 years. They identified that, as of 2012, 33% of the 2002 sophomores had earned a bachelor's degree or higher, 9% had earned an associate's degree, and 10% had earned an undergraduate certificate. Lauff and Ingles (2014) found that 32% of the students had attended a postsecondary institution but did not earn a degree or certificate, 13% had earned a high school diploma, and 3% had less than a high school diploma. It should be noted that the group who attended a postsecondary institution but did not earn a degree or certificate was comprised of 32% of the graduates, which is only one percentage point away from the group who earned a bachelor's degree or higher (Lauff & Ingles, 2014).

High School Influence

There are several things that high schools can do to help first year college retention rates. Higher level math classes and dual enrollment courses are one thing that high schools can

implement to improve first year college retention rates. High school students who take higher level math courses increase their likelihood of staying on track to graduate from a 2-year or a 4-year institution by 10% to 20% (Klepfer & Hull, 2012). Dual enrollment students are 12% more likely to enroll in a postsecondary school within 7 months of graduation and between 16% and 20% more likely to earn a bachelor's degree than non dual enrollment students (Adelman, 2006). Struhl & Vargas (2012) found that dual enrollment students were twice as likely to reenroll for their second year as non dual enrollment students. Dual enrollment students who earned 20 or more credits in their first year of college were 28% more likely to reenroll in the fall of their second year; if they earned fewer than 20 credits they were 11% more likely to reenroll in the fall of their second year when compared to other students (Adelman, 2006).

AP courses have shown to have a positive effect on college retention and persistence. College dropout rates for AP students over a 4-year period dropped to 15% when compared to non AP students with a dropout rate of 25% (Santoli, 2002). AP courses have a positive effect on students returning in the fall of their second year. Students who took AP English Language, AP Biology, AP Calculus AB, or AP US History had a higher second year retention rate than other AP students. These effects were true if the student score a passing grade (3 or better) on the AP exam or if the failed with a score of one or two (Klepfer & Hull, 2012; Mattern, Shaw, & Xiong, 2009). AP Economics has also shown to improve first year retention rates that were 2.68% higher for Caucasian students and 4.34% higher for African American students when compared to students who did not take AP Economics (Klopfenstein & Thomas, 2009). Jackson (2012) found that APIP also increased first year retention rates by 20%. AP courses not only help with retention but also increase college graduation rates (Dougherty, Mellor, & Jian, 2006). AP courses are shown to decrease the amount of time a student spends at a postsecondary institution

as AP students are twice as likely to graduate in 5 years as non AP students (Klepfer & Hull, 2012). AP students are also more likely to graduate from a 4-year university within 6 years than students with no AP credit (McCauley, 2007).

Decreased Retention

There are many reasons why students do not reenroll in the fall following their first year. An increased amount of time spent taking developmental or learning support classes has proven to decrease retention rates (Woodard & Burkett, 2005). Learning support math courses increase the likelihood of a student dropping out within their first year and remedial courses also have a negative effect on graduation rates (Bettinger & Long, 2004). Only 7.2% of students who took all three developmental courses at a community college graduated in 3 years (Yates, 2010). However students who are college ready in all areas are 13% more likely to reenroll at the same school in the fall following their first year (ACT, 2008). Learning support and remedial courses are not the only reason students do not return after their first year; one reason is that the students do not feel academically prepared (Bailey et al., 2002). Other reasons include poor institutional fit, financial concerns, family issues, and a poor social fit (Adelman, 1999; Kuh et al., 2008).

Increased Retention

Freshman year experience seminars, academic advising programs, and supplemental instruction have all shown to increase retention rates (Arendale, 1997; Fidler, 1999; Seidman, 1991). Students who are socially engaged, committed to their school, and are self disciplined are also more likely to reenroll in the fall of their second year (ACT, 2008). Murtaugh, Burns, and Schuster (1999) looked at 8,867 students at Oregon State University from 1991 to 1998 and found that as the students' age increased the retention rate decreased. In addition, students with a higher high school GPA and higher first year college GPA had a higher likelihood of reenrolling

in the fall of their second year. Finally Murtaugh et al. (1999) found that in-state residents have a higher retention rate than nonresidents. Another study conducted by Allen, Robbins, Casillas, and Oh (2008) looked at 6,872 first time freshmen in the fall of 2003 from 23 4-year colleges and universities and discovered that first year academic performance is an indicator of the likelihood of retention. They found that a student's self discipline and high school academic performance have an indirect positive effect on retention. The greatest positive direct effect on retention was the student's college commitment and social connections (Allen et al., 2008).

First Year Experience (FYE) programs are becoming more common in helping with first year retention rates. Many FYE programs include orientation programs, freshman seminar courses, summer bridge offerings, and learning communities. These programs have been found very successful in increasing retention of underprepared students (Barnes, 2012). Taylor (2015) compared students who attend freshman orientation and those who did not. The students entered in the fall of 2012 at an Alabama community college. He found that students who attended freshman orientation had higher first year GPAs, higher fall-to-spring retention, and higher fall-to-fall retention.

Chapter Summary

The existing research regarding AP courses and dual enrollment courses shows the benefits that each program has to offer. Before programs like this were in place, students had no way of accelerating the process of college graduation while still in high school. Students who were capable of doing so had to wait until reaching a postsecondary institution to start the process while wasting valuable time during their senior year of high school. With the evolution of programs like those examined in this chapter, the elite academically gift students are not the only students who have the opportunity to take these courses. The implementation of any

accelerated program is not easy. Research has shown that secondary and postsecondary institutions must have a clear line of communication about what is expected from students when they enter college and what curriculum should be covered.

Both the AP and dual enrollment programs show a benefit to college readiness and college retention. College readiness and college retention are institutional issues; secondary and postsecondary schools must be aware of the issues to see a change in the students. College readiness and college retention are not new problems, but there are new solutions to help with both. If the United States wants to keep up with the global workforce, these issues must be tackled from all fronts. The way to increase college readiness and college retention is through collaboration by secondary and postsecondary institutions and through understanding what both really need for students to accomplish.

CHAPTER 3

METHODOLOGY

Wilson (2016) stated that 33% of Tennessee Board of Regents (TBR) university freshmen in 2014 were not college ready according to TBR requirements. TBR has set benchmarks for each sub section of the ACT. The national average composite ACT score for 2015 was 21; the Tennessee average composite was 19.8. Only 20% of Tennessee students met all four ACT benchmarks while the national average was 28% (ACT, 2015b). The national fall-to-fall retention rate for first time freshmen was 80% for the 2012-2013 school year (Kena et al., 2016). Multiple studies (e.g., Keng & Dodd, 2007; Scott et al., 2010) have shown that AP students outperform non-AP students on the ACT and the SAT assessments. Dual enrollment students are two times more likely to reenroll the fall after their second year compared to non-dual enrollment students (Struhl & Vargas, 2012); AP students are also more likely to reenroll in the fall after their second year compared to non-AP students (Mattern et al., 2009).

Most studies regarding AP and dual enrollment students were not conducted in southern states; and therefore, confirm the need for this research. This study was conducted at a 4-year university in Tennessee that is governed by the TBR. The university has a lower retention rate (69%) for first time freshmen than the national average (73%) and more than half of the incoming freshmen are deemed not college ready in math (Dula, 2015; NCES, 2016). This study focused on the effects that AP and dual enrollment courses had on college readiness as defined by the TBR and fall-to-fall retention. A quantitative, quasi experimental, comparative design was used to analyze secondary data to determine if AP courses had an effect on college readiness and if AP and dual enrollment courses had an effect on fall-to-fall retention in a student's first year.

Research Questions and Corresponding Null Hypotheses

Seven research questions and associated null hypotheses were addressed in this study to evaluate the potential benefit that certain AP courses had on college readiness. College readiness was determined by the TBR requirements regarding ACT sub scores for mathematics, English, and reading. The research questions were used to evaluate the benefit gained from certain AP courses and dual enrollment credit courses on fall-to-fall retention rates for first time freshman students in the fall of 2014 at a Tennessee university. The seven research questions can be addressed through testing the corresponding null hypotheses:

RQ1: Is there a significant difference in the fall-to-fall retention rates between students who did not receive AP credit in a mathematics class (AP Statistics, AP Calculus AB, or AP Calculus BC) and students who did receive AP credit in a mathematics class?

H_o1: There is no significant difference in the fall-to-fall retention rates between students who did not receive AP credit in a mathematics class (AP Statistics, AP Calculus AB, or AP Calculus BC) and students who did receive AP credit in a mathematics class.

RQ2: Is there a significant difference in the fall-to-fall retention rates between students who did not receive AP credit in an English class (AP English Language and Composition or AP English Literature and Composition) and students who did receive AP credit in an English class?

H_o2: There is no significant difference in the fall-to-fall retention rates between students who received AP credit in an English class (AP English

Language and Composition or AP English Literature and Composition) and students who did not receive an AP credit in an English class.

RQ3: Is there a significant difference in the fall-to-fall retention rates between students who did not receive a dual enrollment credit in any course and students who did enter with a dual enrollment credit?

H_o3: There is no significant difference in the fall-to-fall retention rates between students who did not receive a dual enrollment credit in any course and students who did enter with a dual enrollment credit.

RQ4: Is there a significant difference in the fall-to-fall retention rates between students who received dual enrollment credit and students who received AP credit in English or mathematics?

H_o4: There is no significant difference in the fall-to-fall retention rates between students who received dual enrollment credit and students who received AP credit in English or mathematics.

RQ5: Is there a significant difference in college readiness in English between students who did not receive AP English credit and those who did receive AP English credit?

H_o5: There is no significant difference in college readiness in English between students who did not receive AP English credit and those who did receive AP English credit.

RQ6: Is there a significant difference in college readiness in reading between students who did not receive AP English credit and those who did receive AP English credit?

H_o6: There is no significant difference in college readiness in reading between students who did not receive AP English credit and those who did receive AP English credit.

RQ7: Is there a significant difference in college readiness in math between students who did not receive AP mathematics credit and those who did receive AP mathematics credit?

H_o7: There is no significant difference in college readiness in math between students who did not receive AP mathematics credit and those who did receive AP mathematics credit.

Population

Participants in this study included incoming freshmen who enrolled at the university in the fall of 2014. Of those, 80% were in-state residents and 20% were out-of-state residents. The average high school GPA for the incoming freshman class in the fall of 2014 was 3.4; their average ACT composite score was 22.3. Participants included 43% males and 57% females. The class demographics included 83% White, 6% Black or African American, 2% Hispanic/Latino, 3% nonresident alien, 2% two or more races, 1% Asian, and 1% race/ethnicity unknown. For the incoming freshman class in the fall of 2014, each member of the population was grouped into one or more of four categories (ETSU, 2015):

1. students who entered with an AP mathematics credit,
2. students who entered with an AP English credit,
3. students who entered with a dual enrollment credit, and
4. students who entered with neither AP or dual enrollment credit.

The population was also categorized into two other distinct groups: those who reenrolled and attended a Tennessee university in the fall of 2015 and those who did not.

Instrumentation

The instrument used to measure college readings in this study was the ACT in math, English, and reading. Jaschik (2011) reported that ACT math and English sub scores were highly predictive of college readiness while science and reading sub scores were not. This study excluded science sub scores because ACT science sub scores are not linked to the college readiness standards used by TBR institutions, however ACT reading sub scores were used because of their use in the determination of students' college readiness. Each sub score has a range of 0 to 36. TBR schools have set minimum sub scores for math, English, and reading that a student must obtain to be deemed college ready. Those sub scores are 18 for writing, 19 for reading, and 19 for mathematics (TBR, 2014). Standardized test scores like the ACT have been found to be more reliable than a student's high school GPA when trying to predict college readiness (Allen et al., 2008). Because high school GPAs have been on a steady rise since 1990, it has been argued that with their steady increase they have been rendered useless (Woodruff & Ziomek, 2004).

Data Collection

The Office of Institutional Research Applications provided data for analysis after the researcher's dissertation committee and Institutional Review Board approval had been obtained (see Appendix A). The data used in this study were existing data in the university's student information system:

1. The students who entered as first time freshmen in the fall of 2014 with an AP credit in AP Statistics, AP Calculus AB, AP Calculus BC, AP Literature and Composition, and AP Language and Composition;
2. students who entered with a dual enrollment credit in any course;
3. students who obtained the following ACT sub score thresholds: reading greater than 18, English greater than 17, and math greater than 18; and
4. students who reenrolled in the Fall of 2015.

The data were provided by the university and retrieved from the Office of Institutional Research Applications. A director of Institutional Research Applications removed all personal identifiers from the data before the researcher obtained the data to insure confidentiality for all participants. The director made the data confidential by assigning a randomly generated identification code that bore no relation to the participant in any way. The researcher gained access to the data by email after the researcher's dissertation committee and Institutional Review Board approval was obtained. No other data about the participants were collected from the university's Office of Institutional Research Applications.

Data Analysis

Each reach question was addressed by the use of a chi-square test of independence. The chi-square test was an appropriate statistical measure because all data are nominal. More specifically two-way contingency tables were used for the seven research questions. All data were analyzed at the 0.05 level of significance. The independent variables for this study were AP credits received in AP English Language and Composition, AP English Literature and Composition, AP Statistics, AP Calculus AB, AP Calculus BC, and dual enrollment credit received in any course. The dependent variables for this study were college readiness as defined

by TBR and fall-to-fall retention. All data were analyzed by using the Statistical Program for Social Science (SPSS) software.

Chapter Summary

This chapter provides the reason the research was conducted, research design, population studied, data collection, and data analysis. The quantitative, quasi-experimental study used a series of chi-square tests to determine if students who earned AP mathematics credit were more likely to be college ready in mathematics compared to students who did not earn AP mathematics credit. The study also determined if students who earned AP English credit were more likely to be college ready in English than students who did not earn AP English credit. The study also determined if students who earned AP English credit were more likely to be college ready in reading compared to students who did not earn AP English credit. And the study determined if students who earned AP or dual enrollment credit had a higher fall-to-fall retention rate compared to each other and to students who did not earn AP or dual enrollment credit. The results are presented in Chapter 4.

CHAPTER 4

FINDINGS

The purpose of this study was to determine if students who entered as first time freshmen with certain AP and dual enrollment courses were college ready and whether their fall-to-fall retention rates were higher than students who entered without either AP or dual enrollment credit. The purpose was also to compare the retention rates of students who entered with certain AP credit and dual enrollment students. The population consisted of all first time freshmen who enrolled during the fall of 2014. Data for this study were provided to the researcher from the Office of Institutional Research Applications at the institution that was being studied. All personal identifiers were removed to insure privacy of the participants before the researcher was provided with the data.

Seven research questions were developed to guide the study. A chi square test was used for each of the seven research questions and corresponding null hypotheses. The research questions, null hypotheses, data, and data analysis are shown here.

Research Question 1

Is there a significant difference in the fall-to-fall retention rates between students who did not receive AP credit in a mathematics class (AP Statistics, AP Calculus AB, or AP Calculus BC) and students who did receive AP credit in a mathematics class?

H_o1: There is no significant difference in the fall-to-fall retention rates between students who did not receive AP credit in a mathematics class (AP Statistics, AP Calculus AB, or AP Calculus BC) and students who did receive AP credit in a mathematics class.

A two-way contingency table using a chi square test was used to evaluate whether fall-to-fall retention rates were significantly different between students who did not enroll with AP mathematics credit and students who did enroll with AP mathematics credit. The two variables that were used were AP mathematics credit (no or yes) and fall-to-fall retention (no or yes). AP mathematics credit and fall-to-fall retention were found to be significantly related, Pearson χ^2 (1, N = 2,055) = 12.38, $p < .001$, Cramer's $V = .08$. Therefore, the null hypothesis was rejected. Students who did not enroll with AP mathematics credit had a 70.29% fall-to-fall retention rate, whereas students who did enroll with AP mathematics credit had an 89.86% fall-to-fall retention rate. In summary, fall-to-fall retention rates were significantly higher for students who enrolled with AP mathematics credit than for students who did not.

Table 1 provides the number of students who did not enroll at the university in the fall of 2014 with AP mathematics credit and students who did enroll with AP mathematics credit as well as whether or not the students reenrolled in the fall of 2015 (fall-to-fall retention). Figure 1 shows the percentage of students who did not enroll in the fall of 2014 at the university with AP mathematics credit and students who did enroll with AP mathematics credit as well as whether or not the students reenrolled in the fall of 2015 (fall-to-fall retention).

Table 1

Students who Persisted from Fall-to-Fall and who Enrolled in the University with AP Mathematics Credit

	Enrolled with AP Mathematics Credit		
Fall-to-Fall Retention	No	Yes	Total
No	590	7	597
Yes	1,396	62	1,458
Total	1,986	69	2,055

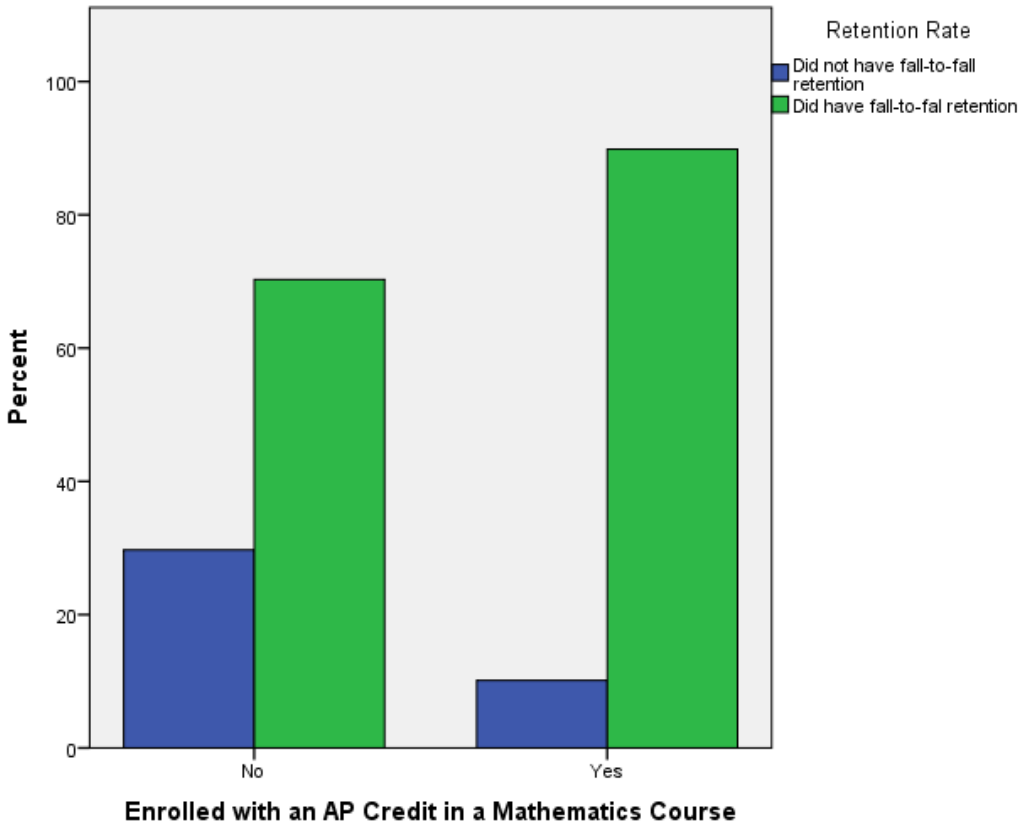

Figure 1. The percentage of students who had fall-to-fall retention and who enrolled in the university with AP mathematics credit.

Research Question 2

Is there a significant difference in the fall-to-fall retention rates between students who did not receive AP credit in an English class (AP English Language and Composition or AP English Literature and Composition) and students who did receive AP credit in an English class?

H_o2: There is no significant difference in the fall-to-fall retention rates between students who received AP credit in an English class (AP English Language and Composition or AP English Literature and Composition) and students who did not receive an AP credit in an English class.

A two-way contingency table using a chi square test was used to evaluate whether fall-to-fall retention rates were significantly different between students who did not enroll with AP English credit and students who did enroll with AP English credit. The two variables that were used were AP English credit (no or yes) and fall-to-fall retention (no or yes). AP English credit and fall-to-fall retention were found to be significantly related, Pearson χ^2 (1, N = 2,055) = 20.07, $p < .001$, Cramer's $V = .10$. Therefore, the null hypothesis was rejected. Students who did not enroll with AP English credit had a 69.91% fall-to-fall retention rate whereas students who did enroll with AP English credit had a 90.38% fall-to-fall retention rate. In summary, fall-to-fall retention rates were significantly higher for students who enrolled with AP English credit than for students who did not.

Table 2 provides the number of students who did not enroll at the university in the fall of 2014 with AP English credit and students who did enroll with AP English credit as well as whether or not the students reenrolled in the fall of 2015 (fall-to-fall retention). Figure 2 shows the percentage of students who did not enroll at the university in the fall of 2014 with AP English

credit and students who did enroll with AP English credit as well as whether or not the students reenrolled in the fall of 2015 (fall-to-fall retention)

Table 2

Students who Persisted from Fall-to-Fall and who Enrolled in the University with AP English Credit

	Enrolled with AP English Credit		
Fall-to-Fall Retention	No	Yes	Total
No	587	10	597
Yes	1,364	94	1,458
Total	1,951	104	2,055

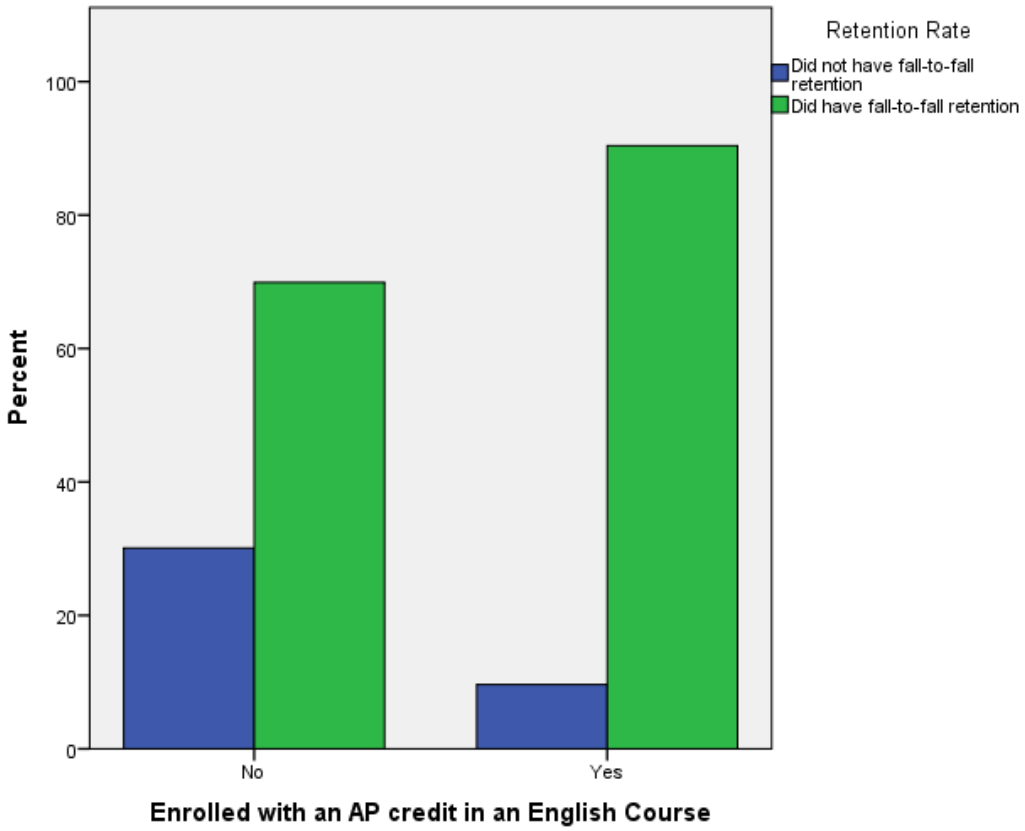

Figure 2. The percentage of students who had fall-to-fall retention and who enrolled in the university with AP English credit.

Research Question 3

Is there a significant difference in the fall-to-fall retention rates between students who did not receive a dual enrollment credit in any course and students who did enter with a dual enrollment credit?

H_o3: There is no significant difference in the fall-to-fall retention rates between students who did not receive a dual enrollment credit in any course and students who did enter with a dual enrollment credit.

A two-way contingency table using a chi square test was used to evaluate whether fall-to-fall retention rates were significantly different between students who did not enroll with dual enrollment credit and students who did enroll with dual enrollment credit. The two variables that were used were dual enrollment credit (no or yes) and fall-to-fall retention (no or yes). Dual enrollment credit and fall-to-fall retention were found to be significantly related, Pearson χ^2 (1, N = 2,055) = 11.51, p = .001, Cramer's V = .08. Therefore, the null hypothesis was rejected. Students who did not enroll with dual enrollment credit had a 70.24% fall-to-fall retention rate whereas students who did enroll with dual enrollment credit had an 87.21% fall-to-fall retention rate. In summary, fall-to-fall retention rates were significantly higher for students who enrolled with dual enrollment credit than for students who did not.

Table 3 provides the number of students who did not enroll at the university in the fall of 2014 with dual enrollment credit and students who did enroll with dual enrollment credit as well as whether or not the students reenrolled in the fall of 2015 (fall-to-fall retention). Figure 3 shows the percentage of students who did not enroll at the university in the fall of 2014 with dual enrollment credit and students who did enroll with dual enrollment credit as well as whether or not the students reenrolled in the fall of 2015 (fall-to-fall retention).

Table 3

Students who Persisted from Fall-to-Fall and who Enrolled in the University with Dual Enrollment Credit

	Enrolled with Dual Enrollment Credit		
Fall-to-Fall Retention	No	Yes	Total
No	586	11	597
Yes	1,383	75	1,458
Total	1,969	86	2,055

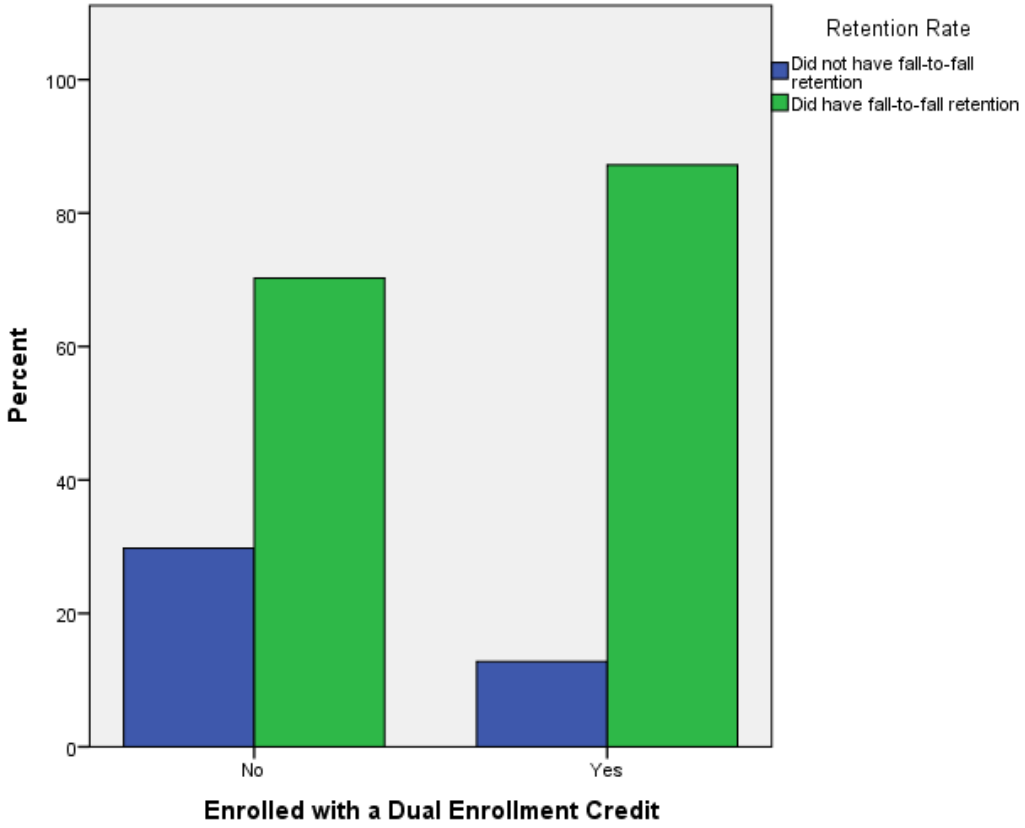

Figure 3. The percentage of students who had fall-to-fall retention and who enrolled in the university with dual enrollment credit.

Research Question 4

Is there a significant difference in the fall-to-fall retention rates between students who received dual enrollment credit and students who received AP credit in English or mathematics?

H_o4: There is no significant difference in the fall-to-fall retention rates between students who received dual enrollment credit and students who received AP credit in English or mathematics.

A two-way contingency table using a chi square test was used to evaluate whether fall-to-fall retention rates were significantly different between students who did not enroll with dual enrollment credit or AP English or mathematics credit and students who did enroll with dual enrollment credit or AP English or mathematics credit. The two variables that were used were course enrollment type (dual enrollment or AP) and fall-to-fall retention (no or yes). Course enrollment type and fall-to-fall retention were not found to be significantly related, Pearson χ^2 (1, N = 209) = .54, p = .461, Cramer's V = .05. Therefore, the null hypothesis was retained. In summary, the percentage of students who enrolled with dual enrollment credit had an 84.72% fall-to-fall retention rate and students who enrolled with AP English or mathematics credit had an 88.32% fall-to-fall retention rate. Fall-to-fall retention rates were not significantly higher when students enrolled with dual enrollment credit or AP English or mathematics credit.

Table 4 provides the number of students who enrolled at the university in the fall of 2014 with AP credit or dual enrollment credit and students who did not enroll with AP credit or dual enrollment credit and whether or not the students reenrolled in the fall of 2015 (fall-to-fall retention). Figure 4 shows the percentage of students who did not enroll at the university in the fall of 2014 with AP credit or dual enrollment credit and students who did enroll with AP credit

or dual enrollment credit and whether or not the students reenrolled in the fall of 2015 (fall-to-fall retention).

Table 4

Students who Persisted from Fall-to-Fall and the Course Enrollment Type

	Course Enrollment Type		
Fall-to-Fall Retention	Dual Enrollment	AP	Total
No	11	16	27
Yes	61	121	182
Total	72	137	209

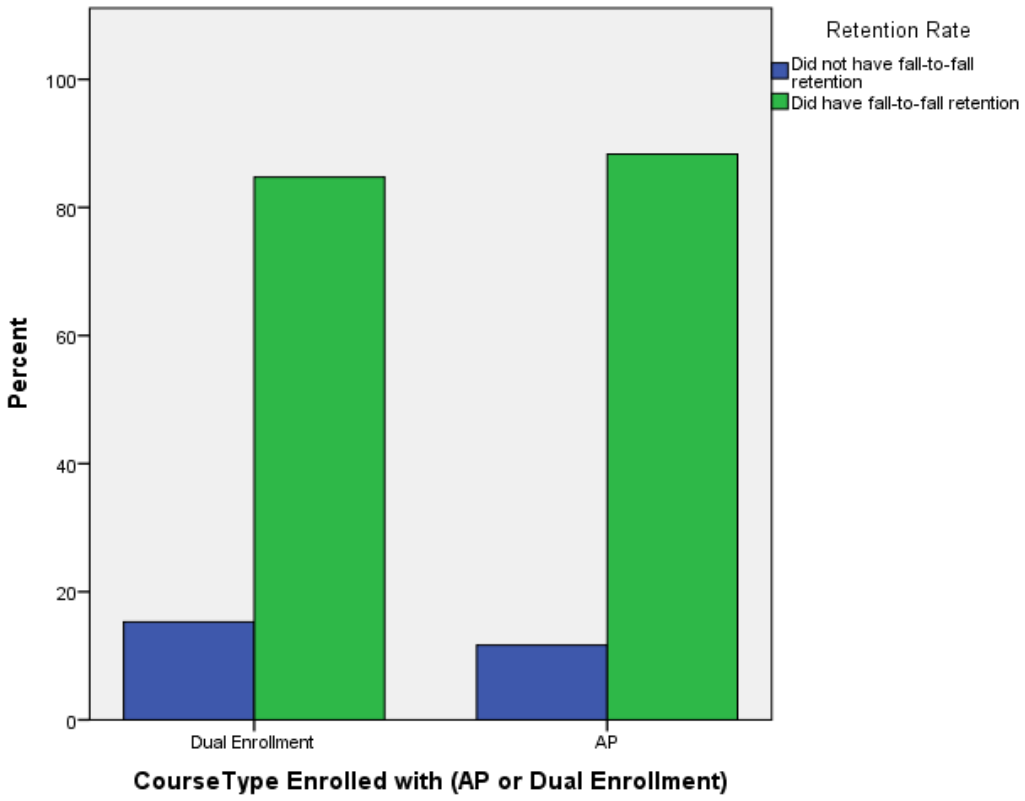

Figure 4. The percentage of students who had fall-to-fall retention and the course enrollment type.

Research Question 5

Is there a significant difference in college readiness in English between students who did not receive AP English credit and those who did receive AP English credit?

H_o5: There is no significant difference in college readiness in English between students who did not receive AP English credit and those who did receive AP English credit.

A two-way contingency table using a chi square test was used to evaluate whether English college readiness was significantly different between students who did not enroll with AP English credit and students who did enroll with AP English credit. The two variables that were used were AP English credit (no or yes) and English college readiness (no or yes). AP English credit and English college readiness were found to be significantly related, Pearson χ^2 (1, N = 2,055) = 25.25, $p < .001$, Cramer's $V = .11$. Therefore, the null hypothesis was rejected. Students who did not enroll with AP English credit had an 80.27% English college ready rate whereas students who did enroll with AP English credit had a 100% English college ready rate. In summary, the English college ready rate was significantly higher when students enrolled with AP English credit.

Table 5 provides the number of students who did not enroll at the university in the fall of 2014 with AP English credit and students who did enroll with AP English credit as well as whether or not the students were college ready in English. Figure 5 shows the percentage of students who did not enroll at the university in the fall of 2014 with AP English credit as well as students who did enroll with AP English credit and whether or not the students were college ready in English.

Table 5

Students who were Deemed English College Ready and who Enrolled in the University with AP English Credit

	Enrolled with AP English Credit		
English College Ready	No	Yes	Total
No	385	0	385
Yes	1,566	104	1,670
Total	1,951	104	2,055

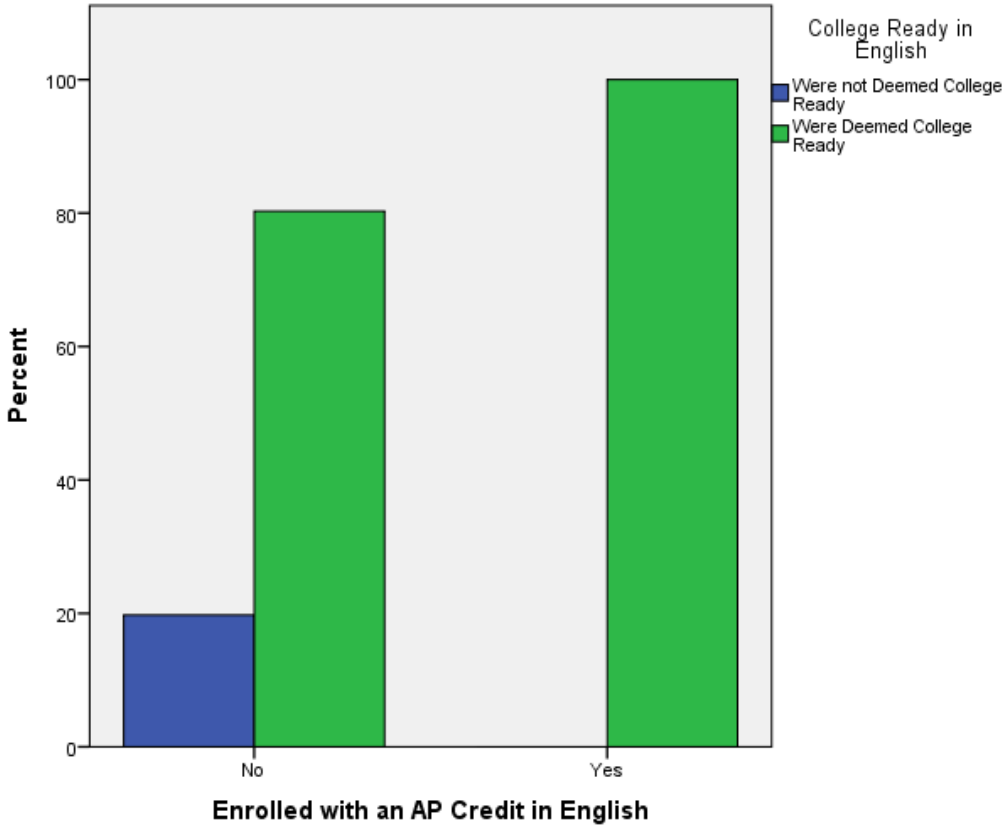

Figure 5. The percentage of students who were deemed English college ready and who enrolled in the university with AP English credit.

Research Question 6

Is there a significant difference in college readiness in reading between students who did not receive AP English credit and those who did receive AP English credit?

H_o6: There is no significant difference in college readiness in reading between students who did not receive AP English credit and those who did receive AP English credit.

A two-way contingency table using a chi square test was used to evaluate whether reading college readiness was significantly different between students who did not enroll with AP English credit and students who did enroll with AP English credit. The two variables that were used were AP English credit (no or yes) and reading college readiness (no or yes). AP English credit and reading college readiness were found to be significantly related, Pearson χ^2 (1, N = 2,055) = 26.15, $p < .001$, Cramer's $V = .11$. Therefore, the null hypothesis was rejected. Students who did not enroll with AP English credit had a 93.73% reading college ready rate whereas students who did enroll with AP English credit had a 100% reading college ready rate. In summary, reading college readiness was significantly higher when students enrolled with AP English credit.

Table 6 provides the number of students who did not enroll at the university in the fall of 2014 with AP English credit and students who did enroll with AP English credit as well as whether or not the students were college ready in reading. Figure 6 shows the percentage of students who did not enroll at the university in the fall of 2014 with AP English credit as well as students who did enroll with AP English credit and whether or not the students were college ready in reading.

Table 6

Students who were Deemed Reading College Ready and who Enrolled in the University with AP English Credit

	Enrolled with AP English Credit		
Reading College Ready	No	Yes	Total
No	396	0	396
Yes	1,555	104	1,659
Total	1,951	104	2,055

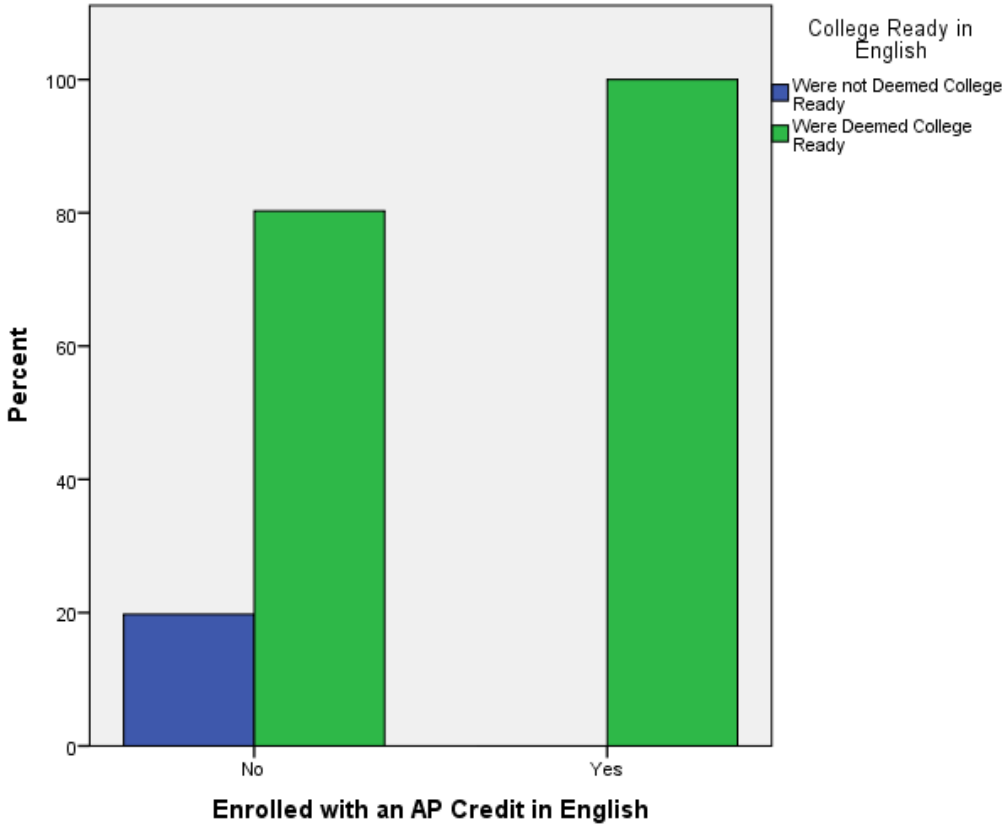

Figure 6. The percentage of students who were deemed reading college ready and who enrolled in the university with AP English credit.

Research Question 7

Is there a significant difference in college readiness in math between students who did not receive AP mathematics credit and those who did receive AP mathematics credit?

H_o7: There is no significant difference in college readiness in math between students who did not receive AP mathematics credit and those who did receive AP mathematics credit?

A two-way contingency table using a chi square test was used to evaluate whether math college readiness was significantly different between students who did not enroll with AP mathematics credit and students who did enroll with AP mathematics credit. The two variables that were used were AP mathematic credit (no or yes) and math college readiness (no or yes). AP mathematics credit and math college readiness were found to be significantly related, Pearson χ^2 (1, N = 2,055) = 34.08, $p < .001$, Cramer's $V = .13$. Therefore, the null hypothesis was rejected. Students who did not enroll with AP mathematics credit had a 66.57% math college ready rate whereas students who did enroll with AP mathematics credit had a 100% math college ready rate. In summary, the math college ready rate was significantly higher when students enrolled with AP mathematics credit.

Table 7 provides the number of students who did not enroll at the university in the fall of 2014 with AP mathematics credit as well as students who did enroll with AP mathematics credit as well as whether or not the students were college ready in math. Figure 7 shows the percentage of students who did not enroll at the university in the fall of 2014 with AP mathematics credit as well as students who did enroll with AP mathematics credit as well as whether or not the students were college ready in math.

Table 7

Students who were Deemed Mathematics College Ready and who Enrolled in the University with AP Mathematics Credit

	Enrolled with AP Mathematics Credit		
Mathematics College Ready	No	Yes	Total
No	664	0	664
Yes	1,322	69	1,391
Total	1,986	69	2,055

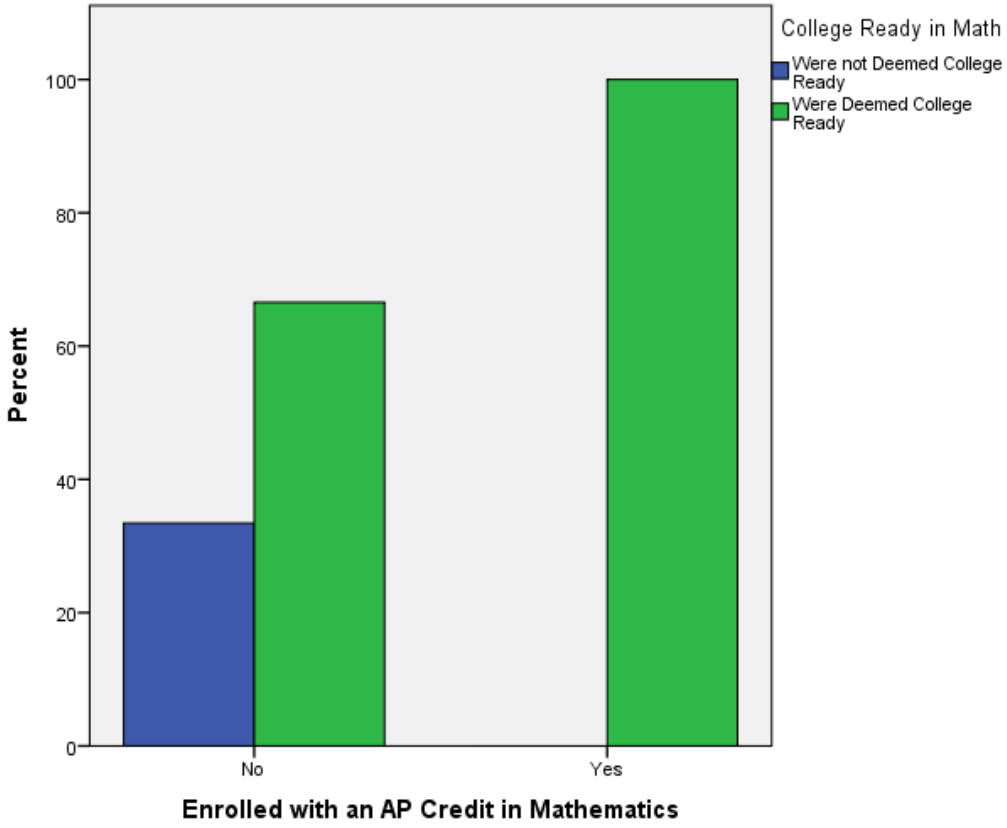

Figure 7. The percentage of students who were deemed mathematics college ready and who enrolled in the university with AP mathematics credit.

Chapter Summary

Chapter 4 presents the analyses of data obtained from the Office of Institutional Research Applications and Data Systems at the participating Tennessee university. The data for first time freshmen who enrolled in the fall of 2014 included AP English credit, AP mathematics credit, dual enrollment credit, fall-to-fall retention rate, English college readiness, reading college readiness, and mathematics college readiness. The researcher observed that students who enrolled with an AP English, AP mathematics, or dual enrollment credit had a significantly higher fall-to-fall retention rate than students who did not enroll with AP credit. Students who enrolled with AP English credit were also significantly more likely to be college ready in reading and English than students who did not enroll with AP English credit. Students who enrolled with AP mathematics credit had a significantly higher probability of being college ready in math than students who did not. It was not found that students who enrolled with AP English or mathematics credit were more likely to have fall-to-fall retention compared to students who enrolled with dual enrollment credit.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Students graduating from high school should be college ready but many are not. American College Testing (ACT) sub scores are used to determine college readiness for most colleges and universities. The Tennessee Board of Regents (TBR) has set a cut score for three of the four sub scores that a student must obtain to be deemed college ready. The benchmarks are in English (18), math (19), and reading (19). Students who do not meet one of the listed benchmarks must take a learning support class in the areas of deficiency (TBR, 2014).

Thirty three percent of students enrolling at Tennessee Board of Regents (TBR) 4-year universities in 2014 were not college ready in at least one sub area, which required that those students take at least one learning support class (Wilson, 2016). When students do not meet the benchmarks established by the TBR it can add additional time required to graduate, increased tuition cost, and lower retention rates (Wirt et al., 2004; Woodard & Burkett, 2005). AP courses have been shown to increase college readiness no matter the student's score on the AP exam (Hacsi, 2004). AP English and AP math courses increase overall ACT composite scores. The AP math course not only helps with overall ACT composite scores but increases the likelihood of a student reaching all ACT benchmarks (Mo et al., 2011).

Learning support classes count as college credit but do not count toward graduation requirements. These classes increase the amount of time students must attend their postsecondary institution, increase total postsecondary education cost, and decrease the probability the student will earn the degree he or she first pursued to earn. All of these factors decrease the chance that a student will earn a postsecondary degree (Wirt et al., 2004). By 2018, there will be 47 million

jobs created by new industry or retiring workers and 63% of them will require an associate's degree or higher (Klepfer & Hull, 2012).

The college retention rate for first time freshmen who enrolled in the fall of 2014 at a 4-year institution and reenrolled in the same institution in the fall of 2015 was 73.1% (ACT, 2015b). The first year retention rate is a strong indicator whether a students will finish the degree he or she first sought. The rates have been consistent over several years. Barth (2003) stated that 25% of first time students at 4-year institutions do not reenroll in the fall following their freshman year. One of the best indicators of whether students will return the following fall is his or her ACT composite score (Reason, 2003). Both AP and dual enrollment courses have shown to increase first year college retention. Students who have received a dual enrollment credit are twice as likely to reenroll the fall following their first year compared to students who did not enroll with a dual enrollment credit (Struhl & Vargas, 2012). Santoli (2002) found that AP students over a 4-year period decreased their dropout rate to 15% compared to a dropout rate of 25% for students who did not have AP credit. Certain AP courses have a greater effect on student retention rates. AP English Language, AP Biology, AP Calculus AB, and AP US History students have been found to have a higher first year retention rate compared to other AP students (Mattern et al., 2009). AP students have a higher first year retention rate no matter their AP exam score when compared to students without AP credits (Klepfer & Hull, 2012).

Advanced Placement (AP) courses have shown to increase both college readiness and college retention. A study that looked at the Memphis, Tennessee, school district found that students who took AP English classes increased their overall ACT composite scores. Mo et al. (2011) found that AP math classes increased overall ACT composite scores and increased the student's chance to achieve the ACT benchmark on each individual sub score. AP students have

also shown a greater retention rate compared to their peers; these effects are true no matter the student's score on their AP exam (Klepfer & Hull, 2012). Santoli (2002) found that the dropout rate falls to 15% over 4 years compared to 25% for non AP students.

With more than 1.1 million tests given to 607,505 students in the US in May of 2013, Advanced Placement (AP) courses are now more prominent than ever in high schools across the country (The College Board, 2014). There are more than 35 AP courses being taught in high schools across the United States. The courses give high school students an opportunity to earn college credit while still in high school. For students to earn college credit they must pass the AP exam that is given in May of each year with a minimum score as required by specific colleges and universities. The exam is scored on a 5-point scale from a low of 1 and a high of 5. Most postsecondary institutions grant college credit for scores of 3 or higher (Dodd et al., 2002). High school teachers follow a curriculum determined by the College Board when teaching AP courses and must go through a course audit yearly to be able to teach AP courses. A course audit ensures the curriculum is followed, proper materials are used, and the correct amount of rigor is infused into the class (The College Board, 2014).

Dual enrollment programs have also shown to be beneficial in terms of college readiness and college retention. Dual enrollment programs help smooth the transition from high school to a postsecondary institution and provide more rigorous course work for students while still in high school (Fowler & Luna, 2009). Dual enrollment students are also two times more likely to have reenrolled the following fall than non dual enrollment students (Struhl & Vargas, 2012).

Dual enrollment courses are another way high school students can earn college credit while still in high school. Students do not have to take an additional exam to earn college credit in a dual enrollment course; if the student earns a C or higher, ordinarily he or she will receive

both high school credit and college credit (O'Brien & Nelson, 2004). Dual enrollment courses can be taught online or at the secondary campus where a college professor comes to teach. Secondary teachers who also serve as an adjunct professor can teach dual enrollment classes. Dual enrollment courses can be taught on a postsecondary campus at normal meeting times whereby high school students attend class as a normal college student while still earning high school credit (Karp & Hughes, 2008).

Statement of Problem

The problem for this study is that it is not known if some AP courses (AP English Language and Composition, AP English Literature and Composition, AP Statistics, AP Calculus AB, and AP Calculus BC) positively affect college readiness as defined by the TBR at the participating university. It is also not known if the above stated AP courses and dual enrollment courses positively affect fall-to-fall retention for first time enrolling freshmen from the fall of 2014 at the participating university. This study served to measure the effects the above stated AP courses have on college readiness and the effects that AP courses and dual enrollment courses have on fall-to-fall retention rates for the participating university.

Discussion and Conclusions

Research questions 1, 2, and 3 were focused on fall-to-fall retention rates for students who enrolled for the first time in the fall of 2014 with AP mathematics, AP English, or dual enrollment credit. The population for research questions 1, 2, and 3 was 2,055. Table 8 contains the results.

Table 8

Students who Reenrolled in the Fall of 2015 and Course Type (AP Math, AP English, or Dual Enrollment)

	Fall-to-Fall Retention in 2015	
Course Type	Yes	No
AP Math Course Credit	89.86%	10.14%
No AP Math Course Credit	70.29%	29.71%
AP English Course Credit	90.38%	9.62%
No AP English Course Credit	69.91%	30.09%
Dual Enrollment Course Credit	87.21%	12.79%
No Dual Enrollment Course Credit	70.24%	29.76%

Students who enroll with AP mathematics, AP English, or dual enrollment credit were significantly more likely to reenroll than students who did not enroll with credit. Students who enrolled with AP math credit were 19.57% more likely to reenroll than students who did not enroll with AP math credit. Students who enrolled with AP English credit were 20.47% more likely to reenroll than students who did not enroll with AP English credit. Students who enrolled with dual enrollment credit were 16.97% more likely to reenroll than students who did not enroll with dual enrollment credit.

Research question 4 was focused on fall-to-fall retention rates for students who enrolled with AP English or math credit versus students who enrolled with dual enrollment credit. The sample size for this research question was much smaller than the other 6 research questions with a population of 209. Results show that students who enrolled with AP credit in English or math were not more likely to reenroll than students who enrolled with dual enrollment credit. Table 9 contains these results. Students who enrolled with AP English or math credit were only 3.6%

more likely to reenroll than students who reenrolled with dual enrollment credit; this is not a statistically significant difference.

Table 9

Students who Reenrolled in the Fall of 2015 and Course Type (AP Math or AP English or Dual Enrollment)

	Fall-to-Fall Retention in 2015	
Course Type	Yes	No
AP Math or AP English	88.32%	11.68%
Dual Enrollment	84.72%	15.68%

Research questions 5, 6, and 7 were focused on college readiness as defined by the TBR for students who enrolled for the first time in the fall of 2014 with either AP mathematics or AP English credit. Students who enrolled with AP English credit were significantly more likely to be college ready in both English and reading than students who did not enroll with AP English credit. They were 19.73% more likely to be college ready in English and 6.27% more likely to be college ready in reading than students who did not enroll with AP English credit. Table 10 contains the results.

Table 10

Students who were Deemed College Ready (English or Reading) and who Enrolled in the University with AP English Credit

	Enrolled with AP English Credit	
English College Ready	Yes	No
Yes	100%	80.27%
No	0%	19.73%
Reading College Ready	Yes	No
Yes	100%	93.73%
No	0%	6.27%

Students who enrolled with AP math credit were significantly more likely to be college ready in math than students who did not enroll with AP math credit. They were 33.43% more likely to be college ready in math than students who did not enroll with AP math credit. Table 11 contains the results.

Table 11

Students who were Deemed Mathematics College Ready and who Enrolled in the University with AP Mathematics Credit

	Enrolled with AP Mathematics Credit	
Mathematics College Ready	Yes	No
Yes	100%	66.57%
No	0%	33.43%

Implications for Practice

With the ever pressing need of a postsecondary degree, secondary and postsecondary institutions must work together for students to attain this goal. Secondary institutions now have more options than ever to offer students a jumpstart into their postsecondary career. The findings of this study can provide secondary administrators, counselors, teachers, students, and parents with information that will help them choose the best courses for their schools or themselves. It can also provide postsecondary institutions with information about what courses increase the retention rates of their students. Five recommendations for suggested practices have been identified.

1. Secondary administrators and counselors should consider incorporating AP or dual enrollment courses into their master schedule.
2. Secondary teachers, students, and parents should consider advocating to both the building administration and the district level administration for AP or dual enrollment courses to be offered at their school.
3. Secondary administrators, counselors, and teachers should encourage all students to take AP or dual enrollment courses.
4. Postsecondary institutions should consider collaborating with secondary schools to offer more dual enrollment courses at the secondary level.
5. Postsecondary institutions should consider collaborating with secondary schools to ensure that they have the necessary materials to offer AP courses.

Implications for Further Research

The purpose of this study was to determine if AP English, AP mathematics, or dual enrollment courses affect college readiness or fall-to-fall college retention. The findings of this

study indicate that students who enrolled with AP English credit were more likely to be college ready in both English and reading than students who did not enroll with AP English credit. The study also indicates that students who enrolled with AP mathematics credit were more likely to be college ready in math than students who did not enroll with AP mathematics credit. The study as well indicated that students who enrolled with AP English, AP mathematics, or dual enrollment credit had an increased probability of fall-to-fall retention than students who did not enroll with AP or dual enrollment credits. This study was not intended to determine the causation of the relationships, only that they do exist. While other studies have had similar findings, they should not be generalized to other postsecondary institutions. These results only looked at a 1-year period and only at certain AP courses. For those reasons, further research is needed. Seven recommendations for future research have been identified.

1. Conduct similar research that includes all TBR institutions (2-year and 4-year) to see if the same results are found.
2. Conduct similar research that includes all AP courses, not just AP English and AP mathematics.
3. Conduct similar research that includes students who took AP courses and who did not earn credit for the course (AP exam score of 1 or 2 or did not take the AP exam).
4. Conduct follow up research using the same cohort of students to evaluate retention rates after their second year.
5. Conduct follow up research using the same cohort of students to evaluate graduation rates and amount of time taken to graduate.
6. Conduct research to determine how different genders, demographics, and socioeconomic status students compare to one another.

7. Conduct a qualitative study to determine why students reenroll in the fall following their first year or why they do not reenroll.

Chapter Summary

Chapter 5 includes an overview of the related literature, a statement of the problem that the research was analyzing, discussion, conclusions of the study, implications for practice, and implications' for further research. The researcher found that AP English, AP math, and dual enrollment credits increase first year fall-to-fall college retention. It was found that there is not a significant difference between the first year retention rates of students who enroll with AP English or math credit and students who enroll with dual enrollment credit and first year retention rates. It was also found that AP English credit increases the chance a student will be English college ready and AP mathematics increases the chance a student will be mathematics college ready.

Implications from this analysis could be used by secondary schools to justify including AP or dual enrollment courses in schools' master schedules. Secondary school faculty and staff should encourage students to enroll in AP or dual enrollment courses. This analysis could also be used by secondary faculty, staff, parents, and students to advocate for AP and dual enrollment courses at their district level. Postsecondary institutions should use this analysis to form partnerships with secondary schools to insure that AP and dual enrollment courses are being taught at the secondary level.

More research is need in this area. Research could be conducted that includes all TBR schools to see if the same results are found. Further research on this cohort should be conducted to include all AP courses (not only English and math), retention rates after the first year, and

graduation rates. A qualitative study should be conducted on this cohort to determine why they reenrolled.

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APPENDIX

Exemption Letter from ETSU Institutional Review Board

EAST TENNESSEE STATE UNIVERSITY

Office for the Protection of Human Research Subjects • Box 70565 • Johnson City, Tennessee 37614-1707
Phone: (423) 439-6053 Fax: (423) 439-6060

February 12, 2016

Dear Diana Bowers,

Thank you for recently submitting information regarding your proposed project "The Impact of Advanced Placement and Dual Enrollment on College Readiness and Retention at a Tennessee University".

I have reviewed the information, which includes a completed Form 129 and email correspondence with Yasmin Stoss.

The determination is that this proposed activity as described meets neither the FDA nor the DHHS definition of research involving human subjects. Therefore, it does not fall under the purview of the ETSU IRB.

IRB review and approval by East Tennessee State University is not required. This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made and there are questions about whether these activities are human subject research in which the organization is engaged, please submit a new request to the IRB for a determination.

Thank you for your commitment to excellence.

Sincerely,
Stacey L. Williams, Ph.D.
Chair, ETSU IRB

Full AAHRPP Accreditation

Accredited Since December 2005

VITA

DIANA ELIZABETH BOWERS

Education:	East Tennessee State University, Johnson City, TN, Educational Leadership, Ed.D., 2016
	East Tennessee State University, Johnson City, TN, Secondary Education, M.A.T., 2007
	East Tennessee State University, Johnson City, TN, Biology, B.S., 2005
	Unaka High School, Elizabethton, TN, Diploma, 2001
Professional Experience:	Happy Valley High School, Elizabethton, TN, Assistant Principal, 2015-Present
	Hampton High School, Hampton, TN, Science Department Chair and Teacher, 2012-2015
	Strayhorn High School, Strayhorn, MS, Science Curriculum Specialist and Teacher, 2011-2012
	Independence High School, Independence, MS, Teacher, 2009-2011
	Hunter Elementary, Elizabethton, TN, Teacher, 2008-2009