

2017

Pre-College credit and Examination Programs: One Size fits All?

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PRE-COLLEGE CREDIT AND EXAMINATION PROGRAMS: ONE SIZE FITS
ALL?

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The School of Education

by

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August 2017

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Guadalupe M. Lamadrid

This dissertation is dedicated to my precious family who fled Cuba and came to the U.S. with basically the clothes on their backs and one small suitcase, my father, Victor, my mother, Guadalupe, who always loved me, supported me in all my endeavors and sacrificed so much on our behalf in order to make sure that my brother and I received the best education. To my brother, Victor Jr., for his love and support. My dear Uncle, Jorge Martinez, and cousins Pilar Morrison and J.G. Martinez, Manina set this in motion, this is in her memory.

To our next generation, my precious and talented Goddaughter-Celina Morrison, Benjamin Morrison and my cherished nephews, Tomas, my beloved Godson – Javier, Luis and Rafael, you all are my heart and I do this for you – for your future.

To my precious angels who are no longer here with me but were a part of this journey nonetheless, my Grandmother – Celina Milian, my ‘Tata’, my Godmother – Pilar Martinez, my ‘Manina’ who in her last conversation with me encouraged me pursue this PhD, my Aunt Emma Vitar, and finally, my dearest, dearest, Father Mike Collins, always so generous with his words of love, support and encouragement which continuously provided the inspiration to keep on task and not give up till I was done. You are all with me, and I know, smiling down from heaven...

ACKNOWLEDGMENTS

There are moments over the past six years that stand out in my memory as milestones on this journey. The common denominator is that they all involved either a friend, co-worker, colleague, or mentor who helped to paint the picture of this experience for me and sustained me throughout this adventure. Words just don't seem adequate enough to express the profound gratitude that I have for you all.

During my studies, I was blessed to sit in the classes of two amazing scholars and mentors from whom I learned so much, and doubly blessed when they agreed to be a part my committee, Dr. Eugene Kennedy and Dr. Roland Mitchell, I am forever changed because of you. Thank you to Seth Orgel, from The School of Music, who in a happy twist of fate was selected to be a member of my committee, thank you for your unwavering support and music.

There are times in this life when you just know that people cross your path for a reason, my major professor and committee chair, Dr. Keena Arbuthnot, is just such a case. One of my favorite words in the dictionary is exemplar, which means an ideal model. Dr. Arbuthnot is an exemplar of her profession, of teaching, mentoring and also as a person. The effect that you have had on my life with your guidance throughout my studies, support and encouragement when times were difficult for me and belief that “you can do this, Lupe”, have meant so much to me that it is truly difficult to quantify or capture with mere words. Dr. Arbuthnot, you have changed me for the better as a scholar and a person, I am so appreciative that I had this amazing opportunity to be your student. I would not have been able to do this without you and will be forever grateful for you.

Twenty years ago, I had the privilege of working for Dr. Karen Denby, and since that time, I have counted myself so very fortunate to have her in my life as a colleague, mentor,

friend, and all around guardian angel. I am indeed indebted to you on so many levels, but particularly for your unwavering support of me as a professional and friend. We are now reunited again at the Board of Regents, and I so look forward to doing good work with you! You, Commissioner Joseph Rallo, Dr. Larry Tremblay and the staff at the Board of Regents have given me the gift of time and peace of mind, thus allowing me to finish this last part of the race! Thank you all from the bottom of my heart!

To my dearest Dr. Adam Elder, writing/study partner and friend extraordinaire, we are forever connected. Thank you for your love, support and superhero statistical skills! I look forward to future collaborations and adventures with you!

Dr. Charlotte Tullos, you were such a blessing to me, your timing was impeccable, thank you for your wise counsel and support of me both as a person and as a professional.

To my former staff in the Office of Admissions who picked up the reins when I would leave for classes or took time off during exams –you were there for me on a daily basis and I cannot thank you enough. Shannon Lamar and Gina Maggio, you kept me laughing when I wanted to cry, thank you for supplying never-ending reality checks! To Bryan Buckner, Mel Thornton and Patrick Dietrich from Enrollment Services and Clay Benton from the Registrar’s Office, many thanks for your unending patience and ability to decipher all my data requests.

Finally, to my friends, especially my bestie, Lori Layman, whose love and prayers sustained me just when I needed it most, thank you! I so look forward to having free time!! Clay Benton, Cary Caro and Kristie Galy, my crew who kept me real, grounded and laughing!

At the end of the day, my purpose in pursuing this PhD was to acquire new skills, enhance the ones I have, all so that I could make things better for students and contribute “to the good of the order.” I thank each and every one of you for your faith in me. This is all for you.

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ABSTRACT

The purpose of this mixed methods study was to utilize a comprehensive 9-16 dataset to quantitatively examine which pre-college credit programs are the most significant predictors of college achievement as defined by college GPA, first to second year retention, time to degree and graduation date. A qualitative analysis was conducted, which via the use of a survey allowed students to share their perceptions and feeling regarding their pre-college credit experiences.

Data for this study was obtained from institutional sources and consisted of 9-16 detail high school record, admissions, financial aid, scholarship and enrolled student information. Univariate and Multi-variate statistical analyses identified the effects of pre-college credit programs on college achievement when controlling for high school academic GPA and standardized test scores. Grounded theory technique was used to describe and develop in the student's own voices their experiences with pre-college credit programs.

The quantitative analysis discovered differences by pre-college credit program in the cohort performance by college GPA, first to second year retention, time to degree and graduation date. The qualitative analysis focused on students who took DE only and AP only. This study found that there were differences in-student perceptions regarding their individual experiences with these programs which then helped to inform the quantitative results.

The major findings indicated that AP students outperformed DE students in almost all measures. The qualitative findings revealed that there appeared to be a dis-connect in the perceptions of how DE students described their experiences with their actual performance.

This study brings to the forefront, issues already articulated on the national stage regarding the efficacy of these pre-college credit programs. Firstly, the need to have a mechanism to capture student data in order to conduct outcome and assessment studies of these

pre-college credit programs. Secondly, the need to have uniform quality and delivery measures for dual enrollment to assure that all students have the opportunity to be successful. Finally, policymakers and stakeholders must take a hard look at whether these pre-college credit programs are working for their student populations and adjust accordingly rather than promoting a “one size fits all” mentality regarding these programs.

CHAPTER ONE: STATEMENT OF THE PROBLEM

As a practitioner in the field of higher education for over twenty-eight years, I have first-hand experience of the struggles that incoming college freshmen experience in that all-important first year as they transition from high school to college. Secondary schools help prepare students to navigate the college admission process as well as meet their high school graduation requirements. Post-secondary institutions are clear in informing students of the necessary requirements and expectations for college admission, yet somehow, critical elements necessary for college course eligibility and achievement upon enrollment at that level are missing. Experts squabble over what college readiness really encompasses; for example, Conley (2005) posited that college readiness means one thing to the administrators, teachers and guidance counselors at the secondary institution and another to the faculty at the post-secondary institution. Over the last thirty years, policy and decision makers have explored how best to define and assess college readiness, how to help students get a head start in college in order to not only increase access, retention and graduation rates but also reduce time to degree and financial aid debt, measures which coincidentally are now also used as indicators of institutional effectiveness (Hoffman, Vargas & Santos, 2008). Efforts to increase access for high school students to engage in rigorous pre-college academic opportunities in order to better prepare them for post-secondary education are expanding in scope nationwide. More and more states are revising their college readiness policies to include the pre-college credit programs of Advanced Placement (AP), Dual Enrollment (DE), and International Baccalaureate (IB) as a means to provide access and opportunities for students to get a head start on college (Adams, 2014; Thomas, Marken, Gray, & Lewis, 2013; Glancy, Fulton, Anderson, Zinth, & ECS, 2015). However, current research studies are mixed regarding the effectiveness of these measures in preparing students for the

transition to college and increasing access (Griffith, 2009). There are various concerns with the use of AP, DE and IB as a “one size fits all” solution to the very complex question of college readiness and access. All stakeholders along the continuum of this process are invested in successful outcomes for precollege credit programs as a college readiness and access measure. There are the parents who want to give their child a leg up for college, the teachers who want to provide a solid foundation of preparation for their students , the high schools that want to increase their graduation rates, the college admissions counselors who review and select those students with the highest markers for college success, the postsecondary institutions that are looking to increase persistence, retention and graduation rates, and finally the students, who navigate this bridge from high school to college via mechanisms, all of whom still have questions surrounding efficacy of these programs, not only as a college readiness measure, but also as a predictor of college success, persistence, retention and graduation.

Pre-college credit opportunities refer to programs built to facilitate the transition from high school to college in order to give students an “advantage” for post-secondary success; students are allowed to take these more rigorous college courses while still in high school with the possibility of also earning college credit, (Bailey & Karp, 2003). Initially developed as an accelerated program for high achieving students who have completed all high school coursework, these programs-- Advanced Placement (AP), Dual Enrollment (DE), and International Baccalaureate (IB) -- have now been identified as ways to facilitate college access and success for not only high achievers but also middle and lower-performing students (Bailey & Karp, 2003). However, is this current practice supported by data? Does the data support the prevailing thought and current practice that these programs increase access and postsecondary achievement for all students?

The AP program administered by College Board, and the IB program, administered by the International Baccalaureate Organization are national programs with standardized content, learning outcomes, policies and scoring, (Achieve, Inc., 2015; Wyatt, Patterson, & Giacomo, 2015). However, for DE, there are no uniform national or state standards for quality of course, teaching and learning outcomes. Indeed, policies governing DE are determined either by states, school districts, or even the individual secondary school itself in agreement with the postsecondary institution (Education Commission of the States, 2015).

The Advanced Placement Program, overseen by College Board, allows high school students to take college level courses in high school class settings and demonstrate proficiency by taking a nationally standardized end of course exam. Scores earned on AP tests are then matched with a concordance table that corresponds to college credit according to the receiving institution's credit and placement policy (Achieve, Inc., 2015; Wyatt, Patterson, & Giacomo, 2015).

The International Baccalaureate Diploma Program (IB) is overseen by the International Baccalaureate Organization and is a two-year curriculum which high school students complete during their junior and senior years in high school (Achieve, Inc., 2015). The program is a holistic combination where students must complete six interdisciplinary IB courses, a research paper, and participate in community service. Upon completion of the courses, students are allowed to sit for the exams (Achieve, Inc. 2015). Students who complete the program and pass the exams then earn the IB diploma, which is recognized both in the US and internationally (Achieve, Inc. 2015). Many colleges have a concordance with IB exam scores where students can also earn college credit based on these results (Achieve, Inc. 2015).

Finally, dual enrollment courses allow high school students to enroll in college-level courses that can be used to earn both high school and college credit simultaneously (Klopfenstein & Lively, 2012; Wyatt, Patterson, & Giacomo, 2015). Originally established as an opportunity for high-achieving students who needed a more challenging high school curriculum, dual enrollment is now seen as a way to get a head start on college, reduce financial aid debt and reduce time to degree (Collins, 2012). As a result, the makeup of the student body enrolling in dual enrollment is now much more diverse, which would appear to address the issues of access and affordability in higher education (Collins, 2012). The overarching goal of dual enrollment programs in this context is to increase the rigor of high school curriculum to better prepare the student for college in order to increase enrollment in, and ultimately, graduation from college (Hofmann, 2012; Karp, Calcagno, Hughes, Jeong, & Bailey, 2007). Only a few studies have looked at the effects of dual enrollment on graduation from four-year institutions and found dual enrollment is positively related to college GPA, persistence and degree attainment (An, 2013; Swanson, 2008). The delivery and course content of DE courses is decentralized, as the teacher of record may or may not have the necessary credentials or training to teach the course, and physically, as the delivery of the courses can be completed at the high school, the college or online (Klopfenstein & Lively, 2012; Wyatt, Patterson, Giacomo, 2015 & Zinth, 2015). End of course tests for DE courses are not standardized, and students are awarded course grades by the teacher of record rather than the institution hosting the course (Wyatt, Patterson, & Giacomo, 2015). State laws and policies governing DE vary state by state with no national standardization (Achieve, Inc. 2015; & Zinth & ECS 2015). The financial costs of DE programs also vary with little information regarding specific funding streams available. In fact, Griffith (2009) found that funding for DE can include “federal, state or local dollars, private donations, student fees or

funding from postsecondary sources” due to the multidimensional and complex nature of the administration of DE. While the popularity of DE has increased nationally, there are concerns that 1) foundational DE courses may not prepare students for the rigor of subsequent coursework, 2) some universities do not recognize or award college credit for DE coursework and 3) grades earned in DE courses become part of the student’s overall college record (Gewertz, 2016).

The questions regarding the use of these programs as a bridge from secondary to post-secondary success are critical for all stakeholders: parents, students, high schools, colleges, legislative bodies, and even the federal government. Specifically, are students who take these courses able to accomplish what these programs promise? Do these programs deliver on the promise to provide students a head start on college, reduce time to degree, financial aid debt, and increase graduation rates? What about performance by underserved populations in these courses? What are the current K-16 policies and practices regarding standards and accountability in these areas? Is there a relationship between completion of pre-college credit programs and completion of a bachelor’s degree for minority students? In order to consider these questions, it is critical to frame the discussion within the context of important milestones in the policy and practice of K-16 standards, as they clearly provide the historical background that couches why the tremendous growth and emphasis on these pre-college courses and examinations exists today.

In 1981, the Secretary of Education created the National Commission on Excellence in Education, charged with examining the quality of education in the U.S. The resulting report, *A Nation at Risk (ANAR): The Imperative for Educational Reform* (U.S. Department of Education, 1983), became the standard for ensuing changes in policy and practice in the K-16 system for the and consequently for the last thirty plus years. The four foundational points addressed in the

eighteen-month study of ANAR (U.S. Department of Education, 1983) are not only still extremely relevant today, but are seminal to current discussions regarding the challenges for defining educational achievement and access in the U.S. today. The specific points considered by the Commission are as germane today as they were in 1983:

- 1) To study the relationship between college admissions requirements and student achievement in high school;
- 2) To identify educational programs which result in notable student success in college;
- 3) To assess the degree to which major social and educational changes in the last quarter century have affected student achievement; and
- 4) To define problems that must be faced and overcome if we are to successfully pursue the course of excellence in education. (ANAR, U.S. Department of Education, 1983, p.2).

In the final report, findings from the Commission painted a grim picture and defined prescriptive measures necessary to enact systemic change in order for the U.S. educational system to compete globally with international educational systems that were fast outpacing ours. The first several pages of the report highlight the “educational disarmament” by the US of our own educational systems, which have allowed “our once unchallenged pre-eminence in commerce, industry, science and technological innovation to be overtaken by competitors throughout the world” (*A Nation at Risk*, 1983, p. 5). The final recommendations, as stated in the Commission Report, established a framework of excellence from which to build on to enact systemic change in 1) course content, 2) standards and expectations, 3) lengthening of time in class/school year, 4) teaching and 5) leadership and fiscal support (*A Nation at Risk*, 1983, pp. 24-33).

The ANAR Committee recommendations thus became the cornerstone for sweeping changes in the K-16 system, predicated on the fact that our educational system was not globally competitive, but was “mediocre” at best and not preparing our students to become contributing members of society (ANAR, U.S. Department of Education, 1983). The report had far-reaching implications at the time, appealing to the country that educational reform was a necessary response to better prepare and educate students (ANAR, U.S. Department of Education, 1983). Thus, ANAR (U.S. Department of Education, 1983) “advocated to move for higher standards in high schools, and the alignment of high school curriculum with college admission expectations” (St. John, Daun-Barnett, & Moronski-Chapman, 2013, p. 57). At the time, these initiatives were considered revolutionary concepts; however, in the current standards and accountability driven environment, successful pre-college programming is considered the gold standard, as the current K-16 system still struggles with how to address college readiness and achievement, as well as access and underperformance of under-represented minorities. Finally, the Commission’s report, ANAR (U.S. Department of Education, 1983) provided the political foundation for subsequent federal and state legislation enacted in an effort to build programs and initiatives specifically directed at the preparation of high school students for college achievement.

In the ensuing years, district, state, and federal organizations identified the pre-college credit course programs AP, DE & IB, as opportunities to prepare and familiarize students with the expectations of college coursework by exposing high school students to college level course requirements, define a metric for college achievement, usually college GPA, reduce time to degree and subsequent student loan debt by providing high school students opportunities to receive college credit level while still in secondary school, thus affording a head start to college, and increase retention and graduation (Hofmann, 2012; Karp, Calcagno, Hughes, Jeong, &

Bailey, 2007). In an effort to expand access and availability, these programs have been financially incentivized at the high school and the university levels in order to make the expansion an attractive and profitable enterprise for all. Additionally, participation in, enrollment in, and outcomes of these programs are also being used as performance markers by state and federal agencies for formula funding and measures of institutional attainment.

Expanding on the efforts started by the initiatives recommended by ANAR (1983), federal government initiatives such as the No Child Left Behind Act (2001) directed funding for the proliferation of DE, AP & IB programs to increase minority participation as a means to close the achievement gap (Kyberg, Hertberg-Davis & Callahan, 2007). Pre-college programs such as DE and examination programs such as AP and IB have seen unprecedented growth and are widely used to bridge the gap between high school and college; however, the reality is that not all students have the same level of access to resources and pre-requisite preparation level in order to be successful in these types of programs (Glancy, Felton, Anderson, Zinth, & Millard, 2014). Glancy et al. (2014) discuss “the uneven access to these opportunities creates disparities for students who want to boost their skills or start early on a postsecondary credential or degree,” yet administrators and policy-makers are utilizing these exact programs to measure student, teacher and institutional success (p.5). In a meta-study of DE programs, Allen (2010) found that quantitative research is very limited on dual enrollment outcomes supporting the claims of benefits due to lack of comprehensive K-16 data to include in their analysis; additionally, these studies often do not employ rigorous statistical methods to control for pre-existing student characteristics, a critical component for determining student preparation and level going into the study (p.15). This is a dichotomy that must be solved and soon, as the proliferation of these programs is a juggernaut in the US K-16 system today.

Consequently, the number of high school students taking pre-college credit courses in either Advanced Placement (AP), Dual Enrollment (DE) and International Baccalaureate (IB) has increased. In 2015, high schools reported approximately 2 million students enrolled in dual credit courses (Cowan & Goldhaber, 2015), roughly 2.5 million students enrolled in AP (Born, 2016), and 830 IB programs in U.S. schools (Adams, 2014; Born 2016; Cowan & Goldhaber, 2015; Glancy, Fulton, Anderson, Zinth & Millard, 2014 and Thomas, Marken, Gray & Lewis, 2013). Additionally, since these pre-college programs aim to increase access for minority students, we must examine minority participation rates in the DE program and AP and IB examination programs. Theokas and Saaris (2013) describe the achievement gap in AP and IB by analyzing national participation rates and gaps, which estimate that there are 9% missing Hispanics and 6% missing Black students from participation in AP, which add up to totals of 37,394 and 79,016 respectively. Theokas and Saaris (2013) conducted a similar analysis for IB and found the opportunity gap to be 19,715 for students considered in a low SES, 7,932 Black students, and 5,376 Hispanic students.

Given the identification of DE, AP & IB as college readiness factors, and the fact that the programs are not all uniformly administered and are not equally available to all students, is participation in these programs really in the student's best interests (Mendillo, 2012)? Are students really gaining enough of an understanding of the subject matter to be successful taking subsequent coursework in college (Mendillo, 2012)? Are students able to reduce their time to degree due to participation in these programs, (Mendillo, 2012)?

With the ever- increasing costs of education in general, DE, AP, and IB programs have become opportunities for students to save money by completing college credit while in high school. Any pedagogical concern that these opportunities may not fully prepare students to be

“college ready” and perform at the college level, is supplanted by the fiscal concern in the mind of the student and their parents. To the students and parents, these programs are a cost-saving measure that can facilitate the student potentially getting a head start on college by one or even two semesters. Zinshteyn (2016) discusses how the rising costs of tuition due to the reduction in state appropriations is driving stakeholders to look for ways to reduce time to degree.

Furthermore, public college tuition is at 33% higher cost today than it was in 2007 (Zinshteyn, 2016). "Over the last 20 years, the price of attending a four-year public college or university has grown significantly faster than the median income, and although federal student aid and tax credits have risen, on average they have fallen short of covering the tuition increases"

(Zinshteyn, 2016, p. 7-8). These pre-credit opportunities have been co-opted by K-16 institutions and policy-makers as they would appear to be an answer to this dilemma.

Yet, despite the emphasis on and growth of these pre-college and examination programs, as well as student participation and enrollment at the high school and university levels, ACT’s National Report of The Condition of College and Career Readiness (2016) details that of that test taking population, only 41% of high school students met the college readiness benchmark in mathematics, 61% in English, 44% in reading and 36% in science (p. 5). These College Readiness Benchmark scores define the baseline scores that must be met by students in order to have a 50% chance of obtaining a “B” or higher in corresponding first-year college courses (ACT, 2016; Venezia & Jaeger, 2013). In sum, of the total 64% of the tested 2016 graduating class who took the ACT test, approximately 24% of all ACT tested high school students met all four of the College Readiness Benchmarks (English, Math, Science & Reading), which indicate academic readiness for first-year college courses in English Composition, College Algebra, Biology and the social sciences (ACT, 2016). The College Board (2015) reported that 41.9% of

SAT takers were college ready, indicating that a student has a 65% chance of obtaining a “B-“or better during the first year of college. Venezia & Jaeger (2013) call this phenomenon the “disconnect between what high school teachers teach and what postsecondary instructors expect in students’ preparation for first-year credit-bearing courses in college” (p. 119).

Compounding ACT (2014) and College Board’s (2013) metrics and of staggering concern is the disproportion between the performance of underserved students competing in the same environment as those who are resourced. For example, in 2007-2008, approximately 91 percent of twelfth-graders in low-poverty schools graduated with a high school diploma, with 52 percent of those then going on to attend a four-year institution, compared to only 68 percent of students who attended a high poverty school graduating with a diploma, and only 28 percent of those then attending a four-year post-secondary institution (Venezia & Jaeger, 2013). This begs the question, why are secondary institutions focusing on DE and other pre-college credit programs, rather than on ensuring that students actually qualify for college level coursework rather than remediation?

The current reality of “uneven access” for students who while desiring to attain a college degree but “do not have access to these pre-college credit and examination opportunities to help them get a head start on a postsecondary credential or degree” is at the nexus of why it is critical for scholarly study incorporating an analysis of Critical Race Theory (CRT), policy and practice in the K-16 system. (Glancy et al., 2014, p.5). This disparity in access, mostly driven by socio-economic factors, creates an educational inequality that runs counter to the very purpose of what these pre-college credit programs and examinations were created to do, which is to prepare students for college achievement and graduation. The truth is that not all of these pre-college credit and examination programs are administered in the same manner, and there exists the

reality that these programs administered in a low-poverty versus high-poverty high school can have very different outcomes. In the landmark case *Williams v. State of California*, 2000, one-hundred students alleged that they were “being denied equal access to a quality education.” In the ruling, the California Department of Education was ordered to allocate funding to provide “all students with equal access to instructional materials, safe school facilities and quality teachers” (Kyberg et al., 2007). Surely there is an inherent tragedy that a group of students’ had to sue the State Department of Education of California (2000) in order to have access to the resources necessary to obtain a quality education.

Currently, pre-college credit and examination programs are perceived as mechanisms that aid high school students not only to better prepare them for the college academic experience, but also promote to post-secondary achievement in the form of a head start on college credit. In 2013, the Obama administration issued a statement that said “dual enrollment opportunities let high school students earn credits before arriving at college, which can save them money by accelerating their time to degree”, (Gewertz, 2016).

Does the data really support the assumptions that have been and are being made about the post-secondary effect of these programs? Over the past 10 years, K-16 policy makers and stake holders have expanded the offerings of these pre-college courses and examinations. These opportunities are very well funded at the district, state, and national levels and are used as measures of institutional quality and attainment and promoted as vehicles to increase access for all students, yet a robust empirical connection between pre-college credit completion and post-secondary success is lacking due to the use of older data sets (An, 2013a & 2013b; Godfrey, Matos-Elefonte, Ewing & Patel, 2014; Hoffman et al., 2008; Marken, Gray & Lewis, 2013; Speroni, 2011 & Swanson, 2008), access to only secondary or only post-secondary data sets

which do not allow researchers to study the full effect of K-16 variables (Mattern, Shaw & Xiong, 2009; Thomas, Marken, Gray & Lewis, 2013), and access to only self-reported and/or incomplete data sets (ACT, 2013; An, 2015; Wyatt, Patterson & Di Giacomo, 2015).

Additionally, there are few statistical studies that look at all three of these programs-- DE, AP and IB-- separately and collectively, in relation to post-secondary achievement, and while it appears that these programs all individually show some promise,

All three indicators should be placed on an equal footing within accountability systems. The current research does not support prioritizing one model over the others. All three models correlate with college readiness and success, and few comparative studies have been done, making drawing conclusions about whether one model is more effective than the others difficult (Achieve, Inc., 2015, p. 16).

In order to gain a true perspective of this problem, it is important to also look at this issue from a policy and legislative perspective. Much attention has been placed on this issue of college readiness beginning with 1983's Commission Report, *A Nation at Risk* to 2001's *No Child Left Behind* law, and finally to present state and federal legislation allocating resources for the development of pre-college credit and examination programs, yet the question still remains, given the dearth of comprehensive statistical study on the efficacy of these programs, how can these efforts continue to be supported by the various district, state and national bodies basically on assumptions or incomplete data? Current trends by state and federal governments to incentivize the delivery of these pre-college credit programs, standardize concordance tables at the state level, and market the opportunity to "get a head start on college, increase retention rates, reduce financial aid debt and reduce time to degree" are at the heart of the growth of these programs. For example, the *No Child Left Behind Act (NCLB, 2001)* provides for the adoption of AP courses as a model for a "rigorous high school curriculum" called the AP Incentives Program; this competitive grant program was developed for programs that increased the number

of high school students taking and succeeding in advanced coursework (Kyberg et al., 2007, p.181).

This study will present three main points for consideration that secondary and postsecondary policy makers, parents, students, and other stakeholders committed to this issue must account for: (1) the lack of empirical evidence examining the effect of completion of pre-college credit courses and examinations on postsecondary achievement, (2) what this means in relation to the various district, state, and national policies that exist where apparently weak metrics are used for the accountability and development of programs and (3) whether these programs are indeed fair to all students, or if there an inherent bias against under-represented minorities due to factors that must be analyzed through the lens of CRT and how this can be solved.

Given this context, this study seeks to examine whether the three main pre-college credit and examination programs, AP, DE or IB, individually and/or collectively exhibit a significant relationship with high school information, demographic information, college achievement, and/or institutional measures. Secondly, do those findings support the convention that these programs increase access and opportunity for under-represented minorities? Additionally, since these pre-college credit and examination programs are often used as a means to provide access and opportunity to get a head start on college for under-represented minorities, this study will also statistically explore minority participation and achievement in these programs to determine whether this is indeed the case for a large public institution in the Southeast.

The findings of this study can potentially assist in informing policy and decisions that are currently being made at all levels of federal, state, district, and local governments and school boards, but also, and most especially, in high schools in the guidance counselor's office and

around kitchen tables where parents and their students sit to consider whether or not to enroll in one of these pre-enrollment credit or examination programs.

Research Purpose

The purpose of this explanatory sequential mixed methods study is to examine a comprehensive K-16 dataset to assess whether there is a significant relationship between completion of AP, DE and/or IB courses in high school and college success and achievement as defined by college GPA, time to degree and graduation.

This mixed methods research study will address 1) quantitatively through the use of statistical analyses, whether there is a difference in the effects of pre-college credit and examination programs on college achievement 2) whether there is an access gap when comparing the performance of minority versus non-minority students on several academic and demographic variables, specifically, whether there is a difference in the way that minority students perform on the various pre-college credit programs as compared to non-minority students, and 3) qualitatively through the use of an online questionnaire, to discover student perceptions and experiences of how these pre-college programs and examinations either aided or detracted from their college achievement and experience.

Research Questions

The overarching quantitative research question to be examined is “Which pre-college credit or examination program or combination thereof (Advanced Placement credit examination (AP), Dual Enrollment course (DE), or the International Baccalaureate Diploma program (IB) or absence of pre-college program participation (None)) is the most significant predictor of student postsecondary achievement?

The quantitative research questions to be examined are:

1. Which pre-college credit or examination programs (AP, DE, IB or NT) are the strongest predictors of college achievement?
2. How does the relationship between pre-college credit and examination programs (i.e.: AP, DE, IB, COMBO (participation in more than one pre-college credit or examination program) or None (absence of pre-college coursework) and college outcomes vary by student high school characteristics: public versus private, in-state versus out of state, and # of college prep courses taken, and are predictive of college success?
3. How does the relationship between pre-college credit programs (i.e.: AP, DE, IB, COMBO or None) and college outcomes vary by student demographic characteristics: race/ethnicity, gender, and/or socio-economic status (SES – as defined by parental level of education) and are predictive of college success?

The overarching qualitative research question to be examined seeks to gather student impressions and feelings regarding their participation in pre-college credit programs via a short survey questionnaire administered to the sample cohort via email.

The overarching qualitative research question to be examined is:

1. Are there differences in the way that students who experienced DE, AP & IB courses in high school perceived the impact of those courses on their transition, preparation and performance in college?

CHAPTER TWO: THEORETICAL FRAMEWORK AND REVIEW OF THE LITERATURE

Theoretical Framework

Utilizing Grounded Theory as the lens through which this mixed methods study is analyzed will provide for the organic development of ideas and impressions collected both quantitatively and qualitatively that can inform and offer insight into the questions regarding the strength of pre-college credit programs as predictors of college success. Additionally, this study will consider high school and demographic characteristics, as well as the impact of pre-college credit programs on the college achievement of students. By combining exploratory quantitative student case data with explanatory qualitative attitudinal data, this study proposes that the question of whether or not these pre-credit programs are accomplishing their intended purposes is multi-faceted and requires consideration on many levels (Creswell, 2015). The outcomes of both analyses in this study can complement and inform the other to create a more holistic conception of the issue in order for all stakeholders to be able to make thoughtful and informed decisions on policy and practice that are based on empirical student data and the thoughtful collection of student impressions.

Specifically, the theoretical framework for this mixed methods study will consider the intersectionality and integration of one pragmatic model for college readiness, Conley's (2005) College Readiness Model (CRM), along with one of the foundational underpinnings of Critical Race Theory (CRT) – racial realism. Blaisdell (2016) offers the notion that racial realism can be a useful lens to education researchers as they look to address critical race theory in their studies.

In developing this juxtaposition, the seminal work of Ladson-Billing and Tate, (1995) appropriately theorized and foresaw that “analysis of educational inequity, must explicitly acknowledge the role of racism”, yet twenty-two years later, secondary and postsecondary

education systems are still grappling with achievement gaps and racism in such areas as access, curriculum and policy (Patton, 2016).

Interestingly, this linkage of CRT with practice has been acknowledged previously in the works of Dixson and Rousseau (2005) and Ledesma and Calderon (2015), as it is almost realistically impossible to separate this theory from any of the underlying achievement gap issues in the K-16 educational systems today. Rowland and Shircliffe (2016) recently maintained that “the stated goals of the standards-based testing movement are to raise academic expectations for high school students and reduce racial and class disparities in educational attainment.” Yet the current reality is that “racial disparities in course-taking patterns, graduation rates, and measures of college readiness” are the norm (Rowland & Shircliffe, 2016), and researchers must acknowledge the importance and inclusion of CRT on school practice and policy (Howard & Navarro, 2016).

Racial realism, defined, recognizes that “racism is a permanent aspect of U.S. society and schools” and that despite that acknowledgement, is still making “the commitment to challenge racism regardless” (Blaisdell, 2016, p. 285). One recognized inherent difficulty in applying CRT-racial realism in educational research is the convention that society would rather avoid or tiptoe around the issue of racism rather than directly address it (Patton, 2016). If we, as a society, as educators, are to address and solve the achievement gap, it is not only necessary to acknowledge the existence of racism and inequity, but to also commit to challenge that actuality. Only recently, in the works of Blaisdell (2016), Howard and Navarro (2016), and Rowland and Shircliffe (2016), has this intersectionality of Critical Race Theory, along with the more pragmatic philosophies been considered in the context of solutions that could potentially address minority gaps extant in education today. Additionally, Howard and Navarro suggest that “given

the disparate educational outcomes for students of color, researchers have to inquire about the influence of CRT on the lived experiences of students in school” (2016). In an overview of CRT covering the last twenty years in the field of education, Howard and Navarro posit that students of color often experienced a deficit of acknowledgement, where learning only focused on the importance of the White perspective, and non-White perspectives were not recognized in school curriculum (2016). This inequity and exclusion has led to chronic academic and achievement disparities between White and non-White student populations that are still entrenched in the educational landscape today. The inclusion of Critical Race Theory in educational dialogue must be considered going forward, as practice and policies move to create more racially inclusive and sensitive learning environments (Howard & Navarro, 2016). This is what drives the heart of this research study and why it is critical to recognize that this is an issue requiring a multi-level holistic solution of quantitative and qualitative study from both the pragmatic as well as theoretical approaches.

Conley based his research on Adelman’s (1999) study, the seminal point in the consideration of pre-college credit programs as impactful in post-secondary achievement. It was Adelman’s study (1999) that first made the connection between completion of dual enrollment and pre-college credit as a factor for potentially predicting college success. Adelman (1999) identified dual enrollment as one answer to the questions regarding access and “equitable opportunities to learn” in order to prepare students for post-secondary performance and achievement, and since that time, resources allocated to these programs have increased incrementally (Adelman, 1999, p. 84 & Speroni, 2011).

In 2005, Conley made a distinction between two terms that clearly identified the conundrum facing secondary and postsecondary education, namely, the difference between college readiness and college eligibility. Conley differentiates between the two terms as follows:

Because of the unique nature of the U.S. educational system, high schools focus on making students college-eligible, in other words, to enable students to meet admissions requirements. Students become college-eligible primarily by taking courses whose titles have been approved by college admissions offices. However, these students may or may not be college-ready, which is defined as being able to meet the expectations they encounter in entry-level college courses (2005, p. xi).

Conley (2005) further distinguished college readiness in three general ways: 1) a set of standards designed for both secondary and postsecondary institutions to identify any gaps in skills, gauge the level of content knowledge, and behaviors of students, 2) faculty expectations for these entering students and 3) whether or not the student is able to enroll in the postsecondary institution without need for remediation in college level general education courses that meet degree requirements in their major. Specifically, Conley's (2007) CRM is a blueprint that builds on the four key intrapersonal and interpersonal elements that serve as the foundation necessary to navigate the bridge between secondary and postsecondary enrollment.

Conley's model consists of four facets of college readiness:

- 1) Key Cognitive Strategies (THINK) describes the intelligent behaviors and development of cognitive strategies and capabilities necessary for college readiness;
- 2) Key Content Knowledge (KNOW) of academic skill areas centrally important to college success;
- 3) Key Academic Behaviors (ACT) consist of attitudinal factors related to the student's own self-awareness, self-monitoring, and self-control over processes and behaviors necessary for academic success;

4) Key Contextual Skills and Awareness (GO) refers to the level of familiarity and knowledge that a student has to successfully adjust to and perform throughout the entire postsecondary process and the subsequent role that they play in this process.

Conley's Four Keys (2007) were developed over time and rely not only on the student, but also teachers, guidance counselors and the high school itself to provide an environment and resources necessary for the attainment of these standards. The framework of Conley's Four Keys is just one part of the college readiness equation, in that managing "differences in expectations between high school and college are manifold and significant and students must be prepared to use quite a different array of learning strategies and coping skills to be successful in college than those developed and honed in high school (2007, p.7).

Conley's (2007) College Readiness Model (CRM) is noteworthy because it grounds the primary thematic considerations of this research in relation to pre-college credit program practice and policy today: (1) the relationship between the high school and the postsecondary institution, (2) the K-12 foundational learning outcomes necessary for postsecondary success, (3) the student transition from high school to college, and (4) faculty expectations for first-time freshman performance. Conley (2007) precisely identifies the multi-layered intricacies inherent in this topic and provides a roadmap for school, district, state, and national agencies to follow in order to meet the established set points for college readiness and success. Conley (2007) asserts that AP, DE & IB pre-college credit programs have the potential to be mechanisms that meet these criteria and thus facilitate the transitions from high school to college, all the way through to a successful graduation from college. The reality, however, is that these programs vary significantly in quality, oversight and the extent to which they truly are of benefit to students (Speroni, 2011).

Many of the concerns previously discussed within the statement of the problem section for this research study offer the hypothesis that part of the tremendous growth of these pre-college placement and examination programs is being driven by the need to create access opportunities for under-represented students (An, 2013; Bailey & Karp, 2003; Blanco, 2006; and Rowland & Shircliffe, 2016). While Adelman (1999) and Conley (2005) discuss the definition and importance of college-readiness, it cannot be separated from the fact that there currently exists an unequal access gap in the US educational system that needs to be addressed. Access to educational opportunities, fully resourced institutions, and supportive infrastructure are just a few of the critical concerns that can be practically linked back to the more generational and sociological factors of CRT philosophy, which tie in directly with Conley's CRM. What is needed is an integration of the narrative and discourse with the practical application of empirical data analysis in order for scholarly study and research to move the discussion from the purely theoretical to a place where recommendations from this type of integrated research can inform policy and practice. In truth, moving forward, the necessity for this CRT lens to be incorporated into the more practical and quantitative aspects of K-16 scholarly study will be an integral part of the transition of CRT into the vernacular, rather than just staying in the realm of the scholarly. Perhaps a future without these biases can be a reality if scholars work to consider, address, and in a practical and quantifiable manner, solve these challenges; otherwise, the narrative may continue to get lost in the translation. A seismic change of this sort would require a commitment from the federal, state, district and local levels to provide funding to properly resource K-16 at the levels necessary to provide all students with the tools that they need to be successful.

Review of the Literature

This literature review will assess the body of empirical research currently available that studies the effect of pre-college credit and examination programs on postsecondary achievement and completion outcomes. Specifically, this review will report on scholarly studies that examine the high school characteristics of students who took AP, IB and/or DE, their subsequent transition to four-year institutions, and whether these pre-college opportunities were significant or related to their postsecondary achievement. This literature summary will include studies that focus on: 1) the individual impact of each of the different programs AP, IB and DE on these postsecondary outcomes, 2) the combined impact of AP, IB and DE on the postsecondary outcomes and finally, 3) parse out the impact of AP, IB and DE on minority postsecondary performance outcomes. Overall, there is a deficit of conclusive empirical study in the literature primarily due to a lack of access to the necessary comprehensive K-16 dataset needed to conduct such studies, the use of incomplete or self-reported data sets, as well as a deficiency in the availability of a mechanism that can adequately capture and evaluate the delivery of DE courses as well as the quality of teachers. The aforementioned deficits are critical shortcomings that are necessary to comprehensively capture the true impact of these pre-college credit programs.

This literature review will address three main foundational gaps that currently exist in the literature with regard to the relationship of pre-college credit with college achievement:

- (1) The dearth of statistically significant empirical data conclusively tying credit in precollege courses and examinations to post-secondary success;
- (2) Given this lack of data, how it is that these programs have continued to grow and are now incentivized by district, state and federal policies and practice; and

- (3) Explore the efficacy of these pre-college programs in creating access opportunities for underrepresented to minorities.

Inextricably tied to efforts to bridge the gap between high school and college, researchers struggle how to not only define the process of college readiness, but also to actually execute it successfully and fairly, hence the plethora of programs and incentivization for stakeholders such as secondary and post-secondary institutions.

Given the current growth of pre-college credit and examination programs and that stakeholders involved in this issue have identified pre-credit programs as the answer to the college readiness and achievement conundrum, there is a critical need for conclusive, substantive empirical research that supports these policy decisions. Overall, there are more studies that consider the impact of these programs on students who enrolled in community college rather than four-year institutions. Additionally, there is a substantive body of policy briefs and reports that considers the issues and utilizes extant studies to inform recommendations that are of a more holistic nature. These policy reports inform the narrative and contribute to the discourse of the issues, but ultimately, they do not conclusively establish the connection between pre-college credit and examination programs and postsecondary achievement outcomes. Additionally, College Board, the company that administers the AP pre-college examinations, has supported and funded many studies on the efficacy of AP performance and their impact on post-secondary success, which tend to be favorable.

In considering the research questions of this inquiry with the current body of scholarly study, it is critical to place the studies in chronological order to highlight not only the increasing importance and growth of this issue, but also to indicate how little impactful change has occurred since Adelman (1999) first made the connection between pre-college programs and college

achievement. This timeline placement will help to drive the point that while verifying a conclusive link between pre-college credit courses and examinations is the gold standard, once that convincing link is established, it will take a transformative change to ensure that all students have equal and properly resourced access to these opportunities.

Advanced Placement Program

The Advanced Placement program, established in 1957 and administered by College Board, a non-profit organization connecting students to college success and opportunity, was established to provide advanced high school students the opportunity to earn college level credit or placement in advanced courses (Klopfenstein & Thomas, 2009). Originally serving students from elite private high schools, the AP Program has now expanded and extended its mission to increase access to all high school students both public and private by offering fee waivers for students with financial need (Godfrey, Wyatt & Beard, 2016). The AP Program affords high school students the opportunity to take more advanced and rigorous courses while still in high school and also take an end of year examination which also awards college credit based on the score (Ewing, 2004; Klopfenstein, 2009). In 2015, more than 2.5 million high school students took AP exams, with continued growth expected in the future. At an average cost of \$92 per AP exam, College Board asserts that its fee waiver program for those students who cannot afford the exam fee is helping students with financial need access a more rigorous academic curriculum in high school with the potential to earn college credit (Born, 2015; Godfrey, Wyatt & Beard, 2016). College Board touts the benefits of the AP program as “increasing students’ on-time graduation rate compared to those students who did not participate...and students can save money as AP courses are accepted at more than 3,800 colleges and universities in the U.S and that the challenge of an AP course is key in preparing students for the rigors of college” (Born,

2015). Additionally, College Board's own research advances the notion that college outcomes for students who participate in the AP program are better than those students who did not have this benefit, (College Board, 2014).

Dougherty, Mellor and Jian (2005), in an empirical study published in the *National Center for Educational Accountability Journal*, examined the relationship between AP course participation and exam success with college graduation rates. The three research questions analyzed in this study were:

- 1) Do students in AP graduate from college at higher rates than non-AP students?
- 2) Do students in AP graduate from college at higher rates than non-AP students, controlling for the students' observed characteristics and that of their schools?
- 3) Do high schools with a higher percentage of students in AP have higher college graduation rates of their students who attend college, controlling for the measured characteristics of those schools?

The sample for the dataset was a cohort of 67, 412 Texas 8th graders who graduated from high school in 1998 and enrolled in a Texas public two or four year college or university within twelve months after high school graduation. Dougherty et al. (2005) established that having such a dataset, which they followed from 8th grade, would allow them to control for the student's academic preparation prior to high school. The authors decided on this particular dataset as the state of Texas warehouses student data from K-16, affording the researchers the opportunity to track and match secondary and postsecondary records for these students longitudinally. The authors conducted their study in spring of 2003, which would give the cohort five years to graduate. The sample was disaggregated by ethnicity: African-American, White and Other (Asian & Native American), and SES: low income and non-low income groups. For the school

characteristics question (#3), Dougherty et al. (2005) limited themselves to schools with a minimum of 500 students overall and at least 15 students in the student group being analyzed. Once this was complete, the actual sample size was 54,556. The students were then divided into 4 groups, 1) those who took and passed at least one AP exam, 2) those who took, but did not pass the AP exam, 3) students who took AP course but not the exam and 4) those who took no AP course or exam.

Dougherty et al. (2005) used descriptive statistics (Q#1), hierarchical linear modeling analysis (Q#2) controlling for income and prior academic preparation, and ordinary least squares (OLS) for (Q#3). Their findings confirmed at the student level the predictive relationship of AP and college readiness and success measures. For example, 92 African-American students in the cohort passed at least one academic AP exam and then enrolled in a Texas public high two or four year college or university; of these 49 students, 53% graduated from a Texas public postsecondary institution within five years. Low-income students in the cohort who took and passed at least one academic AP exam had a higher college graduation rate at 46% versus seven percent for low-income students who did not take any AP course or exam. Finally, Dougherty et al. (2005) found two important trends: 1) that the percent of high school students who take and pass AP exams is the best AP-related indicator of whether the school is preparing its students to graduate from college and 2) “the importance of AP exam results indicates the need for schools and districts to pay close attention not only to the quality of teaching in AP courses but also to improving the academic preparation of students prior to their enrollment in these courses” (p.14). Dougherty et al. (2005) discuss in their implications that their findings were consistent with other indicators showing a major college readiness gap for low-income students. They suggest that high schools can start teaching AP courses earlier and to larger groups of students so that they

can be ready to perform at the college level upon high school graduation and not require remediation upon enrollment in college (Dougherty et al., 2005).

Keng and Dodd (2008), in an empirical research report for College Board, compared the performance of students in the AP program compared to students who did not take AP courses in high school on a number of outcome measures. Given the rapid expansion of the AP program, Keng and Dodd (2008) selected ten of the most prevalent AP Exams taken by the students attending University of Texas at Austin in order to study whether performance on these exams is predictive of subsequent performance in that subject area compared to a non-AP group, as well as whether there is a difference in the college performance by AP Exams versus non-AP. The four groups of students were as follows: 1) students who earned credit on the AP exam 2) students who took AP but did not pass the credit exam, 3) students who did not take the AP exam and 4) non-AP group. There was an additional group of students who received AP credit but elected not to receive the college credit. Keng and Dodd (2008), reported that N 's=10-35 and were substantially smaller than the other groups, so they were not included in the analyses. The dataset consisted of UTA's incoming freshman classes for the 1998-2001 academic years. The population for each class was as follows: 5910 (1998), 6345 (1999), 6467 (2000) and 6219 (2001). The state of Texas' K-16 program affords access to student information which gave the researchers student level variables, such as the following: grades on all AP exams, grades and dates of all college courses, overall college GPA's, high school rank, admission test scores, and transfer credit. Keng and Dodd (2008) ran multivariate One-Way MANOVA for all AP Exam subjects which were statistically significant for all four entering classes followed by post-hoc analysis, univariate ANOVA's and multiple pairwise Tukey-Kramer comparisons of the means.

Keng and Dodd (2008) found that 1) AP students who earned credit by exam outperformed all the other student groups across all exams in college, including subsequent coursework; 2) students who took the course but not the exam still generally performed nicely and actually tended to earn the most college credit hours in the related subject area (observed in 6 of the 10 AP Exams investigated); and 3) poor performance of AP students who did not earn credit by exam. Keng and Dodd's (2008) study continued to support previous research showing that AP students perform as well as, if not better than, non-AP students on most college achievement measures. One limitation of this study was that the dataset consisted of students from a single college campus, which would impact the generalizability of the results.

Hargrove, Godin and Dodd (2008), in an empirical research report for College Board, utilized the previous data set used by Keng and Dodd (2008) to study fourth year college success and added an additional dataset to specifically study first year performance. Research questions for Hargrove et al. (2008) focused on college student outcomes on a) first and fourth year GPA, b) first and fourth year credit hours earned and c) four-year graduation status compared across AP (course only, exam only, and both), and non-AP (DE only and other course only) experiences in high school. This two- phase study utilized data from the Texas Higher Education Coordinating Board (THECB) and the Texas Education Administration (TEA) consisting of 1998-2002 Texas public high school graduates to analyze first-year outcomes using subject specific AP exam and data from 1998-2001 to analyze four-year graduation outcomes using subject-aggregated AP exams. Hargrove et al. (2008) utilized multivariate (MANOVA) and univariate (ANOVA) analysis, followed by subsequent post hoc comparisons. Results for Phase I supported the benefits of participating in both AP courses and exams across both gender and ethnic groups, despite instances of the group by ethnicity interaction where students within

ethnic groups in the AP course and exam group outperformed, in general, other students of the same ethnic group in the AP course only, DE (when available) and other course groups despite performance gaps among some ethnic groups overall; graduation rates for AP exam and credit students graduated at significantly higher rates within four years than students in the other groups. Phase II results found that across the cohorts, AP course and exam students had significantly higher four-year graduation rates (36 %+) than the AP course only (<23%). For students with DE only, Hargrove et al. (2008) reported the graduation rate for only one cohort (2001) and that rate was 24.29%. Hargrove et al. (2008) found that the benefits of participating in both AP courses and exams extended across all outcomes, but specifically for graduation rate; the relationship between the various types of AP and non-AP were consistent across the cohorts. A limitation of the study was that credits earned for AP course and exam and DE were unavailable.

Klopfenstein and Thomas (2009), in a quantitative study published in the *Southern Economic Journal*, sought to examine the extent to which taking AP courses predicts early college grades and retention. Given an environment that emphasizes increased growth of AP and the use of AP by stakeholders as a college readiness measure, Klopfenstein and Thomas (2009), demonstrate concern at the lack of true empirical study of the predictive value of AP on college achievement and take issue with the more descriptive reports published by College Board and ETS that demonstrate a link between AP course completion and college readiness standards. The research questions analyzed in this study looked at 1) the predictive value of AP courses on college grades via first semester GPA and 2) the predictive value of AP courses on college retention via second year retention of students. Both of the questions considered rigorous high school courses, student academics, high school, and family demographic characteristics. The

data for this study came from the Texas Schools Microdata Panel (TSMP); the sample consisted of 28,000 Texas public high school graduates from 1066 high schools who attended 31 four-year Texas public universities in the fall of 1999. The authors describe students who are not retained as “those students who have a GPA of < 2.0 and do not return to any four-year institution in Texas for their second year of study, including those who transfer to two-year postsecondary institutions” (p. 878). This rigorous empirical study utilized multivariate logit, Ordinary Least Squares (OLS) and regression for the statistical analysis and did not include more specific methodological information, choosing instead to inform readers that complete regression results are available from the authors upon request (Klopfenstein & Thomas, 2009). Klopfenstein and Thomas (2009) found that white AP students retained at the highest rate and had the highest average first semester GPA at 2.77 in the 1999 cohort; additionally, only 10% of white AP takers did not return for the second year. Non-AP black and Hispanic students had the lowest retention rate with an average of over 22% not retained and a mean first semester GPA of 2.01. Controlling for various factors, Klopfenstein and Thomas (2009) found that each additional AP course taken (up to five) has a constant positive impact on white student retention while black and Hispanic retention increases for only the first two or three. The authors note in their findings a downward curve for AP effect on retention for black and Hispanic that “the AP effect on retention may be biased downward if AP experience increases the likelihood of college attendance for first generation students, but many postsecondary institutions do not support traditionally under-represented students once they arrive on campus” (2009, p. 881). In the GPA models, F tests confirm that the coefficients are statistically different for white, black, and Hispanic students; as the authors analyzed the relationship between AP course experience and changes in GPA with and without controlling for non-AP courses, Klopfenstein and Thomas

(2009) found the same bias in previous research where “the co-efficient estimate on the number of AP credits taken is 1.6 times larger when only AP courses are considered, while the effect of the number of AP credits on GPA for black and Hispanic students is negligible, thus the omission of non-AP courses in previous studies can lead to erroneous conclusions regarding the effectiveness of the AP program on college achievement, particularly for minority students” (2009, p.884). Klopfenstein and Thomas’ (2009) study concludes “that there is a clear distinction between courses that are “college preparatory” and those that are “college level”, and that stakeholders and policymakers do not recognize this distinction when they apply AP program participation, experience and credit into the equation as a college readiness measure. Klopfenstein and Thomas (2009) further related that “they did not find conclusive evidence that for the average student AP experience has a causal impact on early college success” (p.887). Their findings considered that AP course taking alone, may be predictive of college success, but were doubtful that AP participation has a positive causal impact on college performance for the average student, and that their research pointed to the predictive power of AP taking being more likely the result of the fact that “high ability, motivated students take more AP classes to differentiate themselves from other students in the college admissions process” and that “once other rigorous high school courses and demographic and school characteristics are considered, however, students typically do well in college regardless of their AP experience” (p. 887).

Additionally, the authors caution that the use of the AP program as a signal may be diminished with the increased growth of the program and expansion of enrollment to students with less ability or motivation, Klopfenstein and Thomas (2009). The authors explicitly share their concerns that the expansion of the AP program may cause marginal students to overestimate the impact of these courses on their “college readiness,” when in fact, they won’t be

able to master the material sufficiently for college. Klopfenstein and Thomas (2009) close their study by sharing that the tendency at the time the article was written was to legislate towards the AP program, the authors conclude that policymakers would be better served to shift their emphasis from AP to math and science preparation, as there is much better empirical support for a causal link to college and work force success. One limitation of the study was the age of the dataset-- high school graduates from 1999. In the ten years since Klopfenstein and Thomas (2009) wrote the study, clearly the student body was not the same as it would be with a more current dataset; additionally, the dataset only includes public high schools and colleges.

Mattern, Shaw and Xiong, 2009, in an empirical study for College Board, focused on the relationship between students' performance on AP English Language, Biology, Calculus and U.S. History and college achievement measured by first year GPA (FYGPA), second year retention and institutional selectivity level of the institution attended after controlling for SAT performance and high school GPA (HSGPA). Mattern et al. (2009) selected those specific AP exams as they have the highest volume of exam-takers. The dataset consisted of nearly 100,000 students from 99 U.S. institutions, selected from the SAT Validity Study database, and represented the largest sample in AP validity research to date (Mattern et al., 2009). Course-level performance data from the institution was matched back to the College Board databases and included SAT scores, SAT questionnaire responses (self-reported by the student), AP Exam scores and institutional characteristics of the colleges and universities. Students were classified into three groups according to their performance for each of the AP Exams: 1) Non-AP exam students 2) students who took an AP exam and made a 1 or 2 and 3) students who took an AP exam and made a score of 3 or higher. The final sample sizes for the different exams were as follows: AP English Language (85,971), AP Biology (71,377), AP Calculus (83,951) and AP

U.S. History (93,775). The methodology for analysis used by Mattern et al. (2009) included descriptive statistics, and predictive validity was analyzed utilizing ANCOVA's, and second year retention was predicted using logistic regression. Mattern et al. (2009) found that higher performance on AP English Language, Biology, Calculus AB and U.S. History was consistent with higher FYGPA, second year retention rates and attendance at more selective institutions.

Additionally, the authors found that after controlling for the effects of prior academic performance, students who earned an AP subject exam score of 3, 4 or 5 tended to outperform students who received a 1 or 2, as well as students with no AP exams in FYGPA, second year retention rates and institutional selectivity. Limitations of the study included the following: pre-college information was self-reported by the student, and no high school or SES characteristics were employed in the study.

Patterson and Ewing (2013) conducted their empirical study as part of the Research Report series by College Board to evaluate whether AP Exam Scores associated with ten courses were valid for placement into subsequent higher level courses in the subject area of the exam. The specific AP Exams examined in Patterson and Ewing's (2013) analysis were as follows: Calculus AB, Calculus BC, Biology, Chemistry, Physics C: Mechanics, Microeconomics, Macroeconomics, Psychology, U.S. Government and Politics, and U.S. History. The sample for the study consisted of 95, 518 first-time freshmen for the fall of 2006 attending 53 four-year institutions with publicly available AP Exam credit and placement policies. Patterson and Ewing (2013) utilized the college outcome data from 53 postsecondary institutions that were part of a cohort of schools participating in SAT's validity study for the March 2005 changes that were made to the test. The institutional data was then matched to College Board's data with the resulting test sample at 72, 902 students. The measures used by Patterson and Ewing (2013) in

their study are as follows: 1) students who took AP Exam scores and non-AP students 2) college course rubric and grades provided by the student's institution 3) student characteristics: self-reported gender, racial/ethnic identity from the PSAT/NMSQT and AP Exam registration processes 4) overall academic preparedness as defined by the student's PSAT/NMSQT (taken during sophomore or junior year of high school), which are both taken prior to the SAT and would have been taken prior to registration in the AP program 5) academic interests: self-reported major at the time of PSAT/NMSQT registration and 6) high school characteristics obtained from the College Board's own survey of the AP Placement site (school or district) coordinators: total number of students enrolled in each AP course offered. Patterson and Ewing (2013) then worked to standardize the identification of introductory course equivalents and identification of subsequent courses. The methodological analysis used by Patterson and Ewing (2013) was propensity score matching on the logit scale rather than on the probability scale for students with AP and non-AP to create groups that were comparable in terms of academic preparedness, student demographics, and high school characteristics. Patterson and Ewing (2013) found that the outcome variable which was subsequent course performance, had mean standardized differences which ranged from 0.81 (for Macroeconomics) to 0.443 (for Physics C: Mechanics), with an average of 0.308; results showed that for three of the matched samples, AP students outperformed the matched non-AP students (Chemistry, Physics C: Mechanics and U.S. Government and Politics). For the remaining exams, there was no substantial difference on the standardized difference of subsequent course grades, indicating that AP and non-AP students performed comparably. The final conclusion of Patterson and Ewing (2013), was that after matching the AP and non-AP groups on important covariates, except for those three matched groups, AP students performed as well or better than those without AP. Limitations of the study

included no high school course information outside of AP, no proxy for socio-economic status, and no way to identify if the non-AP group took some other type of pre-college credit or exam program such as DE or IB.

Mattern, Marini and Shaw (2013) conducted an empirical study as part of College Board's Research Report series that examined the role of AP Exam participation and performance on four –year college graduation rates. The authors of the study wanted to examine the relationship between 1) AP Exam participation and college graduation and 2) AP Exam performance and college graduation. Mattern et al. (2013) utilized two national samples. One of the datasets was used in two previous College Board studies; therefore, no descriptive information was provided, but the reader was referred to the studies, while the second data set was obtained from the National Student Clearinghouse (NSC), which tracks student enrollment and degree attainment for more than 3,100 two and four year colleges and universities in the U.S. (an equivalent to 93% of the total U.S. college student population). The datasets consisted of first- year students who entered college in the fall of 2007 and 2008, matched, and the resulting final sample size was 678,305. The measures for the study were as follows: 1) AP Exam participation (AP or non-AP) 2) AP performance 3) PSAT/NMSQT scores 4) gender 5) underrepresented minority status 6) first-generational status (highest parental level of education as reported on PSAT/NMSQT) 7) institutional characteristics – public versus private and 6) graduation data from the student's institution. The analysis consisted of descriptive statistics for each of the samples, utilized logit and hierarchical generalized linear modeling (HGLM) approach to obtain the results (Mattern et al., 2013). The multi-level approach allowed Mattern et al. (2013) to insert the various predictors into the model, and the final results for research question #1 indicated a positive relationship between AP Exam participation and college

graduation in four years, even within specific subgroups of students. Mattern et al. (2013) applied the same modeling process conducted for the first research question to research question #2; the findings note that the parameter estimate for the AP performance variable was positive, indicating that students who earn higher scores on AP Exams have a higher likelihood of graduating in four years compared to students who earn lower scores. On both questions, the findings for underrepresented minority and first-generation status were negative, indicating lower graduation rates for these students. Mattern et al. (2013) found that the positive relationship between AP Exam participation and performance with four-year college graduation rates held even after controlling for student and institutional factors related to graduation. Mattern et al. (2013) in a discussion point to the findings of this study, shares that given the rising cost of college tuition, this study provides support for the notion of the AP program as a pre-college measure that can aid students in reducing time to degree. Limitations of the study include lack of descriptive high school and college academic information regarding grades and credit awarded; additionally, the use of the PSAT/NMSQT as the measure of academic performance is worrisome as that measure is taken in the student's junior and senior year in high school.

Of the seven empirical studies testing the relationship of AP program participation and examination outcomes on college achievement, only two of the seven were independent of the College Board organization: Dougherty et al.'s (2006) study of the relationship between AP and college graduation and Klopfenstein and Thomas' (2009) study analyze the link between AP experience and Early College performance. Klopfenstein and Thomas (2009) pointedly addressed their concerns regarding the rapid proliferation of the AP Program and the expansion of the scope of the program, which falls outside of what the program was initially developed to

accomplish. Both studies were empirically rigorous, and at the end of the day did not conclusively link student participation and performance in the AP program with college achievement markers. The linking of AP Programs to measures of college readiness and success is not conclusively supported by research as detailed by the highlighted studies above. To legislatively mandate the growth of AP programs is doing a disservice to students, parents and even the stakeholders themselves. Klopfenstein and Thomas (2009) and Dougherty et al. (2006) express their concern through their studies that the use of the AP coursework as a mechanism for pre-college readiness and success could have unintended consequences by expanding the scope of the program but not the preparation of students. The solution lies not in stretching students to perform at levels that exceed their capacity for knowledge, but rather in making sure that they have mastery over what they need to know in college.

Dual Enrollment Program

Now at an enrollment of more than 2 million students, dual enrollment, a pre-college opportunity to earn both secondary and post-secondary credit, is seen as a cost effective way of increasing college readiness, and ultimately postsecondary enrollment for high school students (Cowan & Goldhaber, 2015). The program is now second in popularity to College Board's AP Program, and despite a lack of robust empirical evidence of the impact of this program on college success, is touted by stakeholders as a college readiness measure for all students, (Cowan & Goldhaber, 2015). In order to determine how this growth came about, Adelman's, *Answers in the Tool Box* (1999), written in response to the growing use of institutional graduation rates as measures of accountability, conducted a seminal longitudinal study where he found some evidence of an initial link between pre-college opportunities and college success. Since that time, scholarly study has been tirelessly conducted to further and more substantively confirm that

connection. This is a high stakes situation for all interested parties: parents, students, counselors, the high school, colleges and institutions, the district, the state and even the federal government and yet, the use of dual enrollment as a measure of various outcomes persists with very little evidence to corroborate even one of the outcomes that it is originally intended to provide.

Hebert (2001), conducted this quasi experimental study where the research questions studied the following: 1) there is no statistically significant difference in the learning outcomes for DE taught by high school teachers versus those taught by college faculty as measured by students' success (grades) in subsequent college coursework for which the dual enrollment course should have prepared them, and 2) there is no statistically significant difference between the distributions of DE course grades taught by high school teachers versus those taught by college faculty in the grades earned in subsequent college coursework for which the DE course should have prepared them. Hebert (2001) was interested in determining whether there was a difference in the quality of the student outcomes based on whether the DE course was taught by a high school teacher versus a college faculty member, as many institutions were not accepting DE credit due to the perception that DE courses taught by high school teachers were not preparing students adequately to succeed at subsequent coursework. Hebert (2001), examined the learning outcomes for high school students enrolling in DE math courses during a 5 year period at a large multi-campus community college in Florida, who then went on to complete subsequent coursework in math at one of 10 state universities in Florida. It is important to note that the state of Florida has rigorous admission requirements for admission to DE courses in general and math; in particular, students must have a 3.0 cumulative unweighted high school GPA and meet pre-collegiate requirements for math via ACT, SAT or PCP (Hebert, 2001). Hebert (2001) selected students enrolled in math courses as those would have most of the opportunities to have both

high school teachers and college faculty teaching the courses. The non-equivalent comparison groups of the dataset consisted of only enrollees in DE math courses at the participating community college for the study who satisfactorily completed a college credit math course with a grade of C or better during the designated five-year period (Fall 1994-Spring 1999). Hebert (2001) divided her sample into two groups: Group A (920 cases) students were taught by high school teachers, and Group B (913) were taught by a college professor, with a total of 1833 participants. Of the 1833 cases initially identified, 754 students were found to have taken subsequent coursework in math at the postsecondary level by spring 2000; 87.53% of the students enrolled at either Central Florida (UCF), Florida (UF), or Florida State (FSU) and 54 students withdrew from the subsequent coursework, Hebert (2001). Hebert (2001) assigned the instructor (high school or college teacher) as the independent variable, and the dependent variable was the learning outcome. Additionally, some demographic variables were investigated as well: race, gender, and particular institution attended by the student after graduation. The researcher obtained permission from the participating community college to obtain the students who enrolled in DE math courses during the study terms. Key to the study was the fact that Hebert (2001) was able to obtain from the database a flag which identified the course as taught by high school teacher or college faculty member. Hebert (2001) was also then able to obtain through the State University System Student Data Course File (SDCF) college outcome information for each of the DE students who continued their postsecondary education at one of the state's ten universities. The student outcomes were then matched; the grades utilized were from the first math course enrolled post-high school graduation. Hebert (2001) for research question #1, used t-tests to examine the mean course grades of the two groups where a significant difference was found between the learning outcomes of Group A and Group B: the

results found that those students who took DE with the high school teachers had significantly higher grades in subsequent coursework at the postsecondary institution than those who had the college faculty member as the instructor for the DE course (difference is significant at the .01 level). In the analysis, a 3- WAY ANOVA found no interaction between group, race, and sex; additionally, the specific institution that a student attended was also found not to be a factor in Hebert's (2001) outcomes. Hebert's (2001) analysis did find that across the board, females had significantly higher GPA's than males regardless of group or ethnicity. For research question #2, Hebert (2001), utilized a chi-square analysis to compare the distribution of subsequent course grades where she found again, that students in Group A, whose DE courses were taught by high school teachers had significantly higher grades in the subsequent coursework (more A's and B's), and those students who had the college faculty for DE had significantly lower grades (more D's and F's). This difference was significant at the .05 level. Hebert's (2001) study was unique in that it was one of the first to investigate whether there was a difference in the quality of subsequent coursework based on the delivery, and she found in favor of the high school teachers. Limitations of the study include the statistical analysis – perhaps utilizing Hierarchical Linear Modeling (HLM) rather than just t-tests, as well as the fact that her dataset analyzed only students who attended public institutions in Florida – the dataset did not contain those students who went on to attend highly selective private in-state institutions as well as out of state. Hebert (2001) felt that this would eliminate some of the brightest students from the dataset, although gaining entry into UF or FSU is highly competitive when compared to other state universities. Hebert's (2001) considerations for her results favoring high schools includes the following: 1) if the DE course was taught at the high school, the students would have had more contact minutes with the teacher than with the college faculty; therefore, the students taught by high school

teachers would have had two times the exposure, allowing for better mastery of the subject matter 2) students taught by the high school teacher would have been in a familiar environment as would the teacher, thus increasing their comfort levels, as opposed to a visiting college faculty member teaching on the high school campus or students who have to travel to the community college 3) perceptions of high school teachers teaching DE would be that it is prestigious and a perk with perhaps additional compensation, whereas the college faculty member might perceive it as beneath them, and an inconvenience, particularly if they have to travel to the high school and finally 4) high school teachers who teach DE would have to have the additional required hours in the subject area, but their undergraduate degree in education would have afforded them a background in teaching techniques and learning styles, whereas the college faculty member, while an expert in the field, does not have the benefit of the background information on education. Hebert (2001) posits that her findings support changing institutional policies that reject the acceptance of DE work, and she encourages further research to support these changes as they would be of great benefit to students, parents and the institutions. Hebert (2001) suggests further expanded research into other disciplines, venues, and formats to investigate the use of high school teachers teaching college-level courses. She directs her recommendations to those who argue that college courses should only be taught on the college campus, by a faculty member, in a class full of college students, arguing that the purpose of DE is not to provide a college experience but to provide college-level content to academically prepared high school students (Hebert, 2001).

Swanson (2008), in her dissertation sought to investigate the impact of high school DE course participation on post-secondary persistence and degree completion using a representative national database of student records. Swanson's (2008) statement of the problem is related to the

proliferation of DE programs without benefit of comprehensive research to support their effectiveness. The specific research questions addressed in Swanson's (2008) dissertation are 1) do students who have participated in DE programs have higher 2nd year retention rates than those who did not? 2) Do students who have participated in DE programs have shorter time to degree than those who did not? 3) Do students who have participated in DE programs have higher graduation rates than those who did not? And 4) Do students who have participated in DE programs experience positive effects on college retention and graduation rates after accounting for specific demographic attributes when compared to those who did not take DE after accounting for those same attributes? The dataset that Swanson (2008) utilized for this study was the National Education Longitudinal Study (NELS: 88/2000) data gathered by the US Department of Education's National Center for Educational Statistics, which is a nationally representative weighted sample of 2.3 million 8th grade students in the spring of 1988; this same group was surveyed again as 10th graders in 1990, at the predicted graduation date of 1992, two years after high school graduation (1994), and finally eight years after high school graduation in 2000. Attending over 1000 middle schools and over 5000 high schools, the data set included transcripts, test data, as well as survey data from students, parents, teachers and school counselors. Postsecondary data obtained at two and six years post high school graduation included college credits earned while concurrently enrolled in high school, which constitutes Swanson's primary independent variable for her study (Swanson, 2008). Swanson focused on the population of students who were involved in the survey sent two years after graduation (1994), who were in a postsecondary institution, and who matched those back to the dataset of high school graduates from 1992 and had transcript data to the point of degree completion, a total of 106,591 students. Unlike Hebert's (2001) study, Swanson's (2008) study did not indicate where

the courses were taught (high school, community college or college), who taught them (high school teacher or college faculty), if the course was delivered through a formal DE agreement, or whether the student enrolled on their own. Swanson (2008) controlled for race, gender, English language learners, first generation student, location of high school, and familial socioeconomic status (SES). Swanson (2008) used four dependent variables to predict the efficacy of DE course participation: 1) 1st to 2nd year retention was measure by continuous enrollment in the first two years, 2) # of credits earned by the 2nd year of college – a threshold of 50 was used to indicate momentum to degree, 3) length of time required to obtain a bachelor's degree and 4) highest degrees earned by DE participants compared to those who did not. Swanson (2008) constructed a causal model to investigate the effects of her control variables on dependent variables, which created twenty-one different combinations of direct and total effects. Swanson then conducted a series of 21 stepwise logistic regressions for each outcome variable in the pathways indicated in the causal model, thus logistic regression analysis forms the basis of the methodology.

Swanson's subsequent findings for research question #1 (does DE participation increase 1st to 2nd year retention): results of logistic regression analysis found that participation in DE did not enhance students' ability to gain 50 or more credits by the end of their 2nd year of college (Swanson's selected level of persistence for the study); however, Swanson did find that students who participated in DE programs were more likely than non-participating students to retain and continue enrollment without stopping through to the 2nd year, as well as more likely to complete their bachelor's degree. Swanson's (2008) findings for research question #2 (does DE reduce time to degree): Swanson's sample indicated that proportionately fewer DE students earned a bachelor's degree within the time frame of 4.56 years (time to degree) or less than did non-participants, suggesting that DE participation alone failed to help students' odds of earning a

bachelor's degree in 4.56 years or less from initial enrollment in college. Swanson's (2008) findings for research question #3 (does DE influence students to attain higher levels of college degree attainment): a greater proportion of DE participants (13.8%) earned a two year degree or technical training certification than non-DE students when controlling for demographic variables, and when considering DE participation as a contributor toward bachelor's degree attainment, the analytic sample showed that a smaller percentage of DE participants completed their bachelor's degree than did non-participants. Swanson's findings for research question #4 (Does DE participation experience provide positive effects on retention and degree attainment) found that the odds of completing a bachelor's degree were decreased by 1/3 for DE participants versus non-DE participants, and yet DE students increased their odds of retaining through to the 2nd year by 1.67 times when compared to non-DE students. Swanson's (2008) dissertation produced some intriguing results when analyzing demographic factors: male and Hispanic students were less likely to achieve a BA in 4.56 years or less than were female or White students, first generation students were 23.5% less likely to earn 50 or more credits by the end of the 2nd year than non-first generation students; DE students in the lowest SES quintile of SES were 26% more likely to earn an AA or technical certificate than students in the highest SES level; 12.7% of DE students also had participated in AP; a higher percentage (11.3%) participating in AP versus DE (9.8%); AP participation for DE students did not improve the likelihood of earning a BA or a graduate credential; and statistics indicated significant differences in the rate of DE students' aspirations to earn a bachelor's degree than for non-participants. Limitations of the study include the age of the dataset: dual enrollment was in its relative infancy at that time compared to the present day, as well as the sociological changes that have impacted students since 2000 makes the generalizability of these results questionable.

Swanson (2008) recommends additional research utilizing a nationally representative database to continue the analysis, as well as a comparative study of AP and DE performance. Implications for policy makers and other stakeholders include more comprehensive oversight by the DE providers to ensure for example, that the content of the courses being offered are truly college level, assessment of DE programs to ensure that learning outcomes are being met, as well as the establishment of a national data collection and tracking system that can follow students from K-16. This would allow researchers and policy-makers to gain consistent information on student performance outcomes that would inform policy and practice.

Denecker (2013) conducted a qualitative study to explore the perceived disconnect between secondary and post-secondary writing instruction, particularly as they are made evident in dual enrollment composition courses, a “unique space where students simultaneously experience both high school and college expectations” (p.29). The researcher’s intent of the study was to,

Uncover inconsistencies between high school and college-level writing instruction in order to discern best practices for transitioning high school students across the composition threshold, I came to recognize that the most powerful element for moving students from point A to B as writers may lie not with the students themselves but with those who plan, oversee and carry out DE composition instruction. In other words, it is not so much about what the students do, as it is about what the instructor knows or understands about composition practices on both sides of the divide (p. 31).

Denecker (2013) speaks to the discourse regarding the expectations of college composition faculty regarding the level of preparation and mastery they require incoming freshman students to bring to their classrooms, and whether DE instruction in composition meets that standard. To accomplish this task, Denecker (2013) during 2006-2007, studied three University of Findlay (UF), Ohio, DE settings: 1) a traditional composition course on the college campus 2) in the high school setting with a trained high school instructor and 3) on the college campus in a classroom of high school students. Denecker (2013) observed three College Writing

I classrooms at each setting, interviewed and surveyed seven teachers, surveyed seventeen students, and then interviewed fifteen of the seventeen students. Since 2007, Denecker (2013) has continued her study of the DE composition classroom as a follow- up phase working with the DE instructors.

The instructors have all had both secondary and post-secondary teaching experience in writing. In the on-campus classroom of high school students, the instructor was most often a former high school teacher now college instructor; in the on-campus class of college students, the instructor was a faculty member or an adjunct, and on the high school campus, the instructor was a high school teacher who had completed UF's DE training program. The high school students are all juniors or seniors, with the students taking the course on the college campus from more rural or suburban areas who live close to the university, and the ones taking the course on the high school campus are from urban or remote rural areas. The methodology used in this study by Denecker (2013) is the constant comparative method in order to collect and assess data from both settings: on-campus and off-campus. The major themes that emerged from Denecker's study (2013) relate more to building bridges and filling gaps between secondary and post-secondary writing instruction. Denecker's (2013) findings reveal a need for open, respectful, and productive dialogue regarding each level's writing expectations in order to prevent the need to have these discussions or even the need for remediation. She suggests that continued processes such as what her research study generated at UF could serve as conduits for "collaboration, conversation and professional development." Additionally, bringing in the students' perspectives is helpful, as how well they perform or don't perform is a reflection of how the instructors are doing. (Denecker, 2013 p.43 & 45).

White, Hopkins II and Shockley (2014) developed a state-level DE model that provided high school students an opportunity to take a team-taught DE course delivered by high school teachers working with a university chemistry professor. In order to study students' performance, White et al. (2014) then conducted an analysis utilizing several assessment instruments including the American Chemistry Society (ACS) standardized exam in general chemistry. ACS exam results would then be compared with national norms to determine success. Additionally, White et al., (2014) worked with the university professor to develop midterms and exams to be used not only for the research study, but also for the traditional college sections taught during the duration of the study. This initiative by White et al. (2014) was supported by public funds and provided to students at no cost. White et al.'s (2014) three research questions for this study were as follows:

- 1) was this dual-credit initiative viable with respect to course completion rates for participating high school students?
- 2) Was this dual-credit initiative viable with respect to student competency measures of participating high school students?
- 3) Can this initiative provide pedagogical or programmatic insights to help educators become poised to embrace new funding formulas in higher education?

The population for the data set consisted of 51 high school students enrolling in five separate sections of Principles of Chemistry (a general education course for non-science majors) during the three-year study, a second course, General Chemistry I (a general education course for science majors) offered during this project enrolled a total of 25 students in two separate sections. The methodology for this study was primarily descriptive statistics. White et al. (2014) found that,

1) The DE students had higher completion rates than traditional students on the Principles of Chemistry course but the same on General Chemistry;

2) DE students scored higher on 3 out of 4 exams for Principles of Chemistry class without clear differences in the General Chemistry course, thus higher completion rates were accompanied by higher mastery of the content for the DE sections;

3) There were no differences when compared with the national average.

Limitations of the study included a small sample size, which limits the generalizability of the results, and the presence of uncontrolled variables: entrance, demographic and SES. White et al. (2014) conclude that:

1) The initiative was a viable mechanism to enhance accessibility to first-year college coursework;

2) The DE students participating in the Principles of Chemistry course demonstrated increased course completion and greater content mastery as indicated by a higher average scores on 3 out of 4 exams versus traditional college students taking the same course with the same professor;

3) The success of the initiative as judged by course completion rates and mastery of content demonstrate that this type of secondary-post secondary partnership could potentially service as a “novel strategy to increasing college accessibility, improving college readiness and improving the transition to college-level coursework” (White et al., 2014).

Modarelli (2014), in his dissertation sought to investigate the relationship between selectivity level of a university and that institution’s acceptance of an associates’ degree or transfer credit earned through dual enrollment programs, particularly intensive DE programs where high school students earn approximately 60 hours of college credit, or a full associate

degree by their high school graduation. With the explosion of DE program offerings, a troubling trend that has arisen is that many of the more selective four year post-secondary institutions are not accepting course credit earned while concurrently enrolled in high school. In the research questions for his dissertation, Modarelli (2014) sought to investigate whether,

1) The level of selectivity of a university has no effect on whether or not the institution will recognize the completion of an associate degree for students who have completed their coursework through a DE program; and

2) The level of selectivity of a university has no effect on the quantity of dual credits that can be transferred into that university.

The participants for Modarelli's (2014) study were college admissions professionals from the 235 most selective universities in the U.S., as listed in *Barron's Profiles of American College 2009 edition*. Modarelli selected the participants by viewing the university's admissions website and identifying the most appropriate contact. Modarelli (2014) developed a seventeen question online survey via Survey Monkey, which was first piloted with a 10 college sample group outside of the study dataset, refined and then sent to the 235 participants. The purpose of the survey instrument was to collect representative data from each college regarding their acceptance or recognition of credentials and transfer credit earned through DE programs, as well as demographic data about the institutions. Modarelli (2014) ranked the colleges from 1-4 with 1 being the most selective and 4 being the least. Once the survey process was complete, Modarelli (2014), began the analysis of his two research questions via logistic regression. The findings for research questions were as follows:

1) no significant difference found among all 4 selectivity levels with respect to any general associate degree, (77% would accept credential and award junior status); however, when

the credential was earned through a DE program, a significant difference was found with more selective colleges not accepting the credential (only 19% of the most select would accept credential and award junior status to the student), though lower- ranked institutions accepted earned DE credentials than the more selective colleges.

2) The acceptance of DE credit transferred at significantly higher quantities to the lower ranking schools than the more selective institutions, 62% of all levels indicated they would accept all or some of the DE transfer credit; however, the predicted probabilities that the more selective institutions would accept all or some of the credit was .33 – thus, higher selectivity levels of colleges correspond with lower probabilities that the institution will accept all or most DE credit.

Modarelli (2014) as a side note compared the acceptance rates of other pre-college credit programs, AP, IB with DE at the various levels. When looking at the top level of selectivity, AP credits were found to transfer all or most of the time with a predicted probability of .70, IB at .59 and DE at .33. Information such as this is critical to stakeholders and policymakers as they mandate the growth, and in many cases, fund the programs, yet the institutions may not be accepting the credit. Modarelli (2014) concludes that additional research must be conducted as there is a gap in the literature regarding this important issue. Indeed, there is also a gap in the policy and practice governing the transferability of DE credit and credentials into these more selective institutions. On the one hand, there are state and federal legislative mandates calling for the increase of these programs to increase access, retention, graduation rates, decrease time to degree and financial aid debt, yet the post-secondary institutions are not accepting the credit, which, as Modarelli (2014) states, if this is not communicated to the students and parents, it ends up being an empty promise. Modarelli (2014) makes a startling recommendation: “[H]igh

schools that are interested in creating an early credit program with the highest rate of transferability to universities should consider developing an AP or IB program instead of a dual enrollment program” (p. 82). Limitations of the study include the sample size and survey response rate. Of the 235 institutions initially contacted electronically, only 90 agreed to participate, an overall response rate of 38.3%. A weakness of the study is that only one predictor variable was utilized for the logistic regression model, which typically employs several independent variables, thus weakening the strength of the study.

Cowan and Goldhaber (2014) utilized statewide data to investigate the effects of Running Start, a DE program in Washington, on high school graduation and college enrollment. Cowan and Goldhaber (2014) selected Running Start for several reasons: The program is set up at 34 community colleges; it has enrolled more than 10% of the state’s high school juniors and seniors since the 2006-2007 school year; there is no cost to the student as the school districts pay the community college 93% of the state basic education allotment for each full-time student; there are no admission criteria for the program and once enrolled in the program students can take high school and college courses, online or brick and mortar; and more than half of Running Start students take a credit load equal to full time status at the community college. The program has a myriad of college pathways available to students once they graduate from high school. Cowan and Goldhaber (2014) selected the cohort of students who first enrolled as high school freshmen in the 2006-2007 school year. They follow that cohort through to when they would have participated in Running Start in the 11th grade (2008-2009) and then 12th grade (2009-2010). Cowan and Goldhaber’s (2014) total dataset consisted of a total sample of 55,396 students, of whom 8,586 were participants in the Running Start program. Cowan and Goldhaber (2014) were able to utilize high school and college information from the Education Research and Data Center

(EDRC) warehouse, transcript and degree completion information from the Washington State Board of Community and Technical Colleges (SBCTC) and university attendance, transcript and degree completion data from the Public Higher Education Enrollment System (PCHEES). This last database includes information on enrollment in private and out of state enrollments from the National Student Clearing house (NSC). The researchers then constructed a comprehensive database of the various measures utilizing these three databases. The robust dataset utilized in this study by Cowan and Goldhaber (2014) improves on that used in recent studies of DE. The purpose of Cowan and Goldhaber's (2014) study is to analyze the effect of Running Start participation on the probability of high school completion and enrollment. Cowan and Goldhaber (2014) employ a variety of statistical analyses, including linear probability models and logistic regressions. Cowan and Goldhaber's (2014) final results indicated that students who participate in DE are more likely to attend any college immediately after high school graduation, but are no more likely to attend college full-time, and are less likely to attend a four-year university. The richer dataset used by the researchers showed that the estimated effects of the Running Start Program vary greatly depending on the types of postsecondary student information available (suggesting that earlier studies missing this data may have misstated the benefits of DE programs), and there is important heterogeneity in the outcomes of Running Start students depending on their initial preparation for college, which is consistent with prior studies. Cowan and Goldhaber (2014) found that low-achieving participants later enroll in college at higher rates and are more likely to drop out of high school or otherwise fail to complete their high school degree in four years. Cowan and Goldhaber (2014) conclude that policy makers, when considering eligibility requirements for DE programs, balance the benefits of increased college access against the costs of a high school dropout; they additionally recommend the need for more

evidence on the long-term degree completion outcomes of DE participants with low academic preparation. Finally, Cowan and Goldhaber (2014) recommend continued rigorous analysis of the effects of DE participation on overall secondary and post-secondary attainment.

An (2015) continues his rigorous study of DE programs by empirically examining whether academic motivation and engagement account for the relationship between dual enrollment and academic performance. In addition to high school coursework, An (2015) specifically sought to examine how academic trajectories are influenced by the non-cognitive factors of: 1) academic motivation as defined by several indicators on an 8- item scale including peer interactions, interpersonal relationships with other students, study group participation, how often they asked questions in class, and how often they came to class not having completed their assignment and 2) academic performance (the dependent variable) as defined by college GPA during the spring semester of their first year and was obtained from student transcript records.

The four research questions examined by An (2015) in this study were the following:

- 1) Does DE increase academic performance?
- 2) Does DE participation increase a student's academic motivation and engagement?
- 3) Does academic motivation and engagement account for the influence of DE on academic performance?
- 4) Does the effect of DE on academic performance differ by college selectivity?

The dataset for the study was the Wabash National Study of Liberal Arts Education (WNSLAE), a longitudinal study of first-time college students who enrolled at one of nineteen liberal arts postsecondary schools. Researchers for that project surveyed the cohort during the fall of 2008, spring 2009 (the end of their 1st year) and again in spring 2012, at the end of their fourth year. For his research study, An (2015) analyzed all academic motivation and engagement

indicators from the second survey at the end of the student's freshman year. An (2015) captured participation in accelerated programs via three combinations, 1) exam-only (AP), 2) through DE only, 3) a combination of examination and DE versus students who did not earn college credit while in high school, (the comparison group).

An (2015) clarified that the comparison group may have included AP participants who did not either take or earn credit; however, the WNSLAE dataset did not contain that information. The statistical approach utilized by An (2015) was Structural Equation Modeling (SEM) to estimate the influence of DE on academic performance. An's (2015) results were as follows: For question #1, overall there was a positive effect of DE on 1st year GPA which remained even after controlling for race, gender, family background, ACT scores and academic motivation. Students who took both AP & DE had a .14 higher first-year GPA than non-participants. For question #2, DE students tended to be more academically motivated and engaged than non-participants, while students who took both AP & DE tended to participate in study group more often ($b=0.31$) and were more academically motivated ($b=0.12$) than the non-participant group. For question #3, at least 78% of the DE effect on academic performance remained unmediated by academic motivation and engagement, and the effect of DE was weakest at highly selective institutions (total effect = 0.02) than at mid-selective (total effect = 0.14) and very selective institutions (total effect = 0.13) for students with just DE. Additionally, on average, the GPA of AP/DE group students was 0.16 - 0.17 higher than the non-participant group. Finally, for question #4, DE participation benefitted students who attended a highly selective institution; however, it was especially beneficial for those students who attended a mid-selective institution. On average, the GPA of the AP/DE group was 0.16 – 0.17 points higher than non-participants, regardless of college selectivity. DE students who attended highly

selective institutions had GPA's that were 12 and 11 percentage points lower than DE students who attended mid-selective institutions. An (2015) posits that this study moves beyond previous research and his findings that DE tended to increase academic motivation. Even after controlling for pre-college, motivation aligns with DE stakeholders and advocates who maintain that "a key function of DE is to raise a student's academic motivation" (p. 23). An (2015) further infers that academic motivation and engagement are a viable explanation for the relationship between DE and academic performance. Limitations of the study include the use of a database with a narrow scope – students who would apply to a liberal arts college would not necessarily represent the population, thus impacting the generalizability of the study.

The six studies detailed in this section describe a telling story, spanning the years from 2001 to 2015, and the same themes recur: the concern with the legitimacy of the program (does DE really contain the same content as a college course?), the questions about teaching outcomes at the secondary versus the postsecondary level, the gap and lack of communication between the high school and the college providers, the lack of a comprehensive data set that can capture the full picture of the student from K-16, the amount of expectation that is placed on DE programs by high schools that parlay them as a college readiness measure, by stakeholders and policy makers that want to use them as measures of institutional accountability, and by the students who take these courses thinking that they will transfer and provide a head start in college. These studies represent fourteen years of scholarly work; yet fundamentally, there is no conclusive evidence about the efficacy of these programs as predictors of college success and achievement. These studies do offer some measure that may indicate the value of dual enrollment on student collegiate outcomes; however, given the resources, the stakes, and the attention that these programs are currently getting, it is crucial that all participants in the process gather, take a hard

look at the future, and make policy and practice decisions that account for the ambiguity presented by research. Dual enrollment programs are not a one size fits all, and most importantly, the current practice of trying to make DE programs fit several very different sets of needs is just not working. Stakeholders for these programs at all levels must make a decision regarding the true role of DE: Is it an access opportunity, a college readiness program, or a college course to challenge advanced kids? Until those questions are clarified, the true answers regarding the efficacy of DE may not be known.

Multi-enrollment in Pre-College Credit Programs

As previously stated, there presently exists a lack of empirical evidence solidly relating the completion of pre-college credit programs individually to postsecondary performance and achievement (An, 2012; Godfrey et al., 2014; Karp & Jeong, 2008; May, Rodriguez, Sirinides, Perna, Yee & Ransom, 2014; Modarelli, 2014; Speroni, 2011; and Swanson, 2008), yet, district, state and national programs are pouring resources into these pre-college credit opportunities as vehicles to aid high school students in becoming college ready by increasing access to and familiarity with postsecondary expectations, improving college achievement, reducing time to degree, and increasing graduation rates (Hofmann, 2012; Karp, Calcagno, Hughes, Jeong, & Bailey, 2007). There is the concern that pre-college programs are being misappropriated and used to gauge measures that really are not a function of the original purpose of DE programs. Godfrey et al. (2014) highlight the question that with more and more students taking AP and DE courses, individually or in combination, what are the college outcomes and performance outcomes in subsequent courses for these students? In the increasingly competitive world of college admissions, students are taking more than one pre-college course credit or examination program in their quest to stand out from the rest of their classmates. Very few studies compare

the college achievement outcomes for students who take both, much less compare the outcomes of all three of the pre-college programs, AP, IB & DE. With this simultaneous increase in AP and DE participation, the question remains: how well are these students performing in college in comparison to one another and in comparison to students who did not participate in these programs?

Estacion, Cotner, D'Souza, Smith & Borman (2011) conducted a mixed methods study of the outcomes of Florida students enrolled in DE as well as other acceleration programs such as AP, & IB. Citing concerns with increasingly high dropout rates, the continuing need for remediation at the post-secondary level, and recent policy changes in Florida's school improvement accountability system, Estacion et al.'s (2011) study sought to give an overview of the numbers and characteristics of current acceleration programs. The timeliness of Estacion et al.'s (2011) study was fortuitous, as the Florida Legislative Session of 2008 mandated that the funding formula for grading high schools include participation and success in these accelerated programs. The population for Estacion et al.'s (2011) study consisted of junior and senior high school students enrolled in acceleration programs in Florida overall, as well as by district during AY 2006-2007. Additionally, Estacion et al. (2011) performed a nine district review of DE and district college partnerships otherwise known as articulation agreements.

The research questions examined for this study included the following:

1) What were the enrollment numbers in DE (including college & vocational credit in 2006-2007 and how did it compare with enrollment in AP & IB programs?

2) How did students enrolled only in DE programs for 2006-2007 compare with students enrolled only in AP & IB programs?

3) How was participation in DE distributed throughout the state?

4) What factors contributed to the establishment of DE articulation agreements-- what did they cover, and how did the nine selected school districts and their college partners inform HS students of DE options?

Estacion et al. (2011) obtained enrollment data from the Florida Department of Education for the 98,395 students in the sample, and document reviews and interviews with school district and college administrators during the 2009/2010 to examine the articulation agreements.

Descriptive statistics were utilized to analyze the student data and Estacion et al (2011) found the following:

1) For AY 2006-2007, 7.3% of students in 11th and 12th grade participated in college or vocational DE course credit programs;

2) 62% of DE enrollees were women compared to the population of 11th and 12th grade students (51%), White (72%) versus population (51%) and less likely to be economically disadvantaged (eligible for free or reduced lunch; 16% versus population 31%) and English language learner students (0.4% versus 4.6%);

3) Of the students in grades 11th and 12th taking any acceleration programs, more students enrolled in AP & IB courses (74%) than in DE (16%) with 11% participating in both DE and one or more acceleration programs;

4) Students in DE only were less likely than students enrolled in AP or IB only to be Hispanic (9% versus 23%), and economically disadvantaged (17% vs 19%); and

5) Four district and five college partners identified the Florida legislative mandate as the primary reason for establishing articulation agreements; the most commonly cited challenges in implementing DE programs were administrative challenges, lack of qualified high school

teachers, geographic proximity between high schools and colleges, communication with parents, GPA requirements, and communication with school transportation.

Estacion et al. (2011) used a qualitative data analysis software program to conduct a constant comparative qualitative data analysis of the interview transcripts. Quantitative limitations for this study were twofold: only students with complete enrollment, transcript and demographic data were retained in the sample and the age of the dataset came before the period where Florida enacted legislation requiring inclusion of acceleration programs in school grading formulas. Qualitative limitations were primarily time constraints placed by the interviewees thus limiting the time that Estacion et al. (2011) could ask more probing questions.

Speroni (2011a & 2011b) conducted two quantitative studies in 2011 investigating the relative power of AP & DE coursework in predicting access and success (Speroni, 2011a) and the causal effect of DE on students' academic outcomes (Speroni, 2011b). In the first research project, Speroni (2011a) compares the relative power of AP and DE in predicting students' college access and success. This study investigates the extent to which participation in AP & DE programs is associated with students' likelihood of enrolling in college, first enrolling in a four year college and then obtaining a bachelor's degree and also assesses whether the effects of these programs are impacted by students' minority status and academic ability. The dataset for Speroni (2011a) focused on students who took academic DE courses and AP course participation (not AP exam taking) from two cohorts of public high school students in Florida in the 2000-01 and 2001-02 high school graduating cohort: N= 229, 828. The dataset contained HS and college transcript information through 2006, with unique identifiers for AP & DE courses as well as the location where the DE course was taught (high school or college campus). Data also included demographic characteristics such as age, gender, race/ethnicity, English language proficiency,

free lunch eligibility, and high school and postsecondary degree attainment. Additionally, Speroni complemented her dataset with National Student Clearinghouse (NSC) data to track enrollment at out of state colleges which do not track OOS degree attainment. For this quantitative study, Speroni (2011a) used regression and ordinary least squares estimates for all models. Speroni (2011a) found that after controlling for student and high school characteristics, including pre-college measures of academic ability, DE students were more likely than AP students to go to college, but are less likely to enroll in a four year college, whereas AP students are more likely to first enroll in a four-year institution, in terms of degree attainment. She also found that the difference between DE & AP is much smaller and not robust to model specifications, while DE and AP participation are associated with college access and degree attainment. Finally, the effect of DE is driven by courses taken at the local community college campus, so there is no effect for DE courses taken at the high school. Speroni (2011a) found that the AP program serves almost twice the proportion of Black & Hispanic students than DE (36% vs 19%), and while both programs attract students from similar socioeconomic backgrounds, students who choose to participate in both AP & DE are relatively more affluent than those who do not. Most DE students take the courses in a combination high school and college campus (58%), exclusively at the college campus (37%) and at the high school campus (only 5%), and AP only students have a relative advantage in terms of four year college enrollment and bachelor's degree attainment, and they have a higher GPA in college than DE-only students, but students combining both AP & DE take the lead. Speroni (2011a) speaks to these results to frame concerns regarding the quality and ability of high schools to deliver college level instruction and the lack of a standardized curriculum in DE courses, suggesting that more oversight is necessary. Additionally, in light of the expansion of both of these programs, Speroni (2011a) recommends

that caution be exercised when turning to these opportunities as a means of decreasing time to degree and the number of credits needed by students to graduate, as we must increase our knowledge regarding what student type is best suited to each program and how their choices affect their educational future.

In both studies, Speroni (2011a & 2011b) used data from the Florida Department of Education and pulled a sample of all public high school student and postsecondary academic and demographic data from academic years 2000-2001 and 2001-2002 to track their college outcomes through summer 2007. Speroni (2011b) was looking to answer two very specific research questions:

- 1) What is the impact of any academic DE course on college GPA?
- 2) What is the impact of DE-algebra (a more rigorous DE course with admission criteria) on college GPA?

Speroni, (2011b) uses a quasi-experimental method, the regression discontinuity design (RD) to gauge the causal effect of DE on student's outcomes. The outcomes that Speroni (2011b) found were as follows:

- 1) Overall, the data provided little indication that simply taking DE courses in general increased the likelihood of high school graduation, college enrollment, or college completion for students on the margin of eligibility;
- 2) The data indicate that participation in DE-algebra is associated with positive academic outcomes.

That is, the beneficial effect on college enrollment is strong-- coefficients were large, statistically significant, and generally robust to discontinuity sample or regression specifications. Furthermore, students who participated in DE-algebra were not only more likely to enroll in

college, but also more likely to earn a degree (24% versus 13% non-DE students), and results from a series of robustness checks indicate that the positive and significant estimates on college degree outcomes are consistent and stable across a range of samples and model specifications. Speroni (2011b) concludes that college algebra is a gatekeeper course, and that having completed it prior to college seems to have helped students make progress toward a degree. Speroni (2011b) recommends that policymakers consider this study as evidence that DE programs can play a role in improving students' college access and success, and she highlights that factors such as subject area should be taken under consideration when considering the expansion of these programs. Limitations of the first study Speroni (2011a) included AP course participation and not exam taking, and the exclusion of students who took IB, which is why her participation does not = 100. Additional limitations of both Speroni's (2011a, 2011b) studies, which resulted in smaller or null effects, found she relied on samples where data on in-state enrollments were combined with data from the National Student Clearinghouse, which is not as complete as the Florida Department of Education dataset. These omissions could have led to substantial classification error in the outcome variables of interest.

Kretchmar and Farmer (2013) teamed with the Office of Undergraduate Admissions at the University of North Carolina (UNC) to study the question of what is the impact of the number of college level courses taken during high school on the cumulative GPA earned by students in the first year at the university? To answer that question, Kretchmar and Farmer (2013) used a dataset consisting of admitted first year freshman at UNC who enrolled in the fall of 2010. They identified first year college grades as the outcome and high school grades, SAT test score and number of college level courses taken during high school as a function of first year GPA. The total sample count included 3,626 students. Kretchmar and Farmer (2013) conducted

univariate descriptive and correlational analyses to obtain the results. The final results of the Kretchmar and Farmer (2013) study revealed that the data provided no evidence to support that taking more high school courses that include AP, IB or DE will better prepare students for success at UNC than a strong but more modest program. The data also supported that some rigor was better than none. Kretchmar and Farmer (2013) specifically found that high school students who had completed 5 college level courses performed slightly better (3.26 FY GPA) than those with 10 college level courses (3.25 FYGPA) and outperformed those with 0 courses (3.07). The implications of Kretchmar and Farmer (2013) supports the conventional notion that increased rigor is helpful in impacting college achievement as defined by first year GPA. Kretchmar and Farmer (2013) posit that taking a more modest course load is a route that the Office of Undergraduate Admissions at UNC is considering as a recommendation to prospective students. Implications of Kretchmar and Farmer's (2013) study present possibilities for informing policy and the trend that more pre-college programs are better. Limitations of the study primarily impact the generalizability of the results, as the population of students that apply to UNC may not be a true representation of the college-going student body.

Godfrey, Matos, Elefonte, Ewing and Patel (2014), in a comparative study of student performance in DE and AP coursework published by College Board, analyzed the data from the 2000-2001 graduating class from all public schools in one state who immediately enrolled in postsecondary education upon graduation. The sample contained 97,205 public high school students. Godfrey et al. (2014) created four outcome variables for the study:

- 1) Calendar time in terms to degree;
- 2) Credit hours attempted;
- 3) First-year subject specific GPA;

4) Final subject-specific GPA.

Two sets of analyses that involved three multiple regression analyses were utilized for each of the four outcome variables, one for those students with DE and AP participation, and the other for performance on those courses. Additionally, pair-wise comparisons were conducted between the adjusted means for the groups within a regression framework, and hierarchical regressions were conducted on the samples (Godfrey et al., 2014). Descriptive statistics on the sample population included the following: 57.6% female, 25.3% received free lunch at some point in their high school career, 62% white, 18.3% African American and 14.6% Hispanic. Multiple and final results for the four outcome variables computed by Godfrey et al. (2014) revealed a number of findings which I shall list here: First, results were consistent with previous research showing some benefit in participation in pre-college credit and examination programs, second, higher performance on AP courses was positively related to higher college performance in the subject area, and thirdly, higher performance on AP courses was positively related to taking fewer semesters to degree as well as graduation. In addition, the majority of students who took DE courses received final course grades of A or B, while much smaller percentages of AP students earned a 3 or higher on the exam. Next, in terms of academic ability, AP students had the highest mean state assessment scores in math and reading followed by DE students, which indicated that higher ability students were more likely to take AP than DE or regular courses.

Also, importantly, regression results did indicate group differences on the college outcomes when controlling for student demographics; however, the researchers state that overall, it appears that higher performing AP examinees have higher first –year and final subject-specific college grades than those students who were enrolled in DE. Higher AP exam scores were associated with less time to degree, and after adjusting for background variables, AP students

with scores of 4-5 tended to take two to three standard 3-hour courses fewer than their peers with grades of A-B in DE courses. DE students tended to graduate in the shortest time followed by AP; on average DE students with grades of A-B graduate a half term to over one term quicker than AP students with scores of 4-5, while most students who earned a C or better in DE and higher performers tended to graduate in college in fewer semesters than other groups. Limitations of the study included the use of an older dataset not reflective of the current growth of both the AP and DE program.

Wyatt, Patterson and Giacomo (2015) in a quantitative study for the College Board, compared the outcomes of students who have taken either AP Exams or DE courses and graduated high school in 2006. Outcomes investigated were four year college enrollment, persistence at a four year institution, four year and 6 year graduation rates, and 1st year freshman GPA. Wyatt et al. (2015) used three national datasets for the study: 1) the National Student Clearinghouse, which tracks student enrollment and degree attainment for over 3,100 2yr and 4yr colleges & universities in the US and covers 94% of the college going population. 2) NSC enrollment data was matched to College Board's 2006 cohort data of students who completed at least one administration of SAT or PSAT; DE students were identified through NSC records. Coincidentally, this only indicated the type of college (two or two year from which the student took the course, not the course subject, so students who took both AP & DE were excluded): N=1,063,616 students, and was limited to examinees who first enrolled at a two year college or university. This sample was examined for persistence to the 4th yr. of college and 6yr graduation: N=728, 968. Third, the Higher Education Validity Sample, students in this sample attended one of 110 four year institutions partnered with College Board to provide college performance data on their entering 2006 UGF class for research purposes and were

representative of the target population of 726 4- year institutions that received at least 200 SAT score reports in 2005.

Finally, this sample of 110 institutions was diverse with respect to geographic location, public vs private, selectivity and size: N= 128,623. Wyatt et al. (2015) used descriptive statistics and multivariate regression models to measure the relationship of AP & DE participation with four year college enrollment, persistence to 4th year, FYGPA, and graduation at both 4 years and 6 years. Additional variables were included in the regression model to measure the impact of AP performance on college outcomes after accounting for differences in academic performance and demographic characteristics, SAT scores, HSGPA, gender, racial/ethnic identity and parent income. Logistic regression was used to examine the AP effect for all dichotomous outcomes (e.g. graduation), whereas linear regression used to measure the AP effect on FYGPA, which is a continuous outcome. Overall, Wyatt et al. (2015) offer a number of findings. First, students with AP and a score of 3+ on at least 1 AP exam had more positive college outcomes than did DE students who took a DE course affiliated with either a two year or four year institution. Second, students with AP coursework but scoring <3 performed as well or better than students taking DE affiliated with a 2- year institution on every college outcome, although both groups had lower college grades than the NO AP/DE group. Thirdly, compared to students who completed a DE course affiliated with a four year institution, AP students scoring <3 had lower rates of four year college enrollment, lower 4- year graduation rates, and lower college grades while having a higher persistence rate and a higher 6 year graduation rate. Fourth, DE students who take 1 or more courses at a 2 year college have lower enrollment rates, persistence rates and grades at four year institutions, while AP students scoring 3 or higher have greater college success as measured by enrollment, grades, persistence and graduation rates.

Overall, the results of the Wyatt et al. (2015) study indicated the following: First, AP students with at least one score of 3 or higher on an AP Exam outperformed on all examined outcomes except for four year college enrollment. Second, DE students who had taken a dual enrollment course affiliated with a four-year college outperformed only on four year college enrollment, and third, AP students whose highest exam score was less than 3 performed as well or better than did students who took a DE course affiliated with a two year college for all outcomes.

Wyatt et al. (2015) concluded that while this study is noteworthy in having used national college enrollment data, there is a lack of empirical evidence comparing college outcome data for AP and DE students. Limitations of the Wyatt et al. (2015) study include the following: HS GPA was self-reported on the SAT questionnaire; data from Clearinghouse did not contain course or grade level GPA on DE performance; and some of the DE courses may have been career or technical in nature. The difficulty with directly comparing the college outcomes of the 5 groups is that their demographic and academic characteristics differ considerably, so that this difference makes it difficult to determine if the variance is due to the impact of AP & DE or to pre-collegiate academic performance. Finally, this study may not generalize to students as it only took into consideration student performance on the ACT.

Zinth and the Education Commission of the States (ECS) in 2015 conducted a study to determine how DE course content and instructor quality are guaranteed, as most courses are taught on high school campuses by high school instructors. The results of the study confirm that thirty-seven states have specific policies addressing DE course content and instructor credentials. However, given that one of the main goals in delivering DE programs is to provide students with an “authentic college course” experience, and the fact that in most cases the high school teacher

is the teacher of record for the course, there is a real disconnect between policy and practice, according to Zinth and ECS (2015). In fact, they report that “nationally, 61 percent of academically oriented dual enrollment courses taught at high schools are led only by the high school teacher and just 11 percent are taught by postsecondary faculty”(page number). In order for DE to meet the expectations, it is critical for states to ensure that course rigor, content and instructor training and preparation can mirror that of the same course taught at the post-secondary institution. Unfortunately, Zinth and ECS (2015) found that only 22 percent of states require all postsecondary institutions to accept college credits earned through DE programs. Zinth and ECS (2015) summarized the three primary concerns that came out of this study:

- 1) The high school teacher credentialing and training process to teach college level coursework that mirrors the content and qualifications at the postsecondary level;
- 2) Establishing a standard for course approval, student outcome analysis, review of K-16 agreements;
- 3) Questions regarding the role of accrediting bodies in this process and what the policy implications are.

As mentioned by the authors of all seven studies in this literature review, there is a dearth of empirical evidence supporting a substantive positive causal relationship between pre-college credit and examination programs and college outcomes. Additionally, these latest studies which compare AP and DE outcome performance lend authority to the concerns still being expressed by all involved entities in this quest to find the elusive empirical evidence that would justify all the legislation and funding that is being appropriated to those programs.

Minority Access and Performance in Pre-College Credit Programs

The final section of this literature review focuses on whether using pre-college credit and placement programs as a measure to increase access to under-represented minority students has an empirical basis. This study has specifically focused on the effect of pre-college credit and placement programs on four-year college achievement outcomes, whether the use of these programs as a college readiness measure has empirical substance, whether the use and proliferation of these programs by stakeholders to increase college enrollment, retention, and graduation rates can be justified statistically, and finally, whether there is a statistical basis for the use of these programs to increase access. All of these questions are but the very top layer of an extremely complicated and contentious issue. This next discussion will focus on the issue of how the combined effect of race and pre-college credit programs impacts college achievement, and whether that is a realistic expectation to have.

Klopfenstein (2004) in what became one of the first studies to empirically examine minority participation rates, developed a microeconomic model of the AP participation decision for under-represented minorities. Klopfenstein (2004) specifically sought to investigate racial differences in how minority students make the decision to participate in AP courses. Using logit regression, and chi-squared statistics to test the null hypothesis for the slope coefficients, Klopfenstein's (2004) population consisted of Texas Schools Microdata Panel (TSMP) for the 1998-1999 academic year and included all white, Hispanic and black students attending Texas public high schools in which at least one AP course was offered. The resulting sample size consisted of 383,043 students representing 723 Texas public high schools in the white sample, 255,139 students representing 719 high schools in the Hispanic sample, and 100,109 students representing 639 high schools in the black sample. Additionally, Klopfenstein (2004) ran a

second set of regressions on parental education as a proxy for socio-economic status, which was available only for high school juniors and seniors taking the SAT test. This second sample consisted of 19,963 white students (421 high schools), 7009 Hispanic students (334 high schools) and 4325 black students (247 high schools). Klopfenstein's (2004) findings determined that black and Hispanic high school students enrolled in AP courses at approximately 50% of the rate of white students, and that low income is the prevalent factor behind the minority participation gap. Additional regressions were run on family income for a sample subset of students who had taken the SAT. Klopfenstein's (2004) findings of this study concluded that low income is the single most important factor in minority AP participation, and that minority students enrolled in AP math, science and English at lower rates than comparable white students. This study also found that black and Hispanic students are three times more likely to be low income than white students, and even if AP courses are taught at their high schools, black and Hispanic students do not have equal access to these programs (Klopfenstein, 2004). Klopfenstein (2004) explains that this model succeeds in explaining greater than 90 percent of the white-Hispanic and white-black AP participation gaps in Texas high schools. A limitation of this study included lack of the parental education information for the full sample.

Kyburg, Hertberg-Davis and Callahan's (2007) study investigated how schools, teachers, and students in high-poverty urban environments responded to AP and IB offerings and the extent to which an optimal learning environment was established for minority high achievers.

This qualitative study asked the following questions:

- 1) Do teachers and the environments created by AP and IB classrooms in high-poverty urban schools provide appropriate educational opportunities for gifted students from racially, ethnically, and socioeconomically diverse backgrounds?

2) How can instructional and curricular foundations in high-poverty urban high schools create an environment where students can experience a sense of success as well as readiness for college (Kyburg, Hertberg-Davis and Callahan, 2007)?

The authors used grounded theory to collect and analyze their data, and their initial population consisted of students from three urban high schools, two with state mandates for gifted services and the other without (Kyburg, Hertberg-Davis & Callahan, 2007). The researchers conducted classroom observations and interviews with 9 administrators, 4 counselors, 43 teachers and 75 students. They found that when consistent and widely endorsed support frameworks are in place over a lengthy period of time, high achieving minority students can overcome “deficits in requisite study skills, background knowledge, and language, enabling them to derive a sense of success and accomplishment within standardized AP and IB experiences in preparation for future advanced courses of study” (p. 206).

Klopfenstein and Thomas (2009) conducted an economic analysis to determine what factors impact and inhibit minority participation in AP courses, and they examined the extent to which AP course taking predicts early college grades and retention. Additionally, Klopfenstein and Thomas (2009) were one of the first research teams to discuss and empirically study the actual benefits and costs of AP participation in relation to the proliferation of the AP Program as well as the mandated use of AP programs in school districts. Klopfenstein and Thomas (2009) discuss that College Board, which administers the AP Programs, provides plenty of studies indicating that passing AP exam scores are strong predictors of success. Klopfenstein and Thomas (2009) posit that legislators and other stakeholders inferred that success in AP coursework causes college success, and then additionally extrapolated that to mean that the expansion of AP programs will improve college outcomes for that expanded group of students.

Klopfenstein and Thomas (2009) used regression analysis to test whether AP course taking is a predictor of college success. The dataset for this inquiry consisted of all Texas public school students who entered Texas public universities directly after graduating from high school in May 1999, a total number of 28,000 participants. The findings for this rigorous empirical analysis support College Board's notion that AP course-taking may be predictive of college success, but does not find that AP participation imparts a positive causal impact on college performance for the average student (Klopfenstein and Thomas, 2009). The authors further describe that the power of participation in the AP program points to the fact that students who sign up for AP courses are highly motivated and high achieving students (Klopfenstein and Thomas, 2009). An expansion of the AP Program may reduce the predictive strength state Klopfenstein and Thomas (2009), particularly as school districts are mandated to teach the courses, often at the expense of other areas of need. Klopfenstein and Thomas (2009) recommend that it would be beneficial to further study the impact of AP Program participation in light of policy and practice mandating the increase of these programs.

An (2013a & 2013b) conducted two studies exploring the impact of DE on college degree attainment and academic performance using socio-economic status (SES) to determine whether there are differences in the impact and benefit for minority students versus non-minority students. In the first study, An (2013a) seeks to address the disparity in the achievement gap that currently exists between high-SES students who have a higher percentage of attaining a degree than low-SES. An (2013) addresses three research questions in this study:

- 1) Does participation in DE influence students' college degree attainment?
- 2) Does DE benefit students differently based on their SES?
- 3) Is DE a viable option to reduce SES gaps in college degree attainment?

The dataset An (2013a) used for this study is from the National Education Longitudinal Study of 1988 (NELS: 88), a dataset that consists of 8th grade students in 1988 who were tracked through follow-up questionnaires from 1990, 1992, 1994 and 2000. An (2013a) uses the 1994 sample and limits the group to students who attended a postsecondary institution – comparing students who participated in DE to those who participated in AP and other pre-college programs – so that the total sample consisted of 8,800 students. An (2013a) felt that he had the elements to investigate whether DE impacted degree attainment, and noted that students who did not have DE participation were likely to provide a poor comparison for dual enrollees; therefore, he estimated an additional selection model capturing a student’s likelihood of attending college. An (2013a) used multiple imputation techniques to handle missing data and propensity score matching models to estimate the impact of DE on college degree attainment, as well as sensitivity analysis. An (2013a) identifies two dependent variables:

- 1) Whether a student attained any postsecondary degree;
- 2) Whether a student attained a bachelor’s degree.

Control variables included race, gender, parental education, parental occupation, family income, family structure, number of siblings, and several indicators that capture the role of significant others on the student outcomes, as well as early college aspirations and college preparation and measured SES by parental education. Results for An’s (2013a) study indicate that 1) DE participation increases the likelihood of degree attainment, and even after accounting for covariates, an 8% increased likelihood of attaining any postsecondary credential, and a 7% increased likelihood of attaining a bachelor’s degree demonstrate a positive impact of DE on college degree attainment. Secondly, a sensitivity analysis shows that these results are robust to relatively large confounders that affect both selection to participate in DE and college degree

attainment. Third, An found a positive connection between DE participation and degree attainment for first-generation students that was 8% points higher than if they had not participated in DE, while dual enrollees with less educated parents are more likely to attain a college degree than similar non-DE enrollees. Thus the effect of DE is greatest for students with less educated parents. Fourth, he found mixed support that the level of influence of DE differs across levels of parental education. Fifth, DE programs are not detrimental to low-SES students, DE raises the level of college access, though there is evidence that the majority of the increase in college degree attainment occurred for those students who took 2 DE courses and found little added benefits beyond six credits. Finally, in comparing the influence of DE enrollment on college degree attainment versus AP participation, after accounting for baseline differences, there was little difference in the effects of accelerated programs on degree attainment which is consistent with findings from previous studies. An's (2013a) recommendations theorize that, when deciding what type of pre-college credit or examination program to offer, stakeholders consider their constituents rather than a one size fits all approach. Limitations of this student were the initial use of the NELS: 88 database for the crux of the study.

An (2013b) explores the influence of DE on academic performance and college readiness by differences in SES. An (2013b) addresses three research questions in this study: 1) Does participation in DE improve students' academic performance and college readiness? 2) Are there SES differences in the influence of DE on academic performance and college readiness? And 3) does equal participation in DE reduce SES gaps in academic performance and college readiness?

The datasets for An (2013b) are as follows:

1) The Beginning Postsecondary Students Longitudinal Study (BPS: 04/09), which is a sample of first-time college students in 2004 who were surveyed again in 2006 and 2009;

2) The 2009 Postsecondary Education Transcript Study (PETS: 09). An (2013b) limited the sample due to missing transcript and information and the sample for the study was reduced to 13,230.

An (2013b) defined academic performance (the dependent variable) as a student's first-year GPA and college readiness (dependent variable) by whether a student took at least one remedial course during college, and control variables included measures of race, gender, family background, family structure, number of siblings in college, nativity, language spoken at home and age, while family background consisted of parents' education, family income and home ownership. An (2013) again used imputation to handle missing data and propensity score matching and sensitivity analysis to analyze the data. Results of An's (2013b) study were as follows: First, mean differences between DE and non-DE enrollees indicated that DE enrollees performed substantially better in college (GPA is 0.23 higher) than nonparticipants, and DE enrollees have a 13% difference in the likelihood of taking a remedial course than nonparticipants. Results from the propensity score matching model show that over half of the DE advantage is due to observed student differences across programs, and even after adjusting for covariates, DE enrollment is a positive influence on academic performance and college readiness, as the effect size of DE on first year GPA was 0.13. Secondly, overall, students with DE whose parents did not earn a bachelor's degree perform better in college than nonparticipants – first generation students who participated in DE tend to perform better in college than nonparticipants and third, academic achievement accounts for the brunt of the parental-education gap in first-year GPA (primarily due to differences in the distribution of SAT scores where first-generation students are at the lower end of the distribution than students with college educated parents. Fourth, An finds dual enrollees earn a college GPA 0.11 points higher than similar

nonparticipants, and this finding is robust to relatively large unobserved confounders. An (2013b) concludes that “reducing gaps in academic performance and college readiness between first-generation students and students with college-educated parents would require more than equalizing DE participation” (p.424). In the discussion and conclusion, An (2013b) raises the point that “although increasing DE participation may increase academic performance and college readiness for students, this increase does not necessarily translate to a reduction in academic gaps between first-generation and non-first-generation college students” (p. 425). An (2013b) discusses that DE students are similar in baseline characteristics, as they enter and leave the program with these differences and therefore would experience the impact of DE on the achievement and attainment uniformly. Therefore, even if students experienced similar effects of DE on academic performance and college readiness, these programs may not close the parental-education gap. Equal participation in DE is not necessarily the problem or the solution. Limitations of the study included lack of coding to identify the delivery method of the DE programs, the number of DE courses taken by the students, and the subject content.

Pretlow, Wathington and Heather (2014) follows the impact of a policy change intended to expand dual enrollment programs on DE outcomes in the state of Virginia in 2005. Pretlow et al. (2014) sought to investigate the following with their research study:

- 1) Impact of the 2005 policy change on access as measured by the number of participating high schools;
- 2) Impact of the 2005 policy change on participation in DE courses as measured by the number of high school seniors;
- 3) Impact of the 2005 policy change on the participation of certain subgroups of students as measured by students’ gender and racial/ethnic minority status;

4) Impact of the 2005 policy change on college enrollment of DE students at two or four year institutions.

The dataset for the Pretlow et al. (2014) study consisted of course-level student information collected by the Virginia Community College System (VCCS) for seniors who enrolled in at least one DE course and who graduated in the spring of 2004, 2005 or 2006. Information in the dataset included all DE courses attempted and earned during their four years of high school, self-reported race/ethnicity, high school attended and the VCCS institution attended, and if the students continued their postsecondary enrollment at the VCCS college. College outcome data was available for those who attended outside the VCCS system; this NSC was obtained which contained data on college enrollment and degrees earned. Pretlow et al. (2014) used 2004 as the base year (prior to the policy implementation), which allowed for comparison before and after the policy change, as data from 2006 would inform the impact of the changes. Pretlow et al. (2014) ran descriptive statistics to test their hypotheses. The findings were as follows: First, participation in DE by high schools (public and private) increased from 2004 (339 schools) to 2006 (an increase of 15% to 391 schools), thus as a total 76.4% of high schools offered a minimum of one DE course in 2004. (That number rose to 86.6% for 2006.)

Second, the total increase of DE participation from 2004 to 2006 was 18%, and while overall DE enrollment did increase, the gains were not evenly distributed: female participation increased by 18%, males by 19.2%. Black and Hispanic students enjoyed the largest gains: Black students saw a 25.6% increase in participation from 2004 to 2006, Hispanic students saw a 56.3% increase in that time span, and white students increased by 16.7%. While these percentages represent growth for these subgroups, the results indicate that Black and Hispanic students were still significantly under-represented in the general population relative to their

proportion in the total population. The policy change, though associated with gains by all groups, did not significantly decrease the participation gap among racial ethnic groups. While White students made up 64.3% of the 2006 graduating class, they accounted for 80.3% of the DE students; the corresponding numbers for Black students were 23.8% and 13.9%, respectively, and the corresponding numbers for Hispanic students were 5.5% and .41%, respectively. Third, participation as measured by DE credit hours increased though only slightly from 2004 (11.97%) to 2006 (12.18%), an increase of only 1.75% in the total number of DE credits attempted.

Finally, enrollment behavior increased from the 2004 to 2006 cohort; however, most importantly, approximately 87% of seniors who took a minimum of one DE course enrolled in a postsecondary institution within four years of high school, but the remaining 13% did not enroll even though they were eligible for college-level coursework in at least one subject. Pretlow et al. (2014) pose this finding in another way, for the 2004 and 2006 cohorts, a total of 3062 did not enroll in college within four years of high school graduation. Pretlow et al. (2014) speak to the implications that this measure indicates with respect to building policies that target students while they are still in high school, which could have an impact on degree attainment. While the 2005 DE policy change did increase participation, representation of the subgroups indicated that there was still a gap, given as Pretlow et al. (2014) discuss, Hispanics are the fast growing group in Virginia with 1 in 10 high school seniors now Hispanic. Limitations of the study include that the descriptive nature of the analysis does not establish causal claims of the effect of DE or the 2005 DE policy on students' outcomes, and the available data set does not contain comprehensive information across the board for the entire sample.

Godfrey, Wyatt and Beard (2016), in a study for the College Board's Research Report Series, explore college outcomes for students who come from traditionally lower-income

backgrounds (as defined by a household income of \$30,000 or less, and who were awarded a fee reduction to take one or more AP Exams) compared to students from similar backgrounds who did not take any AP Exams. Godfrey et al. (2016) provided background information on College Board's fee reduction program to assist students with a financial burden to participate in the AP program. Godfrey et al. (2016) report that the 2013 AP graduating class had over 27% of the examinees receive this fee reduction. The research question investigated in this study by Godfrey et al. (2016) will explore college enrollment, persistence, and graduation to measure the impact of AP on the low-SES who received a fee reduction versus those students of similar background who did not. Godfrey et al. (2016) used two datasets for this study 1) a College Board database that contains AP, SAT, PSAT/NMSQT scores, self-reported high school GPA and demographic information for students scheduled to graduate from high school in 2007 and 2) the National Student Clearinghouse (NSC), a database that tracks student enrollment and attainment for over 3,100 two and four-year colleges and universities in the US. Godfrey et al. (2016) merged the data and limited the data to those students who attended a U.S. high school, took the SAT test, indicated a household income of \$30,000 or less and self-reported their HSGPA, gender, race/ethnicity and parental education level. All students in this study also took an AP exam(s) using an AP fee reduction. Godfrey et al. (2016) subdivided the dataset by five subject areas: English, math, science, social science/history, and world languages. Godfrey et al. (2016) created matched pairs (did not describe process in article), and after the match, there were 23,416 students in the English sample, 14,592 in the math sample, 14,166 in the science sample, 25, 634 in the social science/history sample, and 13,468 in the world languages sample. By design, the samples had half of the students having taken an AP exam in that subject area, and the other half had not taken an exam in that discipline. Godfrey et al. (2016) then conducted descriptive

statistics and logistic regression analysis on the dataset. Overall, the findings for this Godfrey et al. (2016) study found that lower-income AP examinees with AP fee reduction tend to have a higher likelihood of enrolling, persisting, and graduating from four-year colleges than their non-AP taking peers. Godfrey et al. (2016) found that demographically, the group findings are as follows:

1) Across the AP subject areas, females accounted for a greater percentage than males (mean of 64.3%);

2) Black or African American students accounted an average of 16.5% of the sample;

3) Hispanics accounted for an average of 38.75% of the sample;

4) The average highest parental education level was no higher than a high school diploma;

5) Distribution of household income suggested slightly higher incomes for non-AP students than AP examinees across all subject areas;

6) SAT scores and self-reported HS GPA was higher for the AP examinees than for the non-AP takers.

Godfrey et al. (2016) did not discuss implications, but rather suggested that future research could delve more into the differences between various combinations of AP exam disciplines and performance outcomes for low SES students. Limitations of the study included issues with the matching process, use of self-reported academic parental information, sample limitations, and the descriptive narrative of the study itself which was repetitive.

Overall, there is a dearth of literature investigating the impact of DE, AP and IB on college achievement and attainment. While the studies included in this section were specifically looking at the impact by SES or racial/ethnic status, there are many areas of research yet to be

explored, particularly given the fact that these programs are touted as increasing access. An's (2013a and 2013b) studies provide the most empirically sound findings, yet as they bring up the point that while there is some benefit to pre-college credit and examination programs, there are student characteristics that go beyond just increasing the number of DE, AP or IB offerings in the classroom. Additionally, the lack of comprehensive up to date data-sets is another concern. Recommendations for this type of data clearinghouse have been mentioned in virtually every study in this literature review, though it is clear that researchers are not able to attain the comprehensive data necessary for studies of this type, given that so much is riding on so many levels for this type of research. Stakeholders have got to address this issue, otherwise, the results will continue to be the same.

Summary

The current status regarding the lack of empirical evidence on the relationship of these pre-college programs to college success has been identified by various researchers and seems primarily to be caused by the lack of access to a comprehensive database containing K-16 high school and college academic, demographic, and SES information. Indeed, existing statistical studies have relied on the National Education Longitudinal Study (NELS) dating from 1988 when these pre-college credit opportunities were not managed in the same manner they are today (An, 2013a; An, 2013b; and Swanson, 2008). Other studies have utilized more comprehensive datasets (Godfrey et al., 2014; Speroni, 2011 and Swanson, 2008); however, in the first study, only students graduating from public (not private) high schools were included, and the dataset did not differentiate between academic and technical/vocational courses. Godfrey et al. (2014) included only students who had taken AP courses and not the exams in the sample; additionally, students' IB courses were also excluded in Speroni's study (2011). Finally the use of an older

data-set that does not necessarily represent the changes in DE programs as well as current sociological and economic changes was used in a number of studies (An, 2013a & 2013b; and Swanson, 2008).

This mixed methods study will look to potentially fill the gap in the literature by addressing concerns expressed by previous researchers regarding the lack of empirical data by conducting sound statistical analyses on a current comprehensive K-16 dataset, and furthermore provide a qualitative context by studying student perceptions of their experiences with pre-college programs on their college achievement. Secondly, this study will hopefully provide an opportunity to inform policy and practice in order to make clear and transparent decisions based on actual trends in data as opposed to assumptions.

CHAPTER THREE: METHODOLOGY

This chapter will discuss the research methodology employed for this study. The specific research design will be outlined followed by a description of the data sources. The remainder of the chapter will cover justification for the selection of the specific cohorts and variables, analysis of the data, and missing data, as well as the various statistical techniques utilized in the analysis of both the quantitative and qualitative results within the framework of the four research questions.

Research Design

This explanatory sequential mixed methods investigation studied whether there are differences in the performance of college students predicated on participation in AP, DE and/or IB, pre-college credit programs, as compared to those students who did not participate in any pre-college credit programs.

The quantitative portion of the study analyzed the use of these programs as predictors of college success as defined by cumulative college GPA, 1st to 2nd year retention, time to degree, and graduation date. Additionally, each of these quantitative research questions further examined whether there were differences in the performance of students via the inclusion of high school and demographic characteristics.

The qualitative part of the study consisted of a short survey sent to the sample in order to capture individual impressions and perceptions about their experiences with pre-college credit programs and its subsequent impact on their college achievement. This two-fold investigation provided an opportunity to both empirically examine the quantitative dataset, and qualitatively gather student impressions that can elaborate on the quantitative findings, thereby adding context to the data that may validate or nullify the hypothesis of the study (Creswell & Plano Clark,

2011). The qualitative analysis utilized grounded theory to induct a holistic and comprehensive theory of the issue.

The selection of this research design afforded 1) an opportunity to statistically analyze the comprehensive academic and demographic data of an eleven-year cohort of students, admitted and enrolled from 2005-2016 at a large, public institution in the Southeast and 2) offer further understanding of the issue by conducting a short survey of open-ended questions for the purpose of identifying emergent themes of student impressions and perceptions with their experiences with pre-college credit and examination programs and its impact on their college achievement and attainment (Creswell & Plano Clark, 2011).

Data and Sample

The data utilized for this study consisted of the entire secondary to postsecondary enrollment data cycle (K-16) for admitted and enrolled students at a large, public, PWI, in the Southeast.

Data

Quantitative. While the total population for this study consisted of ten years of data, a three-year cohort was selected and identified as the sample cohort and consisted of the following: 2010-2011, 2011-2012 and 2014-2015 academic years. The selection of these particular academic year cohorts was due to the necessity for at least one cohort to have had the chronological opportunity to attain graduation, as time to degree and graduation were two of the study variables of interest.

The dataset defined for this study was obtained from four different data sources in a secure file server exchange:

•High school secondary transcript information was obtained via a file transfer between the institution and the state's Department of Education. This detail data file was entered by secondary school system staff from the various districts and high schools into a portal sponsored by the Department of Education and consisted of specific detail information regarding the high school record, courses, course type (honors, AP, IB & DE), course hours, course grades, and student demographic information. The submission of the application for this institution includes a tacit release of information approval authorizing the transfer of the electronic transcript from the Department of Education (DoE) directly to the database of the admissions office of the institution. The State DoE considers these electronic transcripts submitted through the Student Transcript System (STS) as official high school records for graduation and the awarding of the state funded tuition program; therefore, the receiving institution does as well.

•Applicant information was obtained securely from the admissions database and consisted of student and parent demographic information, high school name, high school coursework, as well as any potential transfer coursework (including dual enrollment) that the student completed prior to their enrollment in the institution. As part of the admissions process, the core course GPA requirement for the institution was calculated, official test scores from ACT/SAT were electronically loaded directly from the test organization, all transfer coursework and any AP and/or IB courses earned were uploaded into the system and became part of the student's permanent institutional record. It is important to note that upon application to the institution, a unique identifier was attached to the student which then tied the secondary system's student record to the admissions' financial aid and scholarships system, which then rolled over electronically to the registrar's office and became part the students' permanent enrollment record at the institution.

•Financial Aid information was obtained from the Student Aid database and consisted of financial student and parent information including annual household income (submitted from the Free Application for Federal Student Aid [FAFSA]), which also determines eligibility for all state and federal aid programs. This particular state has a state sponsored tuition program which was also captured in the form of a yes/no (Y/N) flag. Additionally, this database also contains institutional merit scholarship information via the Y/N flag.

•Institutional Record information was obtained from the Office of the Registrar at the institution and consists of all the information previously submitted as part of the admission file of the student that now becomes part of the student’s permanent record, as well as all degree program, major, minor, courses enrolled, hours attempted and completed, grades earned, by semester as well as milestones such as graduation date.

Table 1 illustrates a brief overview of the quantitative data types that were considered in this study. A more detailed table can be found in Appendix C.

Table 1 Cohort Years and Data Origin

Cohort Years & Origin (Fall, Spring, Summer Terms)	AY 2010-2011 AY 2011-2012 AY 2014-2015	Students with & without DE/AP/IB pre- college credit
Department of Education Student Transcript System Data	Grades 9-12	Comprehensive Transcript Data for HS grades 9-12
Admissions Data	Applicant Data (ADM)	Comprehensive Demographic Applicant Data & Test Scores
Financial Aid Data	FAFSA (FAD)	Parental and Student financial information as submitted on the FAFSA for state, and federal aid programs consideration.
Institutional Data	Student Record (SRR)	Student information related to all aspects of enrollment.

Qualitative. The qualitative data used in the study consisted of the students in the same three cohorts used in the quantitative analysis. A survey instrument was developed to capture the

perceptions and feelings of the cohort and sent to the students anonymously via email. The data was made up of some demographic measures and responses to open-ended questions.

Data Collection

Quantitative. The data collection process for this study occurred in two segments, as an employee of the Admissions' Office and the data steward for the ADM database at the institution at the time, access to the secondary and admissions data was administered via a request to the staff of Enrollment Management. As part of that same request, a memo to the data stewards for Financial Aid and Scholarships as well as the Registrar's Office was submitted. The requests were all duly approved, and the merged file of all three databases was delivered via a secure password protected file server. Approval for this study was obtained from the Institutional Review Board (see Appendices A & B).

Qualitative. The second phase of the data collection began with the submission of a request for the email addresses of the three cohorts from the Registrar's Office. Upon approval, a de-identified file of valid email addresses was then obtained via the same secure password protected file server. The qualitative data collection procedure used for the analysis of Research Question IV, was accomplished through the use of an online questionnaire consisting of ten demographic and descriptive questions, along with four open-ended questions to gather the students' impressions of how participation in AP, DE and/or IB may or may not have impacted their preparedness for college. In order to increase participation, students in the sample were offered two \$100 gift cards to Amazon as an incentive to complete the surveys. The survey was intuitive and written in QUALTRICS with programmed branch logic to account for specific student situations. For example, when the student selected the type of pre-college credit that

they completed, the survey was set up to only show those questions and options that applied to that student's specific situation.

Approval for this study was obtained from the Institutional Review Board (see Appendices A & B).

Variables

Quantitative. The variables selected for the initial quantitative analysis fell into four main categories: high school information, applicant/admissions information, financial aid and scholarship information and institutional enrollment data, and are listed below along with variable type:

- High School transcript information utilized in this study consisted of high school core GPA (continuous variable on a scale of 0-4), Math GPA (continuous variable on a scale of 0-4), Honors GPA (continuous variable on a weighted scale of 0-5), DE course GPA (continuous variable on a scale of 0-4), AP credit (continuous variable on a scale of 0-4), and IB credit (continuous variable on a scale of 0-4).

- Applicant/admissions information utilized in this study consisted of: student ethnicity (categorical variable), gender (categorical variable), residency status defined as in-state versus out of state (categorical variable), standardized test scores concorded as an ACT/SAT equivalent by the admissions office including composite/math & English sub scores (continuous variables with a range of 1-36), private versus public high school (flag designated by the admissions office and is a categorical variable, Y/N), DE GPA on earned course credit (continuous variable on a scale of 0-4), AP college course credit earned (categorical variable, Pass/Fail), IB course credit earned (categorical variable P/F) and mother and father parental education level (categorical variable)

- Financial aid and scholarship information utilized in this study consisted of parental income listed on the FAFSA for incoming year only (continuous consisting of a range from \$0.00 +), merit aid earned flag (categorical, Y/N), state funded program earned flag (categorical, Y/N), Pell Grant flag (categorical, Y/N) and institutional grant program flag (categorical, Y/N).
- Institutional enrollment information utilized in this study consisted of students semester by semester GPA (continuous variable with a scale of 0-4), total number of completed semesters (categorical), total number of credit hours attempted and earned (categorical) and graduation date (categorical).

Thus, each case represented an individual student who applied to the institution, supplied a high school transcript and test score information, was admitted to the institution as an incoming freshman, completed and submitted the Free Application for Federal Student Aid (FAFSA) found at fafsa.ed.gov for AY2005-2016, and subsequently enrolled in the institution. A complete list of each variable, origin and type can be found at Appendix C.

Qualitative. The survey questionnaire was designed to capture both student demographic information as well as the more abstract and subjective constructs regarding student's feelings and impressions about having participated in pre-college credit programs and whether or not this participation had an impact on their college achievement. The open-ended questions could potentially complement the quantitative findings of the study.

The specific demographic information captured in the survey consisted of categorical variables: type of pre-credit program, delivery system for DE courses, type of credit earned, number of hours of credit earned, gender, ethnicity, high school type –public versus private, high school graduation size and mother and father education levels. Four open-ended questions were designed to capture the more abstract constructs regarding their emotions and perceptions

surrounding their pre-college credit program experiences and were analyzed utilizing the grounded theory method.

The overarching demographic and open-ended research questions were as follows:

a) All students in the sample cohort will be asked to share the type of pre-college credit program that they engaged in? Course credit awarded? Hours earned? Location and teacher type who taught the course? Demographic information was collected: high school type, size of graduation, gender, ethnicity, and parental education level (as a proxy for social economic status);

b) For those students who participated in pre-college credit programs, the following open ended questions will be asked:

1. Do you feel that participation in AP, DE and/or IB programs while in high school was helpful in preparing to take college level courses? Why or why not?

2. In retrospect, would you have preferred to take the courses in college instead of taking them as AP, DE, or IB? Why or why not?

3. How did enrollment in these courses help you feel about your preparedness for college?

4. Compared to other people who did not participate in these programs, do you feel taking these courses made you more prepared for college? Why or why not?

c) For those students who indicated on the survey that they did not participate in pre-college credit programs, branch logic will be programmed in the survey to ask the students why they did not participate, and to please elaborate.

The following open ended questions will then be asked:

1. Do you feel your high school courses prepared you for college? Why or why not?
2. Do you feel that participation in AP, DE, and/or IB programs in high school would have been helpful in preparing you to take college level courses? Why or why not?
3. Looking back, do you wish that you would have participated in AP, DE, or IB courses instead of waiting to take all the courses in college? Why or why not?
4. Do you feel that your peers who participated in AP, DE, or IB programs were better prepared for college than you? Why or why not?

The full survey instrument can be found in Appendix D.

Sample

Quantitative. The sample cohort for the study consisted of high school and applicant information for admitted first- time freshman as well as enrolled student data from the following academic years: 2010-2011, 2011-2012 and 2014-2015. These cohort students were admitted and consequently enrolled in a large predominantly white (PWI) in the Southeast. Those specific years were selected to allow for students to have the opportunity to progress in their studies and thus test progress towards degree and graduation date, which were integral to research questions I-III of this study.

The original sample size was N=16,320 cases. It was found that domestic students studying abroad were included in the dataset. International high school credit does not have exact equivalents to domestic high school credit; therefore, this institution awards P/F credit which results in students not having a GPA on a 4.0 scale. Ergo, the decision was made to exclude these

cases. Additionally, students who were missing standardized test scores were also excluded from the sample.

The dataset was originally divided by GRP or type of pre-college credit program – AP only (2260 cases), DE only (2867 cases), IB only (76 cases), None (10,258) for students with no pre-college credit participation or credit and COMBO (631) for those students who participated in multiple programs, i.e. AP+DE. Several analyses were conducted including IB; however, due to the discrepancy in the size of the IB population (only 76 cases), the decision was made to exclude this population from the final study. The final sample size was 15,933. Final study numbers for each of the groups of interest are presented in Tables 2-8.

Table 2 Sample Overview by Group

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	AP Only	2260	14.1	14.2	14.2
	DE Only	2860	17.8	18.0	32.1
	COMBO	582	3.6	3.7	35.8
	None	10231	63.7	64.2	100.0
	Total	15933	99.3	100.0	
Missing	System	120	.7		
Total		16053	100.0		

Table 3 Sample Overview by Ethnicity

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Asian	564	3.5	3.5	3.5
	Black	1831	11.4	11.4	14.9
	Hispanic	886	5.5	5.5	20.4
	Other	505	3.1	3.1	23.6
	White	12267	76.4	76.4	100.0
	Total	16053	100.0	100.0	

Table 4 Pre-College Programs by Ethnicity

		AP Only	DE Only	COMBO	None	Total
EthNew	Asian	97	71	26	365	559
	Black	139	365	29	1289	1822
	Hispanic	163	117	43	557	880
	Other	71	104	26	298	499
	White	1790	2203	458	7722	12173
Total		2260	2860	582	10231	15933

Table 5 Pre-College Programs by Gender

		AP Only	DE Only	COMBO	None	Total
Gender	Female	1241	1653	343	5340	8577
	Male	1019	1207	239	4891	7356
Total		2260	2860	582	10231	15933

Table 6 Pre-College Programs by High School Type

		AP Only	DE Only	COMBO	None	Total
Private	Public	1284	2286	493	5373	9436
	Private	976	574	89	4858	6497
Total		2260	2860	582	10231	15933

Table 7 Pre-College Programs by High School State

		AP Only	DE Only	COMBO	None	Total
HS State	In State	1454	2242	367	8186	12249
	Out of State	806	618	215	2045	3684
Total		2260	2860	582	10231	15933

Table 8 Pre-College Programs by Pell Grant Status

		AP Only	DE Only	COMBO	None	Total
PELL	Non PELL	1916	2181	488	7958	12543
	PELL	344	679	94	2273	3390
Total		2260	2860	582	10231	15933

Qualitative. The sampling procedure employed for the qualitative portion of this study was a combination of convenience sampling (ease of access to the group) and purposeful sampling. According to Patton (1990), “There is logic and power in selecting information-rich cases” who have experienced or share a common thread related to the study, in this case,

admitted students with or without pre-college credit program credit (p. 624). A short online inquiry instrument was sent via email to the study cohort to gather student perceptions and feelings of their experiences with AP, and DE in relation to their college preparation and achievement. The target participants for the qualitative study were also the participants for the quantitative analysis. Of the 16,320 students in the quantitative analysis, 11,007 had valid email addresses which all were securely obtained from the Registrar's Office of the institution. The survey was then administered via email to this population. In the analysis of the distribution of the emails, all were sent out and received with no bounce backs. The survey remained active for seven calendar days, with one reminder email to non-respondents and at the time of inactivation.

The difference in the number of cases can be attributed to various factors, including but not limited to graduating from the institution and no longer being in the system, resigning from the institution and not leaving a forwarding email, change in email address, etc. In all, a total of 838 surveys were started, and 804 completed to equal a response rate of 84%. The total percentage of the response rate for the sample population was 7.3%. The final sample size was $n=761$. The survey results were reviewed for any skip patterns in the questions, and non-responsiveness. Due to the sample size, the decision was made to delete responses that were incomplete or incompatible with the topic of the research. At the time the survey was sent, IB was still included; however, as with the decision to omit IB from the quantitative analysis, the decision was made to omit IB from the subsequent qualitative analysis. For this study, two groups were selected for the qualitative analysis:

- 1) Students who indicated that they took AP only; and
- 2) Students who indicated that took DE only.

The final sample breakdown for each group and size for the qualitative analysis can be seen in Table 9 below.

Table 9 Qualitative Final Sample

Type of Enrollment	%	Count	HS Type: Public/Private/Charter/Home School	Gender: M/F/O	Ethnicity: Minority/ Non-Minority
AP only	31.60%	241/761	121/114/6/0	95/147	57/184
DE only	12.48%	95/761	50/39/0/4	28/66/1	23/72

Analysis

This study employed quantitative statistical methods to obtain frequencies and correlations between the variables in the data set, then addressed Research Questions I, II, & III by utilizing descriptive, correlational univariate, and predictive multivariate statistical analyses in order to gain information regarding the significance of the relationships between demographic, high school, academic, and college variables with pre-college credit participation. Research Question IV, which was qualitative, was analyzed via the use of Word Cloud and the grounded theory methodology to induct a hypothesis from the various survey respondent themes.

Quantitative

Data Screening. Prior to conducting any statistical analysis, the dataset was reviewed to ensure accuracy and confirm that there were no duplicate or egregious examples of missing data. Descriptive statistics and frequencies were run on the data using SPSS statistical software to gather information on the mean, median, mode, and distribution of the variables of interest. Upon analysis, several US citizens attending foreign institutions were discovered. Foreign credit is not analyzed in the same manner as domestic at this institution, as it is awarded Pass/Fail credit, resulting in a lack of a GPA on a 4.0 scale. Approximately 267 students fell in this category and were excluded from the cohorts of the study.

The results were reviewed to ensure that there were no violations of the assumptions: Independence, Normality, Homogeneity of Variance and Outliers. Once a determination of the data quality was made, a decision to on how to categorize, select and transform variables followed. The various analyses to be employed were specifically selected to address the research questions for the study and shed light on any significant relationships and for the various combinations of variables to be assessed.

The quantitative analysis of the three cohorts (2010-2011, 2011-2012, 2014-2015) comprised the use of descriptive, univariate Factorial ANOVA and ANCOVA and logistic regression to identify which of these pre-college programs is the most significant predictor of post-secondary success as identified by college GPA; 1st to 2nd year retention rates; time to degree (# of semesters); and graduation date. Additionally, the interaction of the above with dichotomous variables, such as number of pre-college courses resulting in credit, race/ethnicity, gender, public versus private high school, LA versus out of state residency and SES, were also examined via the use of Factorial ANOVA, ANCOVA and logistic Regression.

The three quantitative research questions each had four sub-questions which addressed different measures of college success.

College GPA. Research Question I (RQIa) investigated which of the pre-college credit programs is the best predictor of college achievement as defined by institutional GPA (DV). The statistical analysis ANCOVA was utilized with high school academic GPA (includes only academic courses) and ACT/SAT equivalent composite as covariates.

Retention. This sub-question sought to define the strongest predictor of college achievement as defined by retention. In this case, retention was defined as fall to subsequent fall (sophomore year) continuous enrollment, which was identified in the dataset as a categorical

variable, 1=enrolled Fall to Fall of sophomore year and 0=all others not enrolled. A logistic regression was run with this enrolled fall to fall of sophomore year variable as the dependent variable (DV). The analysis still accounted for the effects of high school academic GPA and ACT/SAT equivalent composite.

Time to degree. A Factorial ANOVA analysis was conducted on the cohort to determine the effects of pre-college credit programs on time to degree, identified by number of enrolled semesters (DV) completed by the cohort. This run utilized the number of enrolled semesters by GRP to determine which pre-credit program leads to shorter time to degree. The original research design called for an ANCOVA analysis to investigate this question, however, the covariates did not meet the assumption of homogeneous slopes; therefore, ANCOVA could not be utilized. To still control for those measures institutional GPA, high school academic GPA and ACT/SAT equivalent were transformed from continuous variables into ordinal variables. Each variable was divided into five approximate ranges consisting of approximately 20% of the population for each category. It was determined that high school GPA would be divided into five ranges consisting of 1.59-3.00 (low), 3.01-3.27 (low medium), 3.28-3.51 (medium), 3.52-3.78 (high medium) and 3.79-4.00 (high). ACT/SAT equivalent composite was divided into five ranges: 14-22 (low), 23-24 (low medium), 25-26 (medium), 27-29 (high medium) and 30-36 (high). Institutional GPA was divided into five ranges: 2.00-2.72 (low), 2.73-3.03 (low medium), 3.04-3.29 (medium), 3.30-3.57 (high medium) and 3.58-4.00 (high).

Graduation Date. A logistic regression was conducted to determine the effects of which of the pre-college credit programs (GRP) was the strongest predictor of college success as defined by graduation date (Y/N flag: DV). In order to conduct the analysis, the DV was converted to a categorical variable: Graduated Y= 1, Graduated N=0. Additionally, only one

cohort, 2010-2011 was identified as chronologically able meet the 6 year graduation rate, which is a national measure for institutional graduation rates. Therefore, students who began in the fall of 2010 would be eligible to meet the 6 year graduation rate in May 2016. Any cases within this sample who did not graduate by May 2016 were coded as non-completers.

Research Question II (a-d) followed the same model format, except for the introduction of high school characteristics: high school type (1=private/0=public), residency (0=in-state/1=out of state) and number of pre-college credit courses resulting in college credit. This was a continuous variable that was calculated as the count of all instances of pre-college credit programs where college credit was earned.

Research Question III (a-d) followed the same model format except for the introduction of demographic information: gender (1=Female, 0=Male), ethnicity and SES (defined by Pell Federal Grant status, 0=Non-Pell, 1=Pell). Ethnicity was collapsed into a NewEth variable, which combined some of the lower percentage populations into Other. The groups were as follows: 1=Asian, 2=Black, 3=Hispanic, 4=Other (American Indian/Alaskan Native, Multi-Racial and Native Hawaiian/Other Pacific Islander) and 5=White.

Qualitative. The analysis for Research Question IV utilized the Grounded theory methodology, which views the data as a source from which to build a theory, Glaser & Strauss, (1967). In this study, the qualitative dataset consisted of student responses to the survey questions which can be further described as a diverse property (Glaser & Strauss, 1967). This study will take all the diverse responses and look for common properties (via coding) and elements (via categorizing) that can then be culled to create a cohesive and cogent framework that can then be used to build on and subsequently inform the quantitative findings.

Summary

This explanatory sequential mixed model research study was built around a comprehensive secondary to postsecondary dataset for students enrolled at a large, white, PWI, in the Southeast that is unique in the literature and analysis of this topic. Three sample cohorts representing academic years 2010-2011, 2011-2012 and 2014-2015 were selected for the analysis.

Quantitative. The data utilized for the quantitative study represented secondary, applicant and admissions information, financial aid information and institutional enrollment for each of the cases. The quantitative analysis of Research Questions I-III investigated through the use of this comprehensive dataset the significant predictors of college success via Univariate and Multivariate statistical analysis.

Qualitative. The data analyzed for the qualitative portion of the study originated from respondent answers to survey questions that were sent out to the cohort. The qualitative analysis of Research Question IV sought to investigate the respondent answers to three open-ended questions to inquire whether there were any commonalities or differences in the experiences and feelings of students who participated in AP only and DE only programs. Grounded theory served as the basis for the organic development of common thematic ideas arising from the student responses.

CHAPTER FOUR: RESULTS AND FINDINGS

Research Question One (RQI)

The analysis for RQI examined which pre-college credit program (AP, DE, IB, COMBO or None) is the strongest predictor of college achievement as defined by a) cumulative college GPA, b) 1st to 2nd year retention, c) time (semesters) to degree and d) graduation.

Cumulative College GPA (RQIa)

For this question a Univariate ANCOVA was conducted controlling for the covariates: HS Academic GPA and ACT/SAT Equivalent composite. The assumptions for univariate ANCOVA were checked to ensure that there were no violations of normality, and that the random independent samples, homogeneity of variance, and linear relationship between DV and covariate was linear, homogeneity of regression slopes, and that the covariate and IV were independent. The test for homogeneity of regression slopes showed that the interaction between the high school academic GPA and pre-college credit program was not significant, $F(3, 15921) = 1.71, p = .16$. Similarly, the interaction between ACT Composite score and pre-college credit programs was also not significant, $F(3, 15921) = 1.26, p = .29$. This indicates the assumption of homogeneity of regression slopes was met. Levene's test for homogeneous variance was not met, $F(3, 15929) = 63.30, p < .01$. However, due to the size of the sample, this was not of great concern, as this test is very sensitive to large sample size. Institutional GPA was slightly skewed to the left, indicating a small deviation from normality. However, the test is robust against violations of this type in a large sample size.

The results of the ANCOVA presented in Table 10 show there was a significant effect for the pre-college credit programs on college GPA.

Table 10 ANCOVA Results for College GPA

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	2918.400 ^a	5	583.680	1221.756	.000	.277
Intercept	109.604	1	109.604	229.423	.000	.014
GRPnoIB	67.985	3	22.662	47.435	.000	.009
ACTEqvComp	105.943	1	105.943	221.759	.000	.014
HSAcadGPA	1846.788	1	1846.788	3865.688	.000	.195
Error	7608.939	15927	.478			
Total	136418.472	15933				
Corrected Total	10527.339	15932				

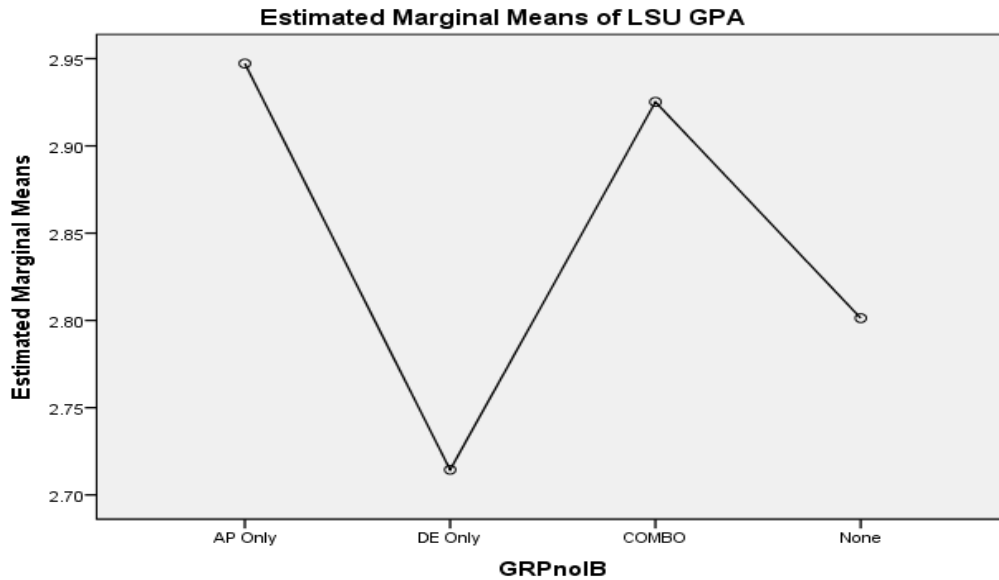
^aR Squared = .277 (Adjusted R Squared = .277)

Pairwise comparisons showed that students who took no pre-college credit programs performed lower than AP ($p < .01$) and COMBO ($p < .01$) but better than DE ($p < .01$). DE students performed significantly worse than all other groups ($p < .01$). There was not a significant difference between AP and COMBO. The comparison of mean college GPA across groups is displayed in Table 10, Table 11, and Figure 1.

Table 11 Comparison of Mean College GPA

GRPnoIB	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
AP Only	2.947 ^a	.016	2.917	2.978
DE Only	2.714 ^a	.013	2.689	2.740
COMBO	2.925 ^a	.029	2.868	2.982
None	2.801 ^a	.007	2.788	2.815

^aCovariates appearing in the model are evaluated at the following values: ACT Eqv Comp = 25.52, HS Acad GPA = 3.3788.



Covariates appearing in the model are evaluated at the following values: ACT Eqv Comp = 25.52, HS Acad GPA = 3.3788

Figure 1 Means of College GPA by Program Type

First to second year retention (RQIb)

The results of the logistic regression for first to second-year retention showed that there was a significant difference in groups for retention after controlling for high school academic GPA and ACT/SAT equivalent composite, $p < .01$. The results in Table 12 show that AP, COMBO and None performed better than DE in first to second year retention.

Table 12 Results for 1st to 2nd Year Retention

GROUP	AP REF	DE REF	NONE REF
AP		.46(.09)**	.21(.08)*
DE	.46(.09)**		-.25(.06)**
COMBO	-.05(.16)	.41(.15)**	.16(.15)
NONE	-.21(.08)*	.25(.06)**	

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

Time to degree (RQIc)

The assumptions for univariate Factorial ANOVA were checked to ensure that there were no violations of normality, random independent samples, and homogeneity of variance. Factorial ANOVA was used instead of ANCOVA, as the test for homogeneity of regression slopes failed. Levene's test for homogeneous variance was not met, $F(425, 6133) = 1.78$, $p < .01$. However,

due to the size of the sample, this was not of great concern, as this test is very sensitive to large sample sizes. Enrolled semesters were slightly skewed to the right, indicating a small deviation from normality. However, the test is robust against violations of this type in a large sample size.

The results of the Factorial ANOVA presented in Table 13 show there was a significant effect for the pre-college credit programs on time to degree ($p < .01$). Pairwise comparisons showed that students who took no pre-college credit programs took longer to degree than AP ($p < .01$), DE ($p < .01$), and COMBO ($p < .01$).

Table 13 Factorial ANOVA Results for Time to Degree

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	3907.402 ^a	15	260.493	110.903	.000	.203
Intercept	194777.478	1	194777.478	82925.270	.000	.927
GRPnoIB	224.384	3	74.795	31.843	.000	.014
NewACTEqvC	49.751	4	12.438	5.295	.000	.003
NewHSAcadGPAC	37.009	4	9.252	3.939	.003	.002
NewLSUGPA	2331.362	4	582.841	248.141	.000	.132
Error	15368.404	6543	2.349			
Total	627765.000	6559				
Corrected Total	19275.806	6558				

^aR Squared = .203 (Adjusted R Squared = .201)

DE did not differ significantly from AP ($p = .61$) or COMBO ($p = .07$) in pairwise comparisons for time to degree. No students took longer than DE for time to degree ($p < .01$). On this measure, it is important to note that the difference between groups is essentially the average length of less than one semester. The comparison of mean time to degree across groups is displayed in Table 14 and Figure 2.

Table 14 Comparison of Mean Time to Degree

GRPnoIB	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
AP Only	9.406	.050	9.308	9.503
DE Only	9.369	.051	9.269	9.469
COMBO	9.162	.106	8.955	9.370
None	9.770	.024	9.722	9.817

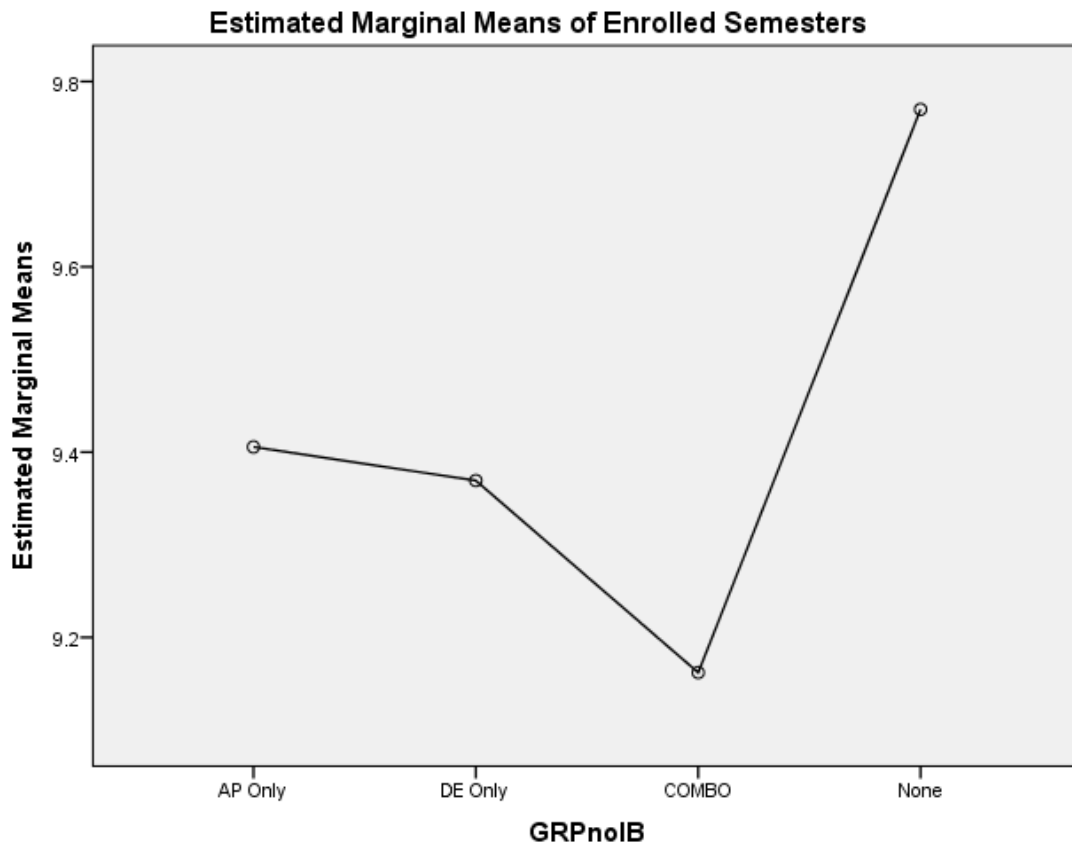


Figure 2 Means of Enrolled Semesters by Program Type

Degree Completion (RQId)

A logistic regression was conducted to determine the relationship between participation in pre-college credit programs and degree completion controlling HS Academic GPA, ACT/SAT Equivalent Score and College GPA. The results of the logistic regression showed there was not a significant difference between the pre-college credit programs on degree completion, $p = .43$.

Research Question Two (RQII)

The analysis for RQII examined which pre-college credit program (AP, DE, IB, COMBO or None) is the strongest predictor of college achievement as defined by a) cumulative college GPA, b) 1st to 2nd year retention, c) time (semesters) to degree and d) graduation when high school characteristics were introduced: high school type (public/private), high school state (instate/out of state) and number of pre-college courses where college credit was earned.

Cumulative college GPA (RQIIa)

For this question a Univariate ANCOVA was conducted controlling for the covariates: HS Academic GPA and ACT/SAT Equivalent composite. Interaction terms were included for high school type, high school state, and number of pre-college credit courses where college credit was earned to determine if the relationship between pre-college credit programs and College GPA varied on these characteristics. The results of the ANCOVA presented in Table 15 show that the difference between groups on cumulative college GPA did not vary.

Table 15 ANCOVA Results for College GPA Controlling for High School Characteristics

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	491.464 ^a	17	28.910	199.178	.000	.336
Intercept	24.897	1	24.897	171.531	.000	.025
GRPnoIB	.386	3	.129	.885	.448	.000
ACTEqvComp	32.209	1	32.209	221.912	.000	.032
HSAcadGPA	235.408	1	235.408	1621.885	.000	.195
Private	2.106	1	2.106	14.506	.000	.002
HSSState	.397	1	.397	2.736	.098	.000
Course Count	.084	1	.084	.578	.447	.000
GRPnoIB * Private	.512	3	.171	1.176	.317	.001
GRPnoIB * HSSState	.518	3	.173	1.189	.312	.001
GRPnoIB * Course Count	.529	3	.176	1.214	.303	.001

(Table 15 Continued)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Error	972.179	6698	.145			
Total	68181.460	6716				
Corrected Total	1463.643	6715				

^aR Squared = .336 (Adjusted R Squared = .334)

The comparison of mean college GPA across groups is displayed in Table 16.

Table 16 Comparison of Mean College GPA with HS Characteristics

GRPnoIB	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
AP Only	3.198 ^a	.015	3.169	3.227
DE Only	3.136 ^a	.021	3.095	3.178
COMBO	3.157 ^a	.054	3.051	3.264
None	3.145 ^a	.019	3.108	3.182

^aCovariates appearing in the model are evaluated at the following values: ACT Eqv Comp = 25.87, HS Acad GPA = 3.4247, Course Count = 1.3243.

First to second year retention (RQIIb)

A logistic regression was conducted controlling for HS academic GPA and ACT/SAT equivalent composite. Interaction terms were included for high school type, high school state, and number of pre-college credit courses where college credit was earned to determine if the relationship between pre-college credit programs and first to second-year retention varied on these characteristics. The interaction terms for high school type and high school state were not significant (See Table 17).

Table 17 Interaction Terms by HS Type, State & Course Count

Variables in the Equation							
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a	GRPnoIB			8.042	3	.045	
	GRPnoIB(1)	.340	.162	4.401	1	.036	1.405
	GRPnoIB(2)	.113	.107	1.130	1	.288	1.120
	GRPnoIB(3)	.567	.309	3.365	1	.067	1.764

(Table 17 Continued)

		B	S.E.	Wald	df	Sig.	Exp(B)
	ACT Eqv Comp	.027	.008	12.603	1	.000	1.028
	HS Acad GPA	1.110	.060	346.937	1	.000	3.035
	Private	.822	.059	191.982	1	.000	2.276
	HS State	-.107	.065	2.751	1	.097	.898
	Course CountCourse Count	.099	.075	1.753	1	.186	1.104
	Course CountCourse Count * GRPnoIB			9.060	3	.029	
	Course CountCourse Count by GRPnoIB(1)	-.013	.084	.022	1	.881	.988
	Course CountCourse Count by GRPnoIB(2)	-.121	.077	2.497	1	.114	.886
	Course CountCourse Count by GRPnoIB(3)	-.132	.083	2.512	1	.113	.876
	GRPnoIB * Private			2.580	3	.461	
	GRPnoIB(1) by Private	-.203	.182	1.236	1	.266	.817
	GRPnoIB(2) by Private	-.177	.163	1.181	1	.277	.838
	GRPnoIB(3) by Private	.359	.617	.338	1	.561	1.432
	GRPnoIB * HS State			4.306	3	.230	
	GRPnoIB(1) by HS State	-.295	.166	3.147	1	.076	.744
	GRPnoIB(2) by HS State	-.086	.132	.422	1	.516	.918
	GRPnoIB(3) by HS State	.254	.301	.712	1	.399	1.289
	Constant	-3.005	.242	154.690	1	.000	.050

^aVariable(s) entered on step 1: GRPnoIB, ACT Eqv Comp, HS Acad GPA, Private, HS State, Course CountCourse Count, Course Count * GRPnoIB , GRPnoIB * Private , GRPnoIB * HS State.

The interaction term for course count was initially significant; however, upon removing high school type and state, the interaction for course count was no longer significant (See Table 18).

Table 18 Interaction Term for Course Count

		Variables in the Equation					
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a	GRPnoIB			4.475	3	.215	
	GRPnoIB(1)	.053	.122	.186	1	.667	1.054
	GRPnoIB(2)	-.128	.093	1.868	1	.172	.880
	GRPnoIB(3)	.414	.277	2.235	1	.135	1.513
	ACT Eqv Comp	.041	.008	28.236	1	.000	1.041
	HS Acad GPA	1.130	.058	374.766	1	.000	3.097
	Course Count	-.022	.072	.092	1	.762	.978
	Course Count * GRPnoIB			5.219	3	.156	
	Course Count by GRPnoIB(1)	.082	.082	1.006	1	.316	1.085
	Course Count by GRPnoIB(2)	-.010	.074	.019	1	.890	.990
	Course Count by GRPnoIB(3)	-.020	.081	.058	1	.809	.981
	Constant	-3.072	.234	171.909	1	.000	.046

^aVariable(s) entered on step 1: GRPnoIB, ACT Eqv Comp, HS Acad GPA, Course Count, Course Count * GRPnoIB

Time to degree (RQIIc)

For this question, a Univariate Factorial ANOVA was conducted controlling for the covariates: HS Academic GPA, ACT/SAT Equivalent composite and College GPA. Interaction terms were included for high school type, high school state, and number of pre-college credit courses where college credit was earned to determine if the relationship between pre-college credit programs and time to degree varied on these characteristics. The results of the Factorial ANOVA presented in Table 19 show the difference between groups on time to degree does not vary by school type, high school state or course count.

Table 19 Factorial ANOVA Results for Time to Degree Controlling for High School Characteristics

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	4126.965 ^a	27	152.851	65.897	.000	.214
Intercept	42490.745	1	42490.745	18318.698	.000	.737
GRPnoIB	7.354	3	2.451	1.057	.366	.000
HSSState	35.675	1	35.675	15.380	.000	.002

(Table 19 Continued)

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
NewHSAcadGPAC	25.721	4	6.430	2.772	.026	.002
NewACTEqvC	41.684	4	10.421	4.493	.001	.003
NewLSUGPA	2315.534	4	578.884	249.569	.000	.133
Course Count	19.155	1	19.155	8.258	.004	.001
GRPnoIB * Course Count	7.293	3	2.431	1.048	.370	.000
GRPnoIB * Private	4.374	3	1.458	.629	.596	.000
GRPnoIB * HSState	8.680	3	2.893	1.247	.291	.001
Error	15148.841	6531	2.320			
Total	627765.000	6559				
Corrected Total	19275.806	6558				

^aR Squared = .214 (Adjusted R Squared = .211)

Degree Completion (RQIIId)

A logistic regression was conducted between participation in pre-college credit programs and degree completion controlling HS Academic GPA, ACT/SAT Equivalent Score and College GPA. . Interaction terms were included for high school type, high school state, and number of pre-college credit courses where college credit was earned to determine if the relationship between pre-college credit programs and degree completion varied on these characteristics. The results indicated that there were no significant interactions between pre-college credit programs and high school characteristics for degree completion (Table 20).

Table 20 Interaction Terms between Pre-College Credit Programs & HS Characteristics for Degree Completion

Variables in the Equation							
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a	GRPnoIB			4.409	3	.221	
	GRPnoIB(1)	.312	.250	1.560	1	.212	1.366
	GRPnoIB(2)	.391	.220	3.152	1	.076	1.478
	GRPnoIB(3)	.260	.720	.131	1	.718	1.297
	ACT Eqv Comp	.002	.013	.020	1	.889	1.002
	HS Acad GPA	-.624	.110	32.391	1	.000	.536

(Table 20 Continued)

		B	S.E.	Wald	df	Sig.	Exp(B)
	LSU GPA	2.576	.079	1053.830	1	.000	13.148
	HS State	-.284	.109	6.721	1	.010	.753
	Private	.095	.094	1.023	1	.312	1.100
	Course Count	.079	.114	.481	1	.488	1.082
	GRPnoIB * Private			.477	3	.924	
	GRPnoIB(1) by Private	.009	.267	.001	1	.974	1.009
	GRPnoIB(2) by Private	-.074	.305	.059	1	.809	.929
	GRPnoIB(3) by Private	.560	.878	.406	1	.524	1.750
	Course Count * GRPnoIB			1.424	3	.700	
	Course Count by GRPnoIB(1)	-.119	.126	.885	1	.347	.888
	Course Count by GRPnoIB(2)	-.092	.122	.570	1	.450	.912
	Course Count by GRPnoIB(3)	-.022	.147	.023	1	.880	.978
	GRPnoIB * HS State			2.870	3	.412	
	GRPnoIB(1) by HS State	.042	.261	.026	1	.872	1.043
	GRPnoIB(2) by HS State	-.282	.236	1.430	1	.232	.754
	GRPnoIB(3) by HS State	-.700	.580	1.456	1	.228	.497
	Constant	-4.393	.399	121.215	1	.000	.012

^aVariable(s) entered on step 1: GRPnoIB, ACT Eqv Comp, HS Acad GPA, LSU GPA, HS State, Private, Course Count, GRPnoIB * Private, Course Count * GRPnoIB, GRPnoIB * HS State.

Research Question Three (RQIII)

The analysis for RQIII examined which pre-college credit program (AP, DE, IB, COMBO or None) is the strongest predictor of college achievement, as is defined by a) cumulative college GPA, b) 1st to 2nd year retention, c) time (semesters) to degree and d) graduation when demographic characteristics were introduced: gender, ethnicity and Pell Grant status.

Cumulative college GPA (RQIIIa)

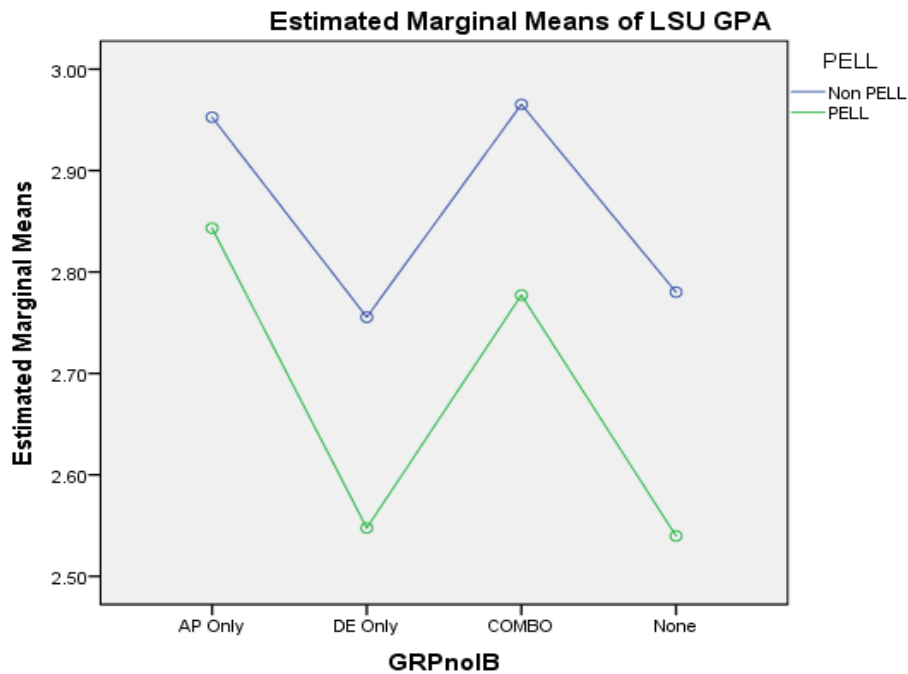
For this question a Univariate ANCOVA was conducted controlling for the covariates: HS Academic GPA and ACT/SAT Equivalent composite. Interaction terms were included for

gender, ethnicity, and Pell Grant status to determine if the relationship between pre-college credit programs and College GPA varied on these characteristics. The interaction term for Gender was not significant, $p = .25$, so Gender was removed from the model. The results of the ANCOVA presented in Table 21 show that the difference between groups on cumulative college GPA varied on Ethnicity and Pell Grant status.

Table 21 ANCOVA Results for College GPA Controlling for Demographic Characteristics

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	3188.277 ^a	25	127.531	276.416	.000	.303
Intercept	61.082	1	61.082	132.392	.000	.008
GRPnoIB	31.999	3	10.666	23.118	.000	.004
HSAcadGPA	1807.058	1	1807.058	3916.696	.000	.198
ACTEqvComp	39.875	1	39.875	86.427	.000	.005
PELL	27.448	1	27.448	59.493	.000	.004
EthNew	10.431	4	2.608	5.652	.000	.001
GRPnoIB * PELL	3.990	3	1.330	2.883	.034	.001
GRPnoIB * EthNew	12.159	12	1.013	2.196	.010	.002
Error	7339.062	15907	.461			
Total	136418.472	15933				
Corrected Total	10527.339	15932				

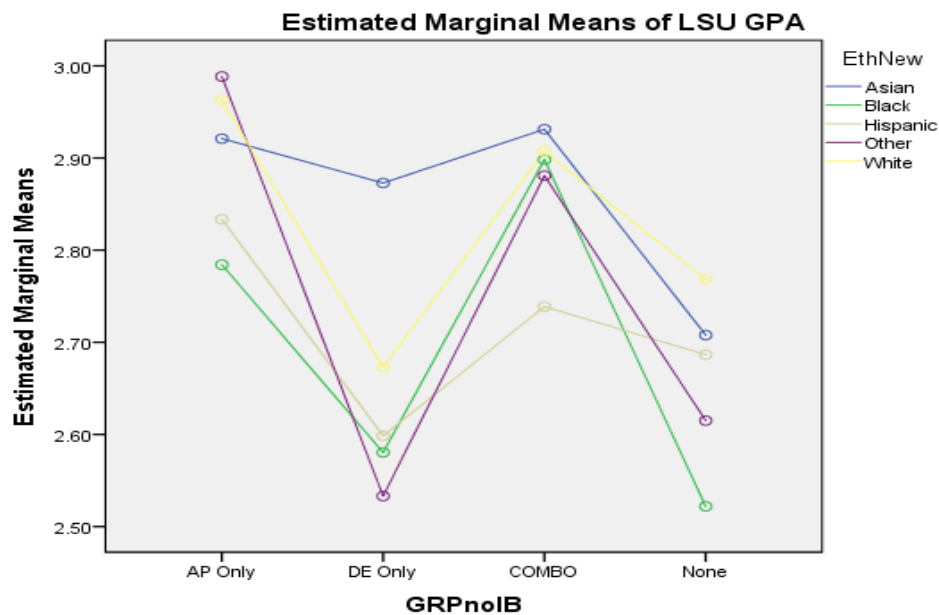
The relationship between Pell Grant status and pre-college programs indicated that students with Pell Grants performed at a lower academic level than non-Pell students. The interaction occurs in AP. The difference between Pell and non-Pell was smaller for this group than for all others, see Figure 3.



Covariates appearing in the model are evaluated at the following values: HS Acad GPA = 3.3788, ACT Eqv Comp = 25.52

Figure 3 Comparison of Mean College GPA with Ethnicity, Gender & Pell Grant Status

The relationship between ethnicity and pre-college credit programs indicated that Asian students generally performed at a higher academic level than all others, see Figure 4.



Covariates appearing in the model are evaluated at the following values: HS Acad GPA = 3.3788, ACT Eqv Comp = 25.52

Figure 4 Means of College GPA by Program Type & Ethnicity

The interaction showed DE was similar in GPA to AP and Combo for Asian students, see Table 22. Meanwhile, everyone else performed worse for DE than they did for AP. All other groups had relatively high GPA's for COMBO, but Hispanic students did not. Students from the Other race performed high academically on AP and COMBO but markedly low on DE only.

Table 21 Comparison of Mean College GPA with Ethnicity, Gender & Pell Grant Status

GRPnoIB	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
AP Only	2.898 ^a	.028	2.842	2.953
DE Only	2.652 ^a	.026	2.601	2.702
COMBO	2.871 ^a	.054	2.764	2.978
None	2.660 ^a	.013	2.634	2.686

^aCovariates appearing in the model are evaluated at the following values: HS Acad GPA = 3.3788, ACT Eqv Comp = 25.52.

First to second year retention (RQIIIb)

A logistic regression was conducted controlling for HS academic GPA, ACT/SAT equivalent composite and College GPA. Interaction terms were included for Gender, ethnicity and Pell Grant status to determine if the relationship between pre-college credit programs and first to second year retention varied on these characteristics. The interaction terms for gender and Pell Grant status were not significant. The interaction term for ethnicity was initially marginally significant; however, upon removing gender and Pell Grant status, the interaction for ethnicity was no longer significant, see Table 23.

Table 22 Interaction Terms by Ethnicity

Variables in the Equation							
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a	GRPnoIB			33.885	3	.000	
	GRPnoIB(1)	.213	.092	5.292	1	.021	1.237
	GRPnoIB(2)	-.314	.067	22.242	1	.000	.730
	GRPnoIB(3)	.146	.169	.749	1	.387	1.158
	ACT Eqv Comp	.035	.008	20.356	1	.000	1.036
	HS Acad GPA	1.111	.058	365.876	1	.000	3.038

(Table 23 Continued)

		B	S.E.	Wald	df	Sig.	Exp(B)
	EthNew			14.601	4	.006	
	EthNew(1)	.144	.156	.848	1	.357	1.155
	EthNew(2)	-.217	.077	7.931	1	.005	.805
	EthNew(3)	-.179	.112	2.553	1	.110	.836
	EthNew(4)	-.316	.145	4.743	1	.029	.729
	EthNew * GRPnoIB			18.084	12	.113	
	EthNew(1) by GRPnoIB(1)	1.029	.615	2.799	1	.094	2.797
	EthNew(1) by GRPnoIB(2)	1.102	.545	4.093	1	.043	3.009
	EthNew(1) by GRPnoIB(3)	-.594	.658	.814	1	.367	.552
	EthNew(2) by GRPnoIB(1)	-.164	.257	.409	1	.522	.849
	EthNew(2) by GRPnoIB(2)	.238	.165	2.091	1	.148	1.269
	EthNew(2) by GRPnoIB(3)	1.591	1.038	2.350	1	.125	4.910
	EthNew(3) by GRPnoIB(1)	-.165	.264	.388	1	.533	.848
	EthNew(3) by GRPnoIB(2)	-.113	.254	.196	1	.658	.894
	EthNew(3) by GRPnoIB(3)	-.341	.464	.539	1	.463	.711
	EthNew(4) by GRPnoIB(1)	.440	.437	1.017	1	.313	1.553
	EthNew(4) by GRPnoIB(2)	.634	.330	3.681	1	.055	1.885
	EthNew(4) by GRPnoIB(3)	.578	.774	.558	1	.455	1.783
	Constant	-2.836	.242	137.591	1	.000	.059

^aVariable(s) entered on step 1: GRPnoIB, ACT Eqv Comp, HS Acad GPA, EthNew, EthNew * GRPnoIB .

Time to Degree (RQIIIc)

For this question a Univariate Factorial ANOVA was conducted controlling for the covariates: HS Academic GPA, ACT/SAT Equivalent composite and College GPA. Interaction terms were included for Gender, Ethnicity and Pell Grant status to determine if the relationship between pre-college credit programs and time to degree varied on these characteristics. The results of the Factorial ANOVA presented in Table 24 show the difference between groups on time to degree does not vary by ethnicity, or Pell Grant status. The interaction term for gender was initially marginally significant; however, upon removing ethnicity and Pell Grant status, the interaction for gender was no longer significant, see Table 25.

The relationship between gender and pre-college credit programs indicates that Female students generally take a shorter amount of time to degree than Male students. Female students who took COMBO had the shortest time to degree followed by DE only and AP. Male students performed stronger academically in COMBO, followed by AP and DE at almost the same rate.

Table 23 Factorial ANOVA Results for Time to Degree Controlling for Demographic Characteristics

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	4179.891 ^a	39	107.177	46.283	.000	.217
Intercept	46063.664	1	46063.664	19892.072	.000	.753
GRPnoIB	53.442	3	17.814	7.693	.000	.004
NewHSAcadGPAC	39.686	4	9.922	4.285	.002	.003
NewACTEqvC	73.796	4	18.449	7.967	.000	.005
NewLSUGPA	1977.435	4	494.359	213.483	.000	.116
EthNew	41.978	4	10.494	4.532	.001	.003
PELL	.643	1	.643	.278	.598	.000
Gender	25.220	1	25.220	10.891	.001	.002
GRPnoIB * EthNew	30.256	12	2.521	1.089	.365	.002
GRPnoIB * PELL	.654	3	.218	.094	.963	.000
GRPnoIB * Gender	15.191	3	5.064	2.187	.087	.001
Error	15095.915	6519	2.316			
Total	627765.000	6559				
Corrected Total	19275.806	6558				

^aR Squared = .217 (Adjusted R Squared = .212)

Table 24 Comparison of Mean Enrolled Semesters with Ethnicity, Gender & Pell Grant Status

GRPnoIB	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
AP Only	9.427	.050	9.329	9.524
DE Only	9.381	.052	9.280	9.482
COMBO	9.183	.108	8.972	9.395
None	9.782	.024	9.735	9.830

Female students who had None had shorter time to degree than Males with None. It is important to note that in this model, the difference in the groups is a little under one semester, see Figure 5.

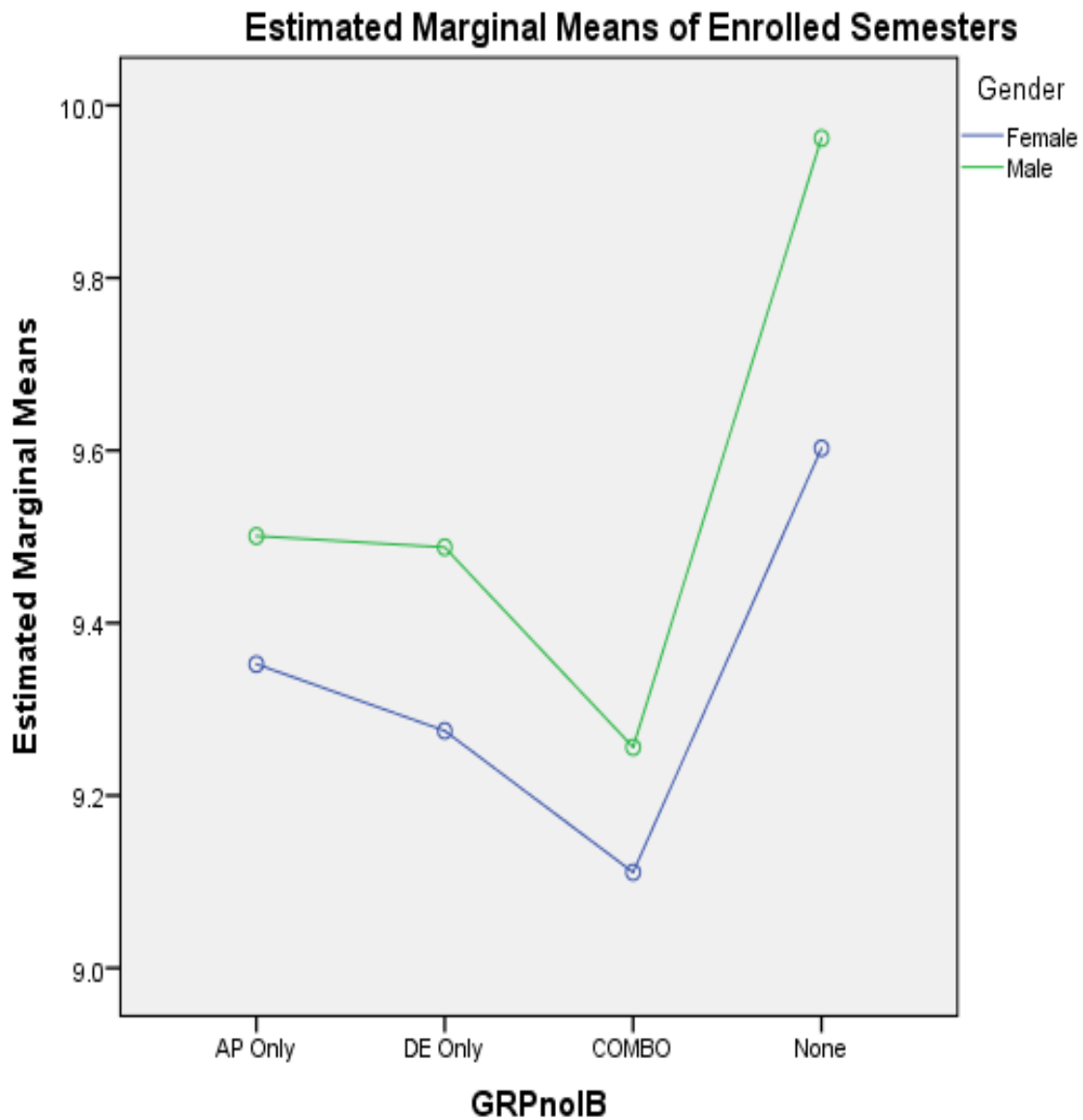


Figure 5 Means of Enrolled Semesters by Program Type & Gender

The relationship between ethnicity and pre-college credit programs found that Hispanic students with DE had the shortest time to degree. White students with COMBO and Black students with AP had the next shortest time to degrees.

Asian students with DE took the longest to degree. It is important to note that in this model, the difference in the groups covers a range of two semesters, see Figure 6.

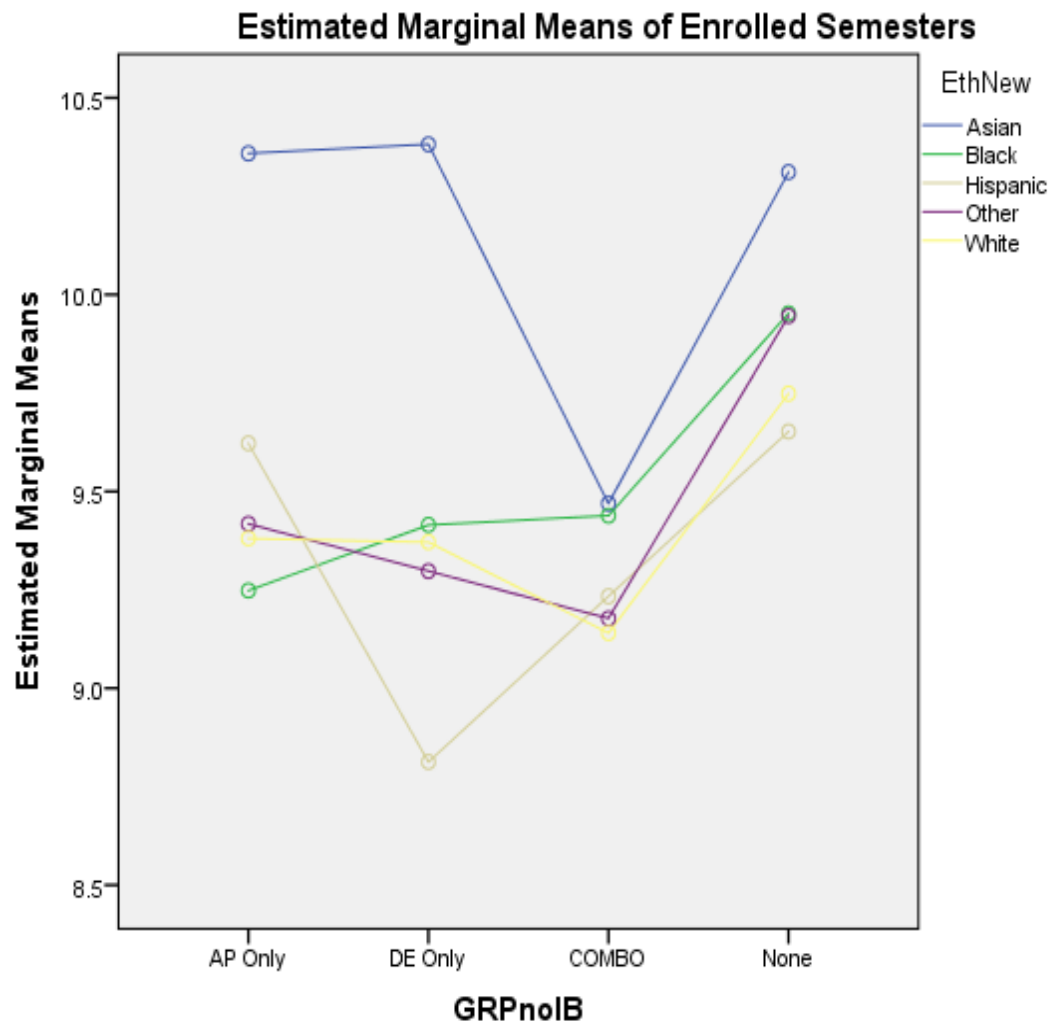


Figure 6 Means of Enrolled Semesters by Program Type & Ethnicity
Degree Completion (RQIIIId)

A logistic regression was conducted between participation in pre-college credit programs and degree completion, controlling HS Academic GPA, ACT/SAT Equivalent Score and College GPA. Interaction terms were included for Gender, Ethnicity and Pell Grant status to determine if the relationship between pre-college credit programs and degree completion varied on these characteristics. The results indicated that there were no significant interactions between pre-

college credit programs and Ethnicity and Pell Grant status for degree completion. The interaction term for Gender was initially marginally significant for degree completion; however, upon removing ethnicity and Pell Grant status, the interaction for gender was no longer significant, see Table 26.

Table 25 Interaction Terms by Gender

Variables in the Equation							
		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1 ^a	GRPnoIB			4.130	3	.248	
	GRPnoIB(1)	.569	.380	2.243	1	.134	1.766
	GRPnoIB(2)	-.271	.330	.671	1	.413	.763
	GRPnoIB(3)	-.660	.792	.695	1	.405	.517
	HS Acad GPA	-.464	.106	19.121	1	.000	.629
	ACT Eqv Comp	-.016	.013	1.441	1	.230	.984
	LSU GPA	2.657	.081	1081.817	1	.000	14.260
	Gender	.480	.092	27.230	1	.000	1.616
	GRPnoIB * Gender			5.181	3	.159	
	GRPnoIB(1) by Gender	-.276	.236	1.366	1	.243	.759
	GRPnoIB(2) by Gender	.340	.225	2.275	1	.131	1.404
	GRPnoIB(3) by Gender	.555	.562	.977	1	.323	1.742
	Constant	-5.433	.420	167.240	1	.000	.004

^aVariable(s) entered on step 1: GRPnoIB, HS Acad GPA, ACT Eqv Comp, LSU GPA, Gender, GRPnoIB * Gender.

Research Question Four (RQIV)

The survey was divided into two types of questions. Ten questions were asked in order to collect general demographic information from the respondents: gender, ethnicity, parental education level, type of high school attended, size of graduating class, type of pre-college program participation, location/teacher delivery of course, type of course, type of credit earned and total hours earned via pre-college degree programs. The information gleaned from this group of questions provided an overview of which pre-college programs were favored, why, how are they taught, and parental education level. The second group of questions consisted of four open

ended questions that asked the students to share their experiences regarding their participation in pre-college credit programs. Students were asked to identify what type of pre-college program they participated in while in high school, of the total (n=761) respondents to this question, 31.8% took AP only, 23% took AP & DE, and 12.88% took DE only. The cohort years for the quantitative sample showed increased numbers of students taking AP only and DE only; however, of the survey sample, AP was clearly the preferred pre-college credit program.

The decision was made to focus on two groups, the AP only student respondents (n=241) and the DE only (n=95) student respondents. The reason for this selection intersects with the quantitative study where AP students outperformed DE students on the various measures. As discussed previously, AP students had the strongest college GPA's, and DE students had the lowest, even lower than students who never took any DE courses. This phenomena was concerning as the growth of both of these programs has skyrocketed over the past several years and continues to escalate. This then was the intersection where perhaps the qualitative results could inform the quantitative findings by bringing in the students themselves, to hear their thoughts and perceptions about the impact of these programs first hand.

Three open-ended survey respondent answers were selected to be highlighted in the study and classified by the main thematic point of the question, see Table 27 below. Each of the respondent answers were further culled in order to classify and then coded for analysis.

For this analysis, Father's and Mother's levels of education were collapsed into one code: Highest Parental Education. The parent with the highest level of education would determine placement into the categories: 1= High School Grad, 2) Some college/2 year degree and 3) four year degree and beyond.

Table 26 Coding Legend for Open Ended Survey Questions

Question	Main Thematic Focus of Questions	Four Common Themes of Student Responses
Do you feel that participation in AP, Dual Enrollment, and/or IB programs while in high school was helpful in preparing you to take college level courses? Why or why not?	Helpful	Was this experience positive, negative, mixed or no difference? 0=Not Helpful 1=Helpful 2=Mixed 3=No Difference
In retrospect, would you have preferred to take the courses in college instead of taking them as AP, Dual Enrollment, or IB? Why or why not?	Retake	No, would not retake Yes, would retake No difference 1=No 2=Yes 3=No Difference
How did enrollment in these courses help you feel about your preparedness for college?	Preparedness	Was this experience positive, negative, mixed or no difference? 0=Less Prepared 1=More Prepared 2=Mixed 3=No Difference

Once the coding was completed, the various student answers in each of the main categories-- helpful, retake and preparedness-- were studied for the commonalities and divergences that would begin to inform the underpinnings of the theory development itself.

As previously stated, the survey questions generally asked: 1) did the survey respondents feel that the pre-college credit program they took was helpful?, 2) did the survey respondents feel that they needed to retake any courses they took through pre-college credit programs once they reached college and 3) did the survey respondents believe that the pre-college credit program that they participated in prepared them for college. Using these main groups, the respondent answers were analyzed by population (AP only and DE only) and can be found below.

Respondent answers regarding helpfulness of AP or DE program participation

AP only respondents. The majority of survey respondents indicated that their experiences with participation in the AP course and testing programs were helpful in all aspects of the college preparation and enrollment process. The students in this sample were forthcoming and addressed how this pre-college credit program hit all the important stages in the secondary to postsecondary transition, admission and enrollment process. The respondents touched on all the same critical viewpoints and concerns that currently exist in the narrative shared by policymakers and stakeholders at the state and national levels. College preparation, the transition from secondary to postsecondary, head start on college, tuition savings and time to degree are all buzzwords in the field of higher education today regarding the promotion and growth of pre-college credit programs.

Public school students who participated in AP, 85% (n=121) felt that the experience was helpful, while 10.7% felt that it was not helpful. Out of the 114 private school students who participated in AP, 75% felt that the courses were helpful, while 18% felt that the courses were not helpful. 84% (n=142) of Male students felt that participation in AP was helpful while 77% (n=99) of Female students felt that participation in AP was helpful. In the analysis of responses by Ethnicity, the majority of students across ethnicities felt that participation in AP was helpful. In the breakdown by parental education, 35% (n=17) of students whose parents had a high school diploma felt that AP was not helpful, and 14% (185) of students whose parents had at least a four year degree felt that AP was not helpful. Conversely, 59% (n=17) of students whose parents had a high school diploma felt that AP was helpful, and 81% (n=185) of students whose parents had at least a four year degree felt that AP was helpful.

AP: Helpful. Several students who felt that AP was helpful discussed specific AP courses, such as AP Biology, AP Chemistry, and AP Physics, as being particularly beneficial to them in subsequent college coursework; however, by far, AP Calculus and AP English had the most mentions as being significantly helpful in providing the skills necessary to be successful in college. The sample respondents who took AP only focused on how AP English, AP Math and AP Science courses provided a solid foundation for their future success in subsequent coursework. As one young man related,

Yes, the difficulty of the material, especially in courses like AP Biology and AP Physics, was equally as difficult as college-level material. Having to complete the material during high school was a sufficient tutorial for how to complete college coursework. (White, male student from a large public high school school).

Foundational courses. One student describes, “I took Calculus AP in high school, and this gave me a major boost in my college calculus class” (White, male student from a mid-size private school). Another student describing her experience in AP English said, “...my English AP class senior year of high school was set up exactly like a college class, which very much helped to prepare me” (White, female student from a mid-size public school).

Course Difficulty. The majority of students who felt that AP was helpful described how their AP classes mirrored the difficulty of college courses. The College Board website cites how one of the advantages that the AP program consistently emphasizes is that the standardized curricula and rigor of AP courses is built specifically to provide students with opportunities to expand their skills and higher order critical thinking and writing for the next educational level by building their courses to simulate college level courses. A representative statement from a student describes her experience with course rigor: “Yes, the material was more advanced, and the prompts were similar to the level and styles of essays and tests in college” (White, female student from a mid-sized private)

Another group of students spoke about how the course difficulty mirrored college addressing the additional advantage that the course was offered in the supporting environment of their high school, “Yes participating in AP classes was helpful because I was able to get exposure to the high rigor courses while I still had the support system of high school” (White, female from a large public school).

Environment. The issue of having these courses taught in a high school environment or a “safe environment,” as one student described it, was a critical theme that came up time and time again in the survey responses.

Another positive for AP students was the ability to earn credit in college courses which allowed them flexibility in scheduling, tuition savings and in many cases reduced their time in college. One student describes his experience as follows:

I think it was extremely helpful. Not only did I get college credit which later would allow me to add on a minor and graduate in four years. I also got experience with harder classes and more advanced textbooks while working with other intelligent students. It was an amazing learning experience overall, (White, male student from a large public).

Facilitated transition to college. Many students spoke about how their AP experience facilitated their transition from high school to college; for example, one student commented,

Yes it was very helpful because it eased the transition from high school to college by giving me an insight into what was expected of you as a college student taking college level courses, (White, female student from a mid-size public school).

Another student who didn’t earn college credit as a result of taking AP agreed, “Yes, it was helpful – Even though I didn’t get college credit, I got a glimpse of how college material was going to be” (Asian, female student from a mid-sized Charter school). AP courses require end- of- course tests which, depending on the score and the institution that the student plans to attend, will award college-level credit. In this case, regardless of whether the student was

awarded credit or not, she cited the benefit of experiencing the added rigor and level of AP courses.

Quality of instruction. The importance of teachers and quality of teaching were highlighted in the statements of a few students who described how “it was extremely helpful in preparing me. My teachers took the AP test very seriously, so when I got to college, I felt very prepared for the workload” (White, male student from a large public school). College Board provides a comprehensive training program for their AP teachers, which is one of the advantages of this program. The teacher training is standardized at the national level, so the thought is that all students will receive the same level of teaching.

AP: Not helpful. Conversely, students who indicated that AP was not helpful describe how they found college much harder saying, “No, the class was still too easy and not comparative with college” (White, male student from a mid-sized private school).

Environment. Additionally, several students remarked about the environment:

No, the material may have been the same, but the pace and environment is different to where an AP course in high school is not helpful when taking the subsequent course in college, (White, female students from a small private school),

and “No, because it was still a high school class and conducted like a high school class,” (White, female student from a large public school).

Quality of instruction. By far, the majority of students who did not feel that AP was helpful cited the quality of the teachers of the courses, “Not really, I only took one course (my school only offered two) and my teacher wasn’t very good” (White male student from a small private school); “I feel like it could have helped, but it was my teacher’s first time teaching an AP class, so it was unorganized” (White female student from a Charter school); and “No,

because my high school, XX High School was not prepared or have the proper resources to teach AP classes” (White female student from a mid-size public school).

While the AP Program is a national program, not all schools participate or are new to the program, and the experiences of the three students cited above is important, because even with a standardized teacher training program, there are still situations where experiences like those highlighted above exist.

Rigor of courses. Other students citing teacher concerns expressed frustration regarding the level of the teaching, “No. The teaching method was still a high school teaching method despite the course material being harder. There was no introduction to college teaching style.” (White female student from a small private school).

Students who indicated that they had mixed feelings regarding the helpfulness of AP courses cited, “Some were more beneficial than others. The teacher had a significant impact on whether the course was effective” (White, male student from a mid-sized private school).

Credit acceptance. Still, others spoke to the college’s policy on the acceptance of AP credit, “I feel that it was only semi-beneficial. This is due to the credits not applying to my major, but they did count for my high school credit” (White, female student from a mid-sized private school).

There are currently no standardized admissions practices regarding the acceptance of AP college credit; it is strictly under the purview of the accepting institution. The state where this study was conducted does require postsecondary institutions to accept a minimum required score of 3 in order to earn general education college credit as a statewide policy mandated by the Board of Regents of this southeastern state. .

Overall, the findings showed that students very much felt that their participation in the AP program was helpful not only to their college preparation, but in many cases, critical to their

subsequent achievement in college. Although most respondents thought that AP was helpful, those students who felt that AP courses were not helpful cited issues with course instruction, lack of proper resources to provide AP coursework, as well as the AP credit policy of the receiving post-secondary institution.

DE only respondents. The survey respondents who indicated that they participated in DE only mirrored the sentiments of the AP only group, and similarly, cited how their experiences with DE programs aided them in the important secondary to postsecondary admission to enrollment process. 69% (n=51) of public school students felt that the experience was helpful, while 18% felt that it was not helpful. 90% (n=40) of private school students felt that the courses were helpful, while 10% felt that the courses were not helpful. An average of 75% of Male (n=28) and Female (n=66) students felt that participation in DE was helpful. In the analysis of responses by Ethnicity, over three-fourths of students felt that participation in DE was helpful. In the breakdown by parental education, 17% of students whose parents had at least a two year degree (n=30) and/or at least a four year degree (n=60) felt that DE was not helpful. Conversely, 70% (n=30) of the students whose parents had a two year degree, and 78% (n=60) of students whose parents had at least a four year degree felt that DE was helpful.

DE: Helpful. Many students who felt that their DE participation was helpful shared that they felt that the program provided a good preview or dress rehearsal of what to expect in college. Starting college knowing course expectations ahead of time was mentioned time and time again.

Facilitated transition to college. Students expressed happiness that this program not only allowed them to earn college credit, but also eased the transition from secondary to post-secondary enrollment; these were common themes amongst the respondents.

I think taking DE courses in high school was very helpful. Not only was I able to complete a year of undergrad work while in high school, but it was a great environment that helped as a prep to college, (White, female student from a mid-sized private school),

and “Yes, It helped ease the transition between high school and college, while allowing me to graduate college early” (White, female student from a home school).

Foundational courses. As with AP only, specific DE courses were mentioned as being particularly helpful, including foundational English and Math courses that were beneficial for subsequent courses, “Yes, specifically math courses. I took pre-calculus as a DE class, which helped me prepare for calculus in college” (Hispanic, female student from a large public school), and “Yes, at least for English it was. The sophistication of my DE English class helped me when it came to crafting papers for my college level classes” (African American, other student from a mid-sized private school).

College Preview & Environment. The majority of students who found DE helpful felt that the courses they took offered the opportunity to become familiar with the challenges and expectations of college in a comfortable setting, “I think it better prepared me for the work load and responsibility that college classes require but in an environment I was comfortable in” (White, female student from a mid-sized private school), and

Yes, taking DE was helpful in preparing me to take college level courses because while still in high school, I could kind of get a feel for the difficulty level of a college course, (White, female student from a large public school).

Confidence. This sentiment was reiterated over and over again as students shared that participating in the DE programs afforded them a level of confidence prior to starting college, “While not applicable to my major, I did feel that the exposure was a confidence booster for college and also exposed me to college expectations”, (White, male student from a mid-sized public school).

Obtained additional skills. A large number of respondents related that DE provided experience with the types of study and time management skills necessary for success in their college studies, “I do believe that my DE courses helped me prepare for college level courses. I learned how to write professionally and how to follow deadlines” (White, male student from a home school).

Jump start on college. Finally, a couple of students addressed how participation in DE programs helped them to get a jump start on college credit as well as saving on tuition costs:

Most definitely was helpful. I will be not only graduating a year early due to my credit hours, but felt that college was somewhat easy because of taking DE in high school, (African American, female student from a small public school), and

I think it helped in a lot of ways. It gave me a taste of college and what to expect, but there were also other benefits. College is expensive, so DE enrollment helped a little with the cost, and also got me more used to a college schedule, (Other, female student from a small private school).

These student voices confirmed in a way that no policy statement ever could, that the national rhetoric tying these pre-college credit programs to college achievement has been heard by students and their parents and they are acting on it. Students have gotten the message that these programs provide a head start to college, can ease the transition to college, can save tuition dollars and reduce time to degree. The students who took DE shared several positive reasons for participation in the program, as well as the subsequent benefits that stayed with them throughout their college career.

DE: Not helpful. The students who felt that DE was not helpful spoke to mainly quality of the teaching and course material, as well as the environment where the courses were delivered as their biggest concerns, for example: “No, it was too relaxed at my high school. No one cared if we did the work. It was a waste of time and energy”, (White, female student from a mid-sized public school) and “Taking DE was not very helpful in preparing me for college level courses.

It was a pretty easy class and not ran as a college level course”, (Asian, female student from a mid-sized public school).

Rigor of course. Several students described their concerns with the quality of the courses, an issue that is on the agenda of secondary and postsecondary entities as more and more students sign up for DE nationwide. Students described their experiences:

Not really, the standards for success were pretty low (White, male student from a home school) and Not really. Still counted as high school, so didn’t really feel like real college experience, (White, female student from a large public school).

Students who expressed mixed feelings regarding the helpfulness of DE courses cited,

I don’t really feel like it prepared me, but it definitely made room for me to get a minor and graduate on time (White, female student from a large public school), as well as It is helpful that it gives you college credit but I still didn’t learn how a college course worked until I got to college, (White, female student from a large public school).

Many students felt that DE did not mirror the quality of a college course, “It was sort of helpful, but more as a prep class because I still needed to retake the college course because the information was covered in more detail”, (White, male student from a mid-sized public school).

Course quality and delivery are trending nationally in current secondary and post-secondary discourse as educators, administrators, policy-makers and stakeholders work to resolve how DE programming in some states is delivering stellar outcomes and others are not.

Despite some negative student experiences regarding DE, the majority of the respondents spoke about their experiences and subsequent benefits of the DE program in ways that paralleled state and national discourse regarding the use of this program as a measure to “get a head start” on their college careers.

Respondent answers regarding whether to retake college credit earned through AP or DE.

AP only respondents. This question in the survey sought to gain insight into whether students despite already earning credit in AP programs would potentially want to retake those

courses in college. Students cited compelling reasons for retaking or not retaking credit earned from the AP program. There were solid points brought up by both sides.

In general, a majority of students in both public and private schools indicated that they would rather not retake the credit earned for AP courses again in college. A majority of students whose parents had either a high school diploma or at least a 2-year degree would not retake AP course credit in college. Students whose parents had at least a four year degree had a slightly lower rate, with 78% (n=185) voicing that they would not retake AP course credit in college, while 17% of that same group stated that they would retake course credit.

AP: Retake courses. The students who indicated that they would retake the credit earned for AP courses again cited the following reasons: 1) they wanted to receive letter grades rather than P/F credit, and 2) they wanted to retake any foundational courses that counted directly for their majors. Students who make the requisite score on their AP course exam are awarded college credit with a Pass (P) -- letter grades are not given-- therefore, many students indicated that they wanted retake the course in college in order to boost their GPA, “I took AP, but retook them in college for a GPA cushion. 10/10 would recommend” (White, male student from a mid-sized public school), and

I would have taken some of them. However, I would have opted to take some of these courses at college so that I could receive a grade on them (hopefully an A) which would have helped boost my GPA, rather than just receiving college credit with no GPA value (White, female student from a mid-sized private school).

Foundational courses. A large number of students who indicated that they would rather retake courses shared an interest in making sure that they had the foundational knowledge particularly in relation to required courses in their majors, “It depends on the course. If it is important to my degree, then no, because I would rather it being fresh in my memory,” (White,

male student from a mid-sized public school). “I took them anyway in college to make sure I had a good foundation for later courses” (White, female student from a mid-sized public school), and

Dependent on the class, I would have preferred the course in college. For myself, I am a chemical engineering major, so I decided to retake Calculus I although I received a placement score of 5. This was to ensure that I truly understood the material on a college level, and it acted as an ease between the transition from high school to college, (Hispanic, female student from a mid-sized private school).

The majority of respondents who selected to retake courses upon enrollment in college shared that, rather than there being an issue with their AP experience, they were acting from an abundance of caution to ensure that they were fully prepared to succeed in subsequent courses in their majors.

AP: Not retake courses. The majority of student respondents felt that retaking those courses was not a practical option for them, as the opportunities afforded by their participation in the AP program translated into a savings of time and money. The cost-benefit analysis for students in the long run was about getting ahead in college and trimming down the time to degree.

Cost savings. The majority of students with AP college credit indicated that they would rather not retake the courses, citing that for them it was a cost savings measure,

No I would not want to take the courses in college. For one, I saved a lot of money testing out of courses that would have cost \$x,xxx. Secondly, it allowed me to begin taking courses that interested me deeply, (Hispanic, male student from a mid-sized private school, parental education level: four year +).

College Preview. Some students shared that they felt their AP experience served as a preview to college helping them to get a glimpse of expectations and outcomes, and that their earned credit was a bonus-- icing on the cake, so to speak, “Honestly, taking AP credits were easier than college courses, and it helped me feel like I was working towards my graduation goal before college began”, (White, male student from a large public school), yet another student

stated, “No, I was glad I got some sort of view of what college would be like” (African American, male student from large public school).

Scheduling Flexibility. Most majors in the institution where these students enrolled require a block of general education courses, which cover the gamut from the Arts and Humanities to the Natural and Biological Sciences. Many students spoke to the convenience of testing out of the general education courses, “No, the classes I took as AP credit (for the most part) completed my gen eds for me and cleared up my college schedule”, (White, female student from mid-sized private school), and “No, because a lot of freshmen classes are basic courses everyone must complete. Some of these classes are a waste of time because they do not pertain to one’s major (White, female student from mid-sized private school).” One student shared her experience taking AP courses in high school and its subsequent impact on her choice of major:

No, I am glad I took AP classes in high school because it prepared me better for college level classes and I was able to earn both English and Psychology credit through my AP test scores. Not having to take those two classes gave me more flexibility in my college scheduling. Plus, through taking AP psych in high school I became more interested in psychology, ultimately switching to that degree in undergraduate. The switch was also made easier due to the fact my AP psych score had given me the credit needed for intro to psych class, allowing me to take more advanced classes earlier, (White, female student from a large public school).

This young lady’s comment brings up an issue of the importance of proper advising for students in the AP program. Given the potential for earning college credit, the long term benefits of these programs can be felt well into their college career, as in this case where one AP class that she took in psychology influenced her choice of major.

Jump start on college. Most students who chose not to retake courses explained that taking AP courses in high school provided an opportunity to earn college credit and get a head start on college hours: “I appreciated taking them in high school because the classes counted for credit in college”, (White, female student from a mid-sized private school) and “No because the

extra credits helped me move ahead”, (African-American, male student from a large public school).

Time to degree. Several students commented that the credit they earned as a result of their AP coursework facilitated an earlier graduation. Furthermore, they indicated that the course credit they earned allowed them flexibility in their schedules to focus on their majors, acquire additional credentials, and reduce time to degree, “No, taking these classes in high school allowed me to graduate a year early from college”, (White, female student from mid-sized private school) and

No, only because taking AP classes is allowing me to graduate in August of 2017 instead of May of 2018, which is when I’m “supposed” to be graduating. So just by taking those classes I’ve shaved about a year off my time in college. I’ve also never taken more than 16 hours a semester, so it’s all due to my AP credits, (White, female student from a mid-sized private school).

The consensus for these respondents was that there was no need to retake the courses, which was counterintuitive; having earned the course credit as a result of their performance in the AP program and getting that head start on their college career, why would they retrace what they had already gained? Those students who selected to retake the foundational courses had very specific reasons for doing so, which involved select pre-requisites required for their majors which were foundational in nature. Again, as with the previous example, the trend from the students echoed the national discussion regarding the consideration of these courses as a measure to save students time and money in regard to their college education.

DE only respondents. Students taking only DE courses for the most part indicated that they would not retake those courses, as they felt the courses would have been more difficult in college. DE-only respondents who indicated that they would retake courses did so because they felt they had not taken advantage of the opportunity in high school and wanted to retake the

course to get a better grade. Additionally, some students brought up the quality of teaching and their concern that they had not covered all of the course material. In general, a majority of students in both public and private schools indicated that they would not retake the DE courses again in college. Only 9% of students indicated that they would retake DE courses again in college. 82% (n=51) of public school and 97.5% (n=40) private school students indicated that they would not retake DE coursework in college. With respect to retaking DE courses in college, a strong majority across all educational levels indicated that they would not retake the courses in college.

DE: Retake courses. The students who indicated that they would retake DE courses offered a wide variety of reasons, for example, not taking the opportunity seriously, poor teacher quality and in an interesting note, the length of time between taking a pre-requisite DE in high school and the subsequent course in college,

I wish I would have taken them in college, solely for the reason that I would have put more effort into them. In high school, it wasn't as important to me to do well, (White, female student from large public school).

Another student brought up concerns about teacher qualifications:

Yes, from my high school experience I would have rathered (sic) taken them in college. My small high school chose teachers that were ill-fitted to teach these college courses and, in doing so, gave my class a disadvantage in learning the college level material, (White, female student from a mid-sized public school).

Timing of pre-requisites. A programmatic concern was brought up by one student who relayed that she would retake the courses as, “..... they were pre-requisites for courses I had to take in college, so it had been a while since taking them” (White, female student from a mid-sized public school).

As with students who participated in the AP program, it is critical to advise these young students regarding the timing of these courses. The point is to get the student to a place where

they can reduce their time to degree, managing the length of time between a pre-requisite and the subsequent course is an important conversation to have in high school.

DE: Not retake courses. About half of the students indicated that they would not retake DE courses in college because they felt that it was generally easier to have taken it in high school and expressed concern about having been able to do as well in college as they did in dual enrollment. One student shared, “I would have rather taken them in high school because I would not have gotten the grades I got in high school if I were to take the classes in college (African-American, female student from a small public school)”, and another said, No, the classes I took were fluff classes that I’m glad to have gotten out of the way (White, male student from a small private school).

These comments speak to the concerns that many post-secondary administrators have regarding the quality of DE coursework. The rest of the students shared that they wouldn’t retake DE courses in college because it would be a waste of time and money as the purpose of the courses was to get a head start in college, “I am glad I took the classes I did in high school because it enabled me to take less classes during the semesters in college”, (White, female student from a large public school).

Schedule flexibility. Another group of students shared that the DE courses afforded them flexibility to reduce the hours carried in college. Again, these students speak to how taking these courses impacts their college schedules, one can extrapolate then the importance of advising these students so that they are taking courses that can apply to their degrees, since they are counting on them to help them get ahead in college, “No, because I would have time to take other courses, and move forward with my degree. There was also more movement around my schedules”, (Hispanic, female student from a large public school) and

“I think I would have still taken them in high school because it really saved me a lot of (and tuition) in college! Looking back, I now know that I could have done much better in those courses but that is only because I had to teach myself how to study once I got to college”,(White, female student from a small private school, parental education level: four year +).

Jump start on college. Still, other students spoke to the benefits of getting general education courses out of the way in order for them to focus on their major courses: “No, DE allowed me to take courses early, when they wouldn’t interfere with my engineering coursework” (White, male student from a home school).

Cost savings. Many students referenced the tuition savings that taking DE courses afforded them, “No, the money saved through DE helped out immensely”, (African-American, other student from a mid-sized private school, parental education level: some college), and “I was happy to receive credit in high school so that I didn’t have to take it in college. It saved me time, money and energy”, (White, female student from a mid-sized public, school, parental education level: some college).

As has been addressed previously, the comments from this group of students corresponds to conversations at the national level regarding the benefits of pre-college programs on college achievement.

Respondent answers regarding college preparedness

AP only respondents. This question sought to get an understanding of the effect taking these pre-college credit programs has on students regarding their feelings of preparation for college. It was interesting to note that “preparation” for college was not defined; therefore, students were able to freely associate whatever it was that made them feel prepared for college. By far, AP only students, spoke about the confidence that they felt about going to college as a result of their participation in AP. 82% (n=121) of public school students and 73% (n=114) of private school students felt that AP prepared them for college. 16% (n=8) of public school

students and 10% (n=40) of private school students felt that AP did not prepare them for college. While 77% (n=146) female students and 77% (n=95) male students felt that their AP courses prepared them for college. Of students whose parents had a high school diploma, 53% (n= 17) felt that AP prepared them for college, while 17% felt that AP did not prepare them for college. 74% of students whose parents had at least a 2- year degree and 79% of (n=185) students whose parents had at least a 4- year degree felt that AP prepared them for college.

AP: Prepared. For those respondents who indicated that their AP experiences made them feel prepared for college, the definition of “prepared” for college covered the gamut, from internal feelings of confidence, feelings of reassurance that “they could perform at the college level,” reinforcement of academic aspirations, earning college credit while in high school as a point of pride, learning new study and critical thinking skills and finally, the oft-mentioned familiarity with course design and expectations.

Confidence. The majority of the respondents shared that having taken AP courses in high school made them feel confident about their own preparation for college, regardless of whether they earned college credit or not. For example, from a number of students, responses on the survey were as follows, “It gave me confidence to know that I was able to succeed in a class of “college level””, (White, female student from a mid-sized private school), and

Honestly, I think it helped my ego a bit. Knowing that I could pass AP courses in high school that gave me credit for college was reassuring to me. This made me feel like I could accomplish anything that I put my mind to (White, female student from a large public school) and It felt great to come into college with hours already under my belt, (White, female student from a mid-sized private school).

And of course, these were just some examples of student statements describing how they felt. Beyond feeling confidence, students shared how they felt that their AP experience prepared them for the long haul: “It reinforced my ambition to perform well in the college courses”,

(White, male student from a mid-sized public school) and “I felt like if I could do these classes, then I would have no problem with adjusting to college academics”, (White, female student from a mid-sized private school).

Acquired additional skills. Again, students referred to how these courses helped to develop specific skill sets for success in college: “Extremely prepared. By the time I entered college, writing essays and researching were common knowledge for me”, (African-American, male student from a mid-sized public school) and “Although it was still in a high school environment, I feel they better prepared me for the type of learning and studying I now experience in college” (White, female student from a mid-sized private school). Some students shared more specific ways that AP courses prepared them for college, “It prepared me by encouraging thinking that is beyond the surface level, which is necessary in many college courses”, (White, male student from a large public school) and “I learned how to study, use certain skills that allowed me to apply myself, and I had good insight of what to expect”, (African-American, female student from a mid-sized public school).

Familiarity with college expectations. Many students shared how taking AP courses provided them with an opportunity to become familiar with college courses and expectations, “The work load and level of the class helped me transition better to college classes” (White, female student from a large public school), “They helped me feel prepared because the design of the course was so similar to college, so it wasn’t hard to adjust” (White, female student from a large public school), and “I knew coming into college would be different in terms of pace and workload and my ap classes sure did help” (Asian, female student from a small public school).

Time to degree. Finally, students talked about how AP courses helped them with their graduation goals, “By going into college with some hours, I was able to easily graduate in four

years. I could have graduated earlier honestly” (White, female student from a mid-sized private school).

This question in particular gives special insight into what is important to these students and what drives them as they transition from secondary to post-secondary enrollment. At the end of the day, it was clear to see the importance that having this experience had on these young men and women, as it provided an “academic dress rehearsal” for the next level of education.

AP: Not Prepared. The students who shared their feelings that participation in AP did not prepare them for college brought up concerns with the quality of teaching. “It didn’t prepare me at all for college, because the teachers had no idea what they were doing”, (White, female student from a mid-sized public school) and,

I figured that they were probably a little worse at preparing me than my honors courses because the teachers were teaching students to pass a test, rather than to understand the material, (White, female student from a mid-sized private school).

Quality of instruction. One student was very specific with his concerns:

I do not believe AP courses (or at least the ones offered by my high school) taught me how to analyze and interpret sources critically and draw my own conclusions about them, skills that are a requirement for any university student. Rather, these courses prepared how best to answer certain questions on the AP exam and how to write a specific type of essay for the writing portion, (White, male student from a mid-sized private school).

Thought they were prepared. The students who shared that they had mixed feelings about whether AP prepared them for college curiously talked about how they thought they were prepared until they actually got to college: “I felt prepared, but then discouraged and overwhelmed once I got to class”, (White, female student from a small private school) and “I felt more prepared when in reality I wasn’t” (White, female student from a large public school).

Attended college preparatory school. One important caveat to consider when sifting through the student responses is that most of the students who indicated that they experienced no

difference in their feelings about their preparedness for college all mentioned that they attended a college preparatory school. For instance, “I went to a college preparatory school, so I felt prepared for college regardless of the AP class I took” (White, female student from a small private school) and “They were just stepping stones. All of my high school courses were rigorous so the AP courses didn’t create that big of a dent” (African-American, female student from a small Charter).

The dynamic of student responses for those respondents who did not feel that their AP experiences “prepared” them for college noted teacher shortcomings as their primary issue. Those students who indicated no difference in their level of preparedness noted their attendance at college preparatory schools over-rode the benefits of participation in the AP program.

DE only respondents. DE students’ definitions of “prepared” varied a bit from their AP counterparts, so that while many still mentioned confidence and also over-confidence, the use of relief and easing anxiety were also used as proxies for preparedness by these students. Out of 40 private school students, 82.5% felt that DE prepared them for college while 63% of 51 public school students felt that DE prepared them for college. 76% of 66 Female students compared to 61% of 28 Male students felt that DE prepared them for college. All five students whose parents had a high school diploma indicated that they felt DE prepared them for college, while 17% of 30 students whose parents had at least a 2-year degree and 12% of 60 students whose parents had at least a four year degree felt that DE did not prepare them for college. Conversely, 67% of 30 students whose parents had at least a 2-year degree and 72% of 60 students whose parents had at least a four year degree felt that DE courses prepared them for college. Finally, 12% of 60 students whose parents had at least a four year degree had mixed feelings regarding whether DE coursework prepared them for college.

DE: Prepared. The students who felt that DE did prepare them for college described feeling confident about going to college as a result of taking DE courses, “Since I received an A in this course, I felt comfortable and confident with myself entering college,” (White, female student from a large public school), and “It boosted my self confidence in my study habits and my own capabilities” (Other, male student from a large public school).

Another student shared that perhaps he became a little over-confident “It made me feel as though I was prepared for college more so than I thought I was” (White, male student from a mid-sized public school).

Relief and anxiety. Students also shared the importance of how DE courses eased their anxiety about starting college:

After completing my DE course successfully, it helped ease some of my anxiety about my college classes I would have to take in the future. I felt more prepared for college after taking the course” (White, female student from a large public school),

and “I felt a sense of relief because I knew what to expect from a college course. This way the transition process forward high school to college was smoother” (African-American, female student from a mid-sized public school). More so than the AP respondents, these students spoke more to their anxiety about the process in general. The importance of the transition between high school and college cannot be overstated; this can be such a stressful time for these high school seniors. One student in particular captured the essence of this in her statement: “It allowed me to get the feel for a college course before being thrown into the whole college experience” (White, male student from a mid-sized private school).

DE: Not Prepared. The students who felt that DE did not prepare them for college fell into two camps: first, that the courses were not equal to the rigor of a college course:

I didn't feel like it enhanced my preparedness because the classes I took for college credit was the same exact class given to other high school students, but they didn't receive college credit for it, (White, female student from a mid-sized private school).

Second, some felt that the courses and/or teachers did not provide students with a college level experience. "I didn't feel that prepared me for college, but I am glad I took them" (White, female student from a large public school).

The students who indicated that they had mixed feelings about having taken DE courses shared the following concerns: "I felt collegiate; however, I am not sure they really prepared me for college," (White, male student from a home school) and "I feel prepared in the sense that I was going in with credits, but the classes I took felt like they were still at the high-school level" (White, female student from a large public school).

More so than the AP respondents, these students spoke more to their anxiety about the process in general. The importance of the transition between high school and college cannot be overstated; this can be such a stressful time for these high school seniors.

To summarize, AP courses were shown to be of greater benefit to the student respondents both by their perception of being more helpful to the students, but also by virtue of how the students described their feelings regarding the level of preparedness that they felt for college as a result of completing these courses.

DE students were much less effusive in their descriptions of their perceptions, injecting perhaps a more pragmatic tone into their responses. DE students echoed some of the positive reactions of the AP respondents; however, concerns regarding instruction, delivery, rigor of coursework and cost savings were much more prevalent in this group.

Based on student responses, there is no doubt that participation in these programs is impactful for high school students preparing to go to college. The students' own perceptions point towards not only a strong connection to developmentally related issues such as transition to

college, but also to a strong interpersonal component, such as feelings of confidence or relief of anxiety come about as a result of participation in these programs.

Mixed Methods

The purpose of selecting a mixed-methods research design was to have an opportunity to infuse the quantitative results with the voices of the student respondents in order to qualitatively inform that could not be solely explained via statistical analyses.

In this study, the quantitative analysis discovered that there were differences by pre-college credit program in the cohort performance by college GPA, first to second year retention, time to degree and graduation date (for the 2010-2011 cohort). Additionally, there were also differences once additional high school and demographic variables were added. The qualitative analysis focused on students who took AP only or DE only; therefore this discussion will focus on how the qualitative results of these two groups intersected with the quantitative results.

Overall, in the quantitative analysis, AP only students outperformed DE only students on all the academic measures. AP only students ($p < .01$) performed better than DE students, but DE ($p < .01$) students performed significantly worse than all other groups. AP only performed better than DE in first to second year retention ($p < .01$), and DE was the lowest performer in first to second year retention, ($p < .01$).

Contrary to those entities who tout that pre-credit programs reduce time to degree and increase graduation rates, the findings for this study did not support that position. Rather, this study found that the difference between groups did not differ significantly on time to degree and was essentially the average length of less than one semester, which is coincidentally consistent with previous research, and that there was not a significant difference between the pre-college credit programs on degree completion, $p = .43$.

Qualitatively, there were differences in student responses between the AP only and DE only groups. AP survey respondents expressed generally positive benefits of AP program participation, a finding that was borne out in the statistical analyses, which yielded strong positive outcomes. Particularly striking, however, was the apparent disconnect between the positive feedback expressed by DE students in some of the survey answers with the DE statistical results, which placed these students almost always at the bottom of the list in performance outcomes. DE students did express more concerns regarding rigor of course, teacher qualifications, environment of course, and seriousness of their own intent, which was more consistent with the lower performance outcomes found in the statistical analysis. The majority of DE survey respondents shared how they felt that their participation in DE was helpful, yet the outcomes reported in the statistics did not bear that out. This could be due to the student's own naiveté about what college was really like. For example, DE student survey feedback pointed to negative issues with the environment, the rigor, and instruction of the courses, all of which were reflected in their performance outcomes of the statistical analysis. However, the majority of survey respondents felt that DE courses were helpful, this could be a case where these DE students had no inkling about what really constitutes a college level course and upon enrollment in the institution, discovered the reality that these DE courses really did not cover the necessary material or were paced differently, designed differently or even tested differently than a college level course.

There were no doubts about the benefits of AP program participation in regards to being helpful, and preparing students for college; this was shown both quantitatively and qualitatively. AP students cited primarily academic reasons for retaking any course credit earned through this program, more of a personal choice than any issue with the courses.

The situation with DE was a little more difficult to discern. Students did feel that DE program participation had positive benefits; however, students brought up more issues related to rigor of course, course quality, delivery environment and teacher quality, than the AP program participants. Most DE students revealed that they would not retake DE courses due to their concern that it would be more difficult in college, as well as that it would be counter-intuitive to retake a course and have to pay for it again. These concerns did tie in with the statistical findings regarding their lower performance outcomes at this institution.

CHAPTER FIVE: DISCUSSION AND CONCLUSIONS

This chapter recaps the study and underscores the relevance of the findings in relation to each of the four research questions, as well as the body of literature in this field. Implications of the findings for policy and practice at the secondary and postsecondary levels are discussed along with an overview of the limitations of the study. Finally, the chapter concludes with an examination of recommendations for future research as a result of this study.

Summary of Study

This explanatory sequential mixed-methods study consisted of three quantitative and one qualitative research questions. The first three quantitative research questions sought to identify which pre-college credit program, AP, DE, IB, Combo, or None was the most significant predictor of college achievement as defined by 1) cumulative college GPA, 2) first to second year retention, 3) time to degree (enrolled semesters) and 4) graduation date. The study also considered the above in relation to the introduction of high school characteristics and demographic variables. The qualitative research question sought to discover the perceptions and feelings of students who took pre-college programs in an effort to further inform the statistical findings. The resulting discussion will consider the findings of the study in relation to each of the research questions, as well as the context of the body of literature currently examining the predictive nature of pre-college credit programs on college achievement.

The Effect of Pre-College Credit Programs on College GPA

Through the use of a comprehensive data set, this study sought to examine the impact of pre-college credit programs on college GPA. The robust dataset contained detail-level student information from the secondary through post-secondary student cycle that allowed for the analysis of student level high school and college course and grade information. The study then

added high school characteristics, as well as student demographic information, to further study the interactions of pre-college credit programs on college GPA. For the purposes of this study, the college GPA utilized for the three cohorts was the cumulative college GPA.

The quantitative results indicated that there was a significant effect for pre-college programs on college GPA. Students who completed AP only had the highest mean college GPA at 2.947, while students with DE only had the lowest college GPA at 2.714, lower even than students who did not complete any pre-college credit programs, 2.801. The level of data information in this study was more robust than most studies in the literature, which have used self-reported data for either the secondary or post-secondary information. Additionally, most studies utilize the first year college GPA in contrast to the cumulative college GPA, as used in this study. This study confirms the role of these pre-college credit programs as a predictor of college success.

When high school type (public/private), high school state, and number of pre-college credit courses were added to determine whether the relationship between pre-college credit programs and college GPA varied, the difference between groups on cumulative GPA did not vary. Current literature has not used number of pre-college credit courses completed as a variable.

When gender, ethnicity and Pell Grant status were added, the difference between groups varied on ethnicity and Pell Grant status. The results indicated that the level of academic performance differed by ethnicity. All groups who took AP only or COMBO performed at a stronger academic level than students who took DE only or None. Of the AP only group, Other and White students had the highest average GPA's (2.95+), while Hispanic and African-American students had an average GPA of 2.84+ and 2.78+ respectively. Hispanic, Other and

White students who did not take pre-college courses performed better than those who took DE only. African-American and Asian students who took DE only performed slightly better than those who did not take any pre-college credit programs. Previous studies analyzing the difference between these pre-college credit programs noted a difference between the performance of students who take AP and DE; this study notes a more significant difference between the performances of students in those two programs, suggesting perhaps issues related to quality of program or teaching of DE courses in this state.

The results found that Pell Grant students performed at a lower academic level than non-Pell students. Specifically, students on Pell Grants who took DE or None performed lower academically with an average GPA range of 2.55 compared to those who took AP or COMBO with an average GPA range of 2.95. These findings were in line with the literature; however, this does bring into question current conventions that promote the use of pre-college programs as opportunity to increase access.

The Effect of Pre-College Credit Programs on First to Second Year Retention

The results for first to second year retention indicated that students who took AP, COMBO and None performed better than DE.

The results for first to second- year retention when high school characteristics were introduced were not significant.

The results for first to second year retention when demographic characteristics were introduced were not significant.

The Effect of Pre-College Credit Programs on Time to Degree

The results showed that there was a significant effect for pre-college credit programs on time to degree. Students who took no pre-college credit programs took longer time to degree than students who took AP, DE or COMBO. On this measure, the difference between groups was essentially less than one semester, which is consistent with previous studies. COMBO students took an average of 9.16 semesters to graduate, DE only took an average of 9.369, AP only took an average of 9.406 and None took 9.770 semesters to graduate. This finding runs counter to current narratives promoting the proliferation of pre-college credit programs as a measure decreasing time to degree.

The results between groups did not vary by high school characteristics.

The relationship between gender and pre-college credit programs indicated that Female students who took COMBO had the shortest time to degree followed by DE only and AP. Male students performed stronger academically in COMBO, followed by AP and DE at almost the same rate. It is important to note that previous studies have found that the difference in the length of time to degree for students with pre-college credit programs, versus those without is just under a semester, and this study is consistent with those findings. The difference in the groups in this study was just a little under a semester.

Findings for differences between ethnicity and time to degree again found differentiation between groups. Hispanic students with DE only had the shortest time to degree, White students with COMBO and Black students with AP had the next shortest time to degree. In this analysis, the difference in semester by ethnic groups covers a range of two semesters.

The Effect of Pre-College Credit Programs on Graduation Date

One cohort, 2010-2011, was selected to test the six-year graduation rate for this institution. The results indicated that there was not a significant difference between the pre-college credit programs on degree completion. These findings were consistent with those of Speroni 2011a & 2011b, who, using the same measure, degree completion, found little significant difference between the college graduation rates of AP and DE students.

The results indicated that there was not a significant difference between pre-college credit programs on degree completion with the introduction of high school type, student state or course count. The results indicated that there were no significant interactions between pre-college credit programs and degree completion upon introduction of ethnicity, gender or Pell Grant status.

These findings run counter to the current narrative which has used the argument that participation and earning credit in these pre-college credit programs leads to degree attainment (Klopfenstein & Lively, 2012). In a study conducted in 2014 for institutions, the Higher Learning Commission touted the following benefits for completion of DE: 1) diversifying high school curricula, 2) increasing access to higher education, 3) improving high school and college relationships, 4) shortening time to degree and 5) lowering the cost of college, (Higher Learning Commission, 2014, p. 2).

The Results of the Qualitative Survey

The student responses that comprised the dataset for the qualitative question of this study provided insight into how students perceived or felt the worth of these pre-college credit programs upon their collegiate aspirations and enrollment. They run the gamut from the very practical savings on tuition dollars to the more subjective interpersonal feelings. Five overarching patterns emerged in the student responses: 1) a majority of students felt that these

experiences resulted in feeling more confident about being successful in college; conversely, in a few instances, students related to perhaps feeling over-confident and getting caught by a false sense of security and surprise at the rigor of college, 2) while students expressed some mixed feelings about their pre-college experiences, most expressed very positive feelings regarding how they were able to shorten their time to graduation, save money, attain flexibility in scheduling classes in college and/or acquire additional major or minors as a result of this credit, 3) student concern that these courses did not accurately reflect college level work or a true “college level experience,” yet many commented that they preferred to take these courses in high school in a “safer, smaller and easier environment”, 4) student concern about teacher quality, and lack of skill in teaching these courses, and 5) many students shared that they wish their high schools would have had access to more of these opportunities. There were some differences between the perceptions for AP students versus DE students; however, those were slight.

AP

Overall, the majority of survey respondents who took AP-only indicated that their experiences with participation in the AP course and testing programs were helpful in all aspects of the college preparation and enrollment process. The students in this sample were forthcoming, and addressed how this pre-college credit program hit all the important stages in the secondary to postsecondary transition, admission and enrollment processes. In their own words, the respondents also touched on all the same critical viewpoints and concerns that currently exist in the narrative shared by policymakers and stakeholders at the state and national levels regarding the efficacy of pre-college credit programs on college achievement. College preparation, the transition from secondary to postsecondary, head start on college, tuition savings, and time to degree are all buzzwords in the field of higher education today regarding the promotion and

growth of pre-college credit programs, and they were all mentioned by the students themselves in their descriptive statements about their experiences with AP.

Helpful. The majority of students who felt that AP was helpful described how their AP classes mirrored the difficulty of college courses as well as having the additional advantage that the course was offered in the supporting environment of their high school. Having these courses taught in a high school environment or a “safe environment,” as one student described it, was a critical theme that came up time and time again in the survey responses. The critical importance of teachers and quality of teaching were highlighted by students who felt particularly supported by the additional skill sets that they attained through participation in this program. Specific foundational AP English, AP Math and AP Science courses were cited as providing a solid foundation for their future success in subsequent coursework, as students strove to position themselves for success in their respective majors. Another critical recurring theme spoke to how students felt their AP experience facilitated their transition from high school to college.

Not helpful. Conversely, students who indicated that AP was not helpful to them described how they found college much harder than they expected.

Overall, the findings showed that students very much felt that their participation in the AP program was helpful not only to their college preparation but in many cases critical to their subsequent achievement in college.

Retake. Students cited compelling reasons for retaking or not retaking credit earned from the AP program. There were solid points brought up by both sides. In general, a majority of students in both public and private schools indicated that they would rather not retake the credit earned for AP courses again in college. A large number of students who indicated that they would rather retake courses shared an interest in making sure that they had the foundational

knowledge, particularly in relation to required courses in their majors and success in subsequent coursework.

The majority of respondents who selected to retake courses upon enrollment in college shared that rather than there being an issue with their AP experience, they were acting from an abundance of caution to ensure that they were fully prepared to succeed in subsequent courses in their majors. Given the potential for earning college credit, the long-term benefits of these programs can last well into their college career. Those students who selected to retake the foundational courses had very specific reasons for doing so, which involved select pre-requisites required for their majors which were foundational in nature.

Not retake. The majority of student respondents who felt that retaking those courses was not a practical option for them cited that the opportunities afforded by their participation in the AP program translated into a savings of time and money. The cost- benefit analysis for students in the long run was about getting ahead in college and trimming down the time to degree. These students who chose not to retake courses explained that taking AP courses in high school provided an opportunity to earn college credit and get a head start on college hours, their majors and even their degrees. Several students commented that the credit they earned as a result of their AP coursework facilitated an earlier graduation. Furthermore, they indicated that the course credit they earned allowed them flexibility in their schedules to focus on their majors, acquire additional credentials, as well as reduce time to degree. The consensus for these respondents was that there was no need to retake the courses, which was counterintuitive, having earned the course credit as a result of their performance in the AP program, and getting that head start on their college career, so why would they retrace what they had already gained?

The students' responses echoed the national discussion regarding the consideration of these courses as a measure to save students time and money in regard to their college education.

Prepared. The analysis of students' responses sought to get an understanding of what effect taking AP credit programs had on students regarding their feelings of preparation for college. The majority of the respondents shared that having taken AP courses in high school made them feel confident about their own preparation for college, regardless of whether they earned college credit or not. Because the term "preparation" for college was not defined, students were able to freely associate whatever it was that made them feel prepared for college. For those respondents who indicated that their AP experiences made them feel prepared for college, the definition of "prepared" for college covered the gamut, from internal feelings of confidence, feelings of reassurance that 'they could perform at the college level', reinforcement of academic aspirations, earning college credit while in high school as a point of pride, learning new study and critical thinking skills and finally, the oft-mentioned familiarity with course design, and expectations. These student responses provided special insight into what is important to these students and what drives them as they transition from secondary to post-secondary enrollment. At the end of the day, it was clear to see the importance that having this experience was for these young men and women, as it provided a "dress rehearsal," and prepared them for success at the next level of education.

Not prepared. The students who shared their feelings that participation in AP did not prepare them for college brought up concerns with the quality of teaching. The dynamic of student responses for those respondents who did not feel that their AP experiences "prepared" them for college noted teacher shortcomings as their primary issue. Those students who indicated

no difference in their level of preparedness noted their attendance at college preparatory schools overrode the benefits of participation in the AP program.

DE

The students who took DE shared several positive reasons for participation in the program, as well as citing the subsequent benefits that stayed with them throughout their college career. Many students who felt that their DE participation was helpful shared that they felt that the program provided a good preview or dress rehearsal of what to expect in college. Starting college knowing course expectations ahead of time was mentioned time and time again. Students' expressions of happiness that this program not only allowed them to earn college credit, but also eased the transition from secondary to post-secondary enrollment were common themes amongst the respondents. Specific DE courses were mentioned as being particularly helpful, including foundational English and Math courses that were beneficial for subsequent courses.

Helpful. The majority of students who found DE helpful felt that the courses they took offered the opportunity to become familiar with the challenges and expectations of college in a comfortable setting. A large number of respondents related that DE provided experience with the types of study and time management skills necessary for success in their college studies, that DE provided a jump start on college credit as well as savings on tuition costs.

Not helpful. The students who felt that DE was not helpful spoke mainly to quality of the teaching and course material, as well as the environment where the courses were delivered as their biggest concerns. Several students described their concerns with the quality of the courses, an issue that is on the agenda of secondary and postsecondary entities, as more and more students sign up for DE nationwide. Course quality and delivery are trending nationally in

current secondary and post-secondary discourse as educators, administrators, policy-makers and stakeholders work to resolve how DE programming in some states is delivering stellar outcomes and others are not. Despite some negative student experiences regarding DE, the majority of the respondents spoke about their experiences and subsequent benefits of the DE program in ways that paralleled state and national discourse regarding the use of this program as a measure to “get a head start” on their college careers. These student voices confirmed in a way that no policy statement ever could, that the national rhetoric tying these pre-college credit programs to college achievement has been heard by students and their parents and they are acting on it. Students have received and repeated the messages that these programs can provide a head start to college, can ease the transition to college, can save tuition dollars, and reduce time to degree.

Not retake. Students taking DE courses indicated that they would not retake those courses as they felt the courses would have been more difficult in college. About half of the students indicated that they would not retake DE courses in college because they felt that it was generally easier to have taken it in high school, and they expressed concerns about having been able to do as well in college as they did in dual enrollment. The rest of the students shared that they wouldn’t retake DE courses in college because it would be a waste of time and money, as the purpose of the courses was to get a head start in college and retaking courses would only set them back.

Retake. DE only respondents who indicated that they would retake courses did so because they felt they had not taken advantage of the opportunity in high school and wanted to retake the course to get a better grade. Additionally, some students brought up the quality of teaching and their concern that they had not covered all of the course material. The students who indicated that they would retake DE courses offered a wide variety of reasons, for example, not

taking the opportunity seriously, poor teacher quality, and in at least one interesting response, the length of time between taking a pre-requisite DE in high school and the subsequent course in college. As with students who participated in the AP program, it is critical to advise these young students regarding the timing of these courses; the point is to get the student to a place where they can reduce their time to degree, managing the length of time between a pre-requisite and the subsequent course is an important conversation to have in high school.

Prepared. DE students' definitions of "prepared" varied a bit from their AP counterparts, as many still mentioned confidence, and also over-confidence; however, the use of relief and easing anxiety were also used as proxies for preparedness by these students. More so than the AP respondents, these students spoke more to their anxiety about the process in general. The importance of the transition between high school and college cannot be over-stated, this can be such a stressful time for these high school seniors and they recognize that the stakes are high.

Not prepared. Students who felt that DE did not prepare them for college cited concerns with the quality, delivery and environment of the courses. These comments from the students themselves speak to the concerns that many post-secondary administrators have regarding the quality of DE coursework. This issue is fraught with controversy in the southeastern state where this institution is located. On the one hand, states like Florida, Georgia and Texas manage DE programs on a statewide level with admission and progression criteria, which is not the case in this southeastern state. On the other hand, there are secondary and post-secondary administrators who have pushed for the proliferation of these programs primarily for monetary gain at what many believe comes at the expense of the students. These statements, from the students themselves, attest to the issue that the concern with rigor, quality of instruction, and delivery is a just one.

Implications for Policy and Practice

Pre-college credit programs are currently used as measures or opportunities to ease the transition to college, provide an opportunity for students to get a head start on their college career, reduce time to degree, save tuition dollars, and increase access for under-represented minorities. These are all tremendously ambitious propositions to place on these programs. Yet, district, state, and national outcome measures are using those very items to gauge institutional effectiveness at both the secondary and post-secondary levels when there exists a dearth of independent empirical evidence in the literature fully supporting a significant relationship between those items and college performance.

The implications of this study and its findings carry the clear potential to inform current policy and practice based on the use of this robust, comprehensive, dataset, which provided official, detail, transcript, admissions, financial aid, scholarship, and enrollment, case- level data. There are few studies of this nature, primarily due to the lack of access to a dataset of this quality. As a result, policy makers, legislators, and stakeholders at both the federal and state levels have promulgated the proliferation of pre-college credit programs as a means to increase access and graduation rates, while reducing time to degree and financial aid debt without the benefit of rigorous empirical evidence to support the establishment of these policies. The reality for this southeastern state and the institution in question was that students with AP credit academically outperform students in the pre-college programs tested. In this study, students who took a combination of AP and DE were also analyzed, and their performance was also better than DE. Students with DE credit performed at the bottom of the pre-college programs tested.

The state where this institution is located has a centralized mechanism for the submission of all public and private high school transcripts, which when matched to the postsecondary

record, provides a clear picture of each student record that could then be used to empirically study the effect of secondary factors on college achievement. There are a few other states, Florida (Hebert, 2001; Estacion, Cotner, D'Souza, Smith & Borman, 2011; and Speroni, 2011a and 2011b) and Texas (Dougherty et al., 2005; Hargrove et al., 2008; Keng & Dodd, 2008; Klopfenstein, 2004; Klopfenstein & Thomas, 2009), which have utilized similar datasets in empirical studies. DE policies in both of those states are standardized at the state level with rigorous admission and progression criteria.

The state where this study took place does not have any standardized measures for DE quality control, delivery method, or course content. There are measures where teachers of record (at the post-secondary institution) must comply with SACS accreditation requirements; however, there are concerns that not all teachers delivering college content are truly qualified to teach college level coursework. For example, often a post-secondary “teacher of record” is assigned to the courses; however, the actual course is delivered by the high school subject teacher who has less than a week of “training” under his or her belt.

There are also no standardized admission criteria or progression standards for students to participate in DE. There are some individual courses requiring specific criteria such as an ACT score; however, there are currently no GPA requirements for admission. At this large Flagship institution in the Southeast, it is common to admit students to enroll in the institution’s own DE program who are not eligible for admission to the university.

As a result, the findings of this study which placed students who took DE coursework at the bottom of academic measures, often faring worse than students who took none, place this issue at the top of a list of concerns that needs to be addressed particularly in this southeastern state but also nationally. The Higher Learning Commission (2014) cited several drawbacks to

DE which include the following: inadequate instructor qualifications, not providing an authentic college experience, and uncertainty of course transferability (p.2). There is an additional factor which needs to be added to this list and that is uncertainty of course quality. These were all themes that were brought forth by the student respondents in the answers to the survey questions and were borne out by the low performance outcomes of DE only students in this study. This goes to the heart of these findings and this study. The statistical analysis demonstrated that the DE program is not producing the intended outcomes; the survey respondents said it clearly, as a young lady shared: “I do not think it was helpful in preparing me for college because they taught them like high school classes, not college classes” (White, female student from a small public high school, parental education level: some college).

This same young student shared her thoughts about whether or not her participation in DE courses prepared her for college: “I do not feel like they actually prepared me for college; they gave me a false sense of security. Like I knew what to expect in college, but I actually did not.”

This young lady, in this survey response, captures the crux of the issue with DE programs in this state. This young lady was a first generation student who thought that participation in this program would provide a jump start to her college career. Instead, her response lends itself to a reality that perhaps she faced a much tougher time of it than she originally anticipated when she came to college. Policymakers and stakeholders in secondary and post-secondary systems cannot afford to continue to support the current status of administration and quality issues that are plaguing DE programs in this state. There are difficult decisions to be made; however, they must be made. Due to the robustness of this dataset, this study highlights the pre-college program that on average is working for students, and also the one that is not working so much for students.

This requires the attention of secondary and postsecondary administrators, policy-makers and other stakeholders who are vested in growing DE programs in this state. It's not so much a matter of quantity as it is quality. It doesn't help students that there are hundreds of these programs if, when they get to college, they can't be successful.

College Board has conducted various studies of the effect of its AP Programs on college achievement, primarily finding results supporting their own programs. This study found that across the board, the three study cohorts who took AP and attended this large Flagship in the Southeastern U.S. performed at an academically superior level than the other pre-college credit programs with few exceptions. Students who combined AP and another pre-college credit program such as DE, also performed better. Of major importance was the fact that minority students who were admitted into this institution with AP credit in this study performed at a much higher academic level on the various college measures than those who completed DE courses. The importance of providing all students equal opportunities and resources to be successful in their education is critical. While this Flagship is a PWI, minority student numbers increased over the last ten years as the institution sought to build a diverse community reflective of the state in which it is located. These pre-college programs need to be further developed to establish and become part of building a community of scholars who can transition successfully from secondary to post-secondary environments equally prepared.

The survey respondents spoke to resource issues at their high schools which prevented them from experiencing a quality program. This occurred for both AP and DE programs, but much more so for DE. This study presents the position that the figurative bar must be raised to ensure that DE program standards are raised so that any student who participates in DE pre-college credit programs can be as successful as the AP students. It is important to note that a

large majority of students with DE coursework in this state are admitted to this Flagship institution.

There are several factors that need to be considered with respect to why AP outcomes are so much higher than the other pre-college credit programs in this study. First of all, the AP program is a standardized program with a highly coordinated training unit for teachers, and the content of the courses are nationally uniform; therefore, all students who take the courses receive the same lessons along with test administration and test content which are also standardized. Secondly, several years ago, the Board of Regents for this state engaged in a concerted effort to increase AP offerings statewide, which could account for the higher representation of students who had credit in AP courses in this study.

Dual enrollment programs have seen tremendous growth and support in this country over the last several years, ostensibly due to the fact that they are perceived as a jump start to college, yet with uneven and questionable results regarding quality of teaching, course content and college outcomes. This study found that across the board, students in the study cohorts who took DE performed lower than the other pre-college credit programs, or even students who did not participate in any pre-college credit programs at all. This state has seen tremendous growth in DE programs and participation since 2005. This study, while confined to one institution, raises concerns regarding the effect of this growth on the quality of learning experienced by the students. DE courses are delivered in the high schools by high school teachers “trained” to administer the course content, in community colleges, and in very few instances at the 4- year institution by a college professor.

This issue is fraught with controversy in the state where this study took place. On one hand, states like Florida, Georgia and Texas manage DE programs on a statewide level with

admission and progression criteria, and strong outcome data, which is not the case in this southeastern state. On the other hand, there are secondary and post-secondary administrators who have pushed for the proliferation of these programs primarily for monetary gain, which many believe comes at the expense of the students. These statements, from the students themselves, attest to the issue that the concern with quality and delivery is a just one. If these programs were administered with all the necessary checks and balances, would the low outcomes found in this study have occurred? DE programs work in other states and other institutions. Why not this state?

Another significant finding of this study concerns the narrative regarding the effect of these courses on time to degree and graduation date. While this study found on average, no statistically significant interaction between these programs and time to degree or graduation, many of the survey respondents shared several examples where their participation in these programs reduced the number of semesters or hours carried per semester, afforded flexibility for scheduling, and indeed reduced time to their degree. These findings are consistent with previous studies (Modarelli, 2014; Swanson, 2008), yet somehow, these facts have not made it into the narrative at any level, state or national.

This state in particular is currently preparing to increase state funding for DE programs in the current 2017 legislative session; thus, the findings of this study speak to the concerns regarding the use of this program as an answer to the many questions that plague secondary and post-secondary leaders regarding college retention, completion and success. This is not just a post-secondary issue; the Higher Learning Commission (2012), cited as a benefit the opportunity to increase secondary to post-secondary collaboration. Secondary school systems and post-secondary education systems must collaboratively develop a delivery system and quality product

that benefits the students first. Results such as those found in this study must be used to inform policy and practice so that the right questions are being asked regarding why DE outcomes were so low compared to others in this study, and that measures to correct them are implemented with top priority.

Limitations of Study

The limitations of this study included 1) the dataset consisted of admitted and enrolled students for only one public, four-year Flagship, PWI, institution in the southeastern U.S.; therefore the generalizability of the results may not apply to all postsecondary institutions. Second, the method of delivery for DE courses (taught at HS, taught at postsecondary institution or online) was not captured, which is a critical part of the concerns with DE, and third, teacher credentials (HS teacher only, HS teacher with 18+ masters level coursework as required by Southern Association of Colleges and Schools [SACS] in the subject area, or College Faculty) for DE courses was not included in the dataset as it is a variable that is currently not captured by the institution or state for that matter.

Due to the size of the original dataset which contained information from 2005-2016, only three cohorts (2010-2011, 2011-2012 and 2014-2015) were selected for this study. Additionally, the intent was to include an analysis of student performance for those with IB, but due to the comparatively small size of that population (76), the decision was made to exclude this population from the study.

Future Research

The opportunities for future studies related to this study and this topic are plentiful. As mentioned previously, this study intended to include the IB student population in the three cohorts. However, due to the small size of the population at this institution, the decision was made to exclude this group from the cohorts. Given that IB, nationally is a much less prolific program than other pre-college credit programs, a multi-institutional study comparing IB outcomes with the other pre-college credit measures could perhaps be considered. In initial runs of the three cohorts in this study, IB students performed comparably or in some cases better than AP students.

Future studies would also include replication of this study with the full original dataset of cases from 2005-2016 in order to gain a historical perspective of the growth and performance of pre-college credit programs at the institution. This institution in general has the largest enrollment of DE students in the state.

This study, with some modifications, could be expanded to include comprehensive state level data from all two and four year institutions in this southeastern state. In light of the findings at the Flagship, a study of the impact of these pre-college credit programs on college performance at the other state institutions could potentially yield helpful outcome data to inform legislative and education policy.

Along those lines, more granular investigation of school to school variation could potentially uncover whether there is a difference in the performance of AP and DE students amongst the various high schools and universities. Given that the AP and DE programs presented results at the opposite ends of the scale, it would be interesting to investigate whether there are any patterns or anomalies that could be identified at the school level.

Additionally, in order to attain further validation for the strength of the findings of this study, replication of the statistical analyses by using multi-level modeling analyses would confirm inferences of the study results presented in this dissertation as well as provide the opportunity to study group effects.

In the course of the analysis, the COMBO variable which looked at students who took both AP and DE was studied generally; however, it would be of interest to delve into the more granular course information to determine if there are differences in the performance between AP and DE courses when they are taken by the same student.

Finally, the voices of the students themselves eloquently articulated their first-hand experiences with these programs and how the impact of these opportunities can resonate through college and beyond. The qualitative analysis added a level of depth and description to the results of the statistical analysis, which numbers alone, could not have accomplished. It would be helpful, as this topic is studied in the future, to consider the continued use of a mixed methods research design that would inform the quantitative results with the voices of the specific groups that are being examined.

Conclusion

This mixed methods study is one of the first to address the topic of pre-college credit program effectiveness utilizing this research design. This study captures the duality of these programs, statistically via outcome measures, and qualitatively through the anecdotes provided by the students in their own voices.

The statistical results point to a positive relationship between a robust, nationally standardized AP program on several measures of college achievement. Conversely, less positive outcomes were found for the decentralized, dual enrollment programs currently offered in this

southeastern state. The AP program is working for the majority of students, and despite unprecedented growth in this southeastern state, DE programs are just not at the same level.

The differences in both the quantitative and qualitative analyses for these programs spoke to 1) the merit and worth of pre-college credit programs for students and 2) the fact that some programs are not producing the desired outcomes, and that needs to be addressed. The remarks of the students who took these pre-college credit programs articulated both positive and negative attributes regarding their experiences, which provided a realistic rendering of their perspectives. There is no doubt that these programs are beneficial for students, some more so than others in this Southeastern state; however, the issues that currently plague DE programs need to be addressed and corrected immediately. These programs can work, as evidenced by Florida and Texas. It is imperative that corrective measures such as standardization of learning outcomes, rigor of courses, delivery of courses, teacher credentialing as well as student admission and progression criteria be actively explored in this state.

Additionally, the narrative governing the use of these pre-college credit programs as a panacea for college readiness, institutional concerns regarding retention, graduation rates and financial aid debt, must be reconsidered. The narrative must be adapted to more realistically represent the fact that there are inconsistencies in some of the policies governing these pre-college credit programs, as well as reflect the empirical findings that studies such as this one, have found.

Students who participate in these pre-degree college programs want to translate these opportunities into post-secondary success. There is work to be done to bring all of these pre-college credit programs to a level of quality where all students can have an equal opportunity to be successful at the post-secondary level.

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APPENDIX A: LOUISIANA STATE UNIVERSITY INSTITUTIONAL REVIEW BOARD
APPLICATIONS FOR EXEMPTION FROM INSTITUTIONAL OVERSIGHT



ACTION ON EXEMPTION APPROVAL REQUEST

TO: Guadalupe Lamadrid
Geography & Anthropology

FROM: Dennis Landin
Chair, Institutional Review Board

DATE: March 21, 2017

RE: IRB# E10362

TITLE: Pre-college credit and placement programs: one size fits all?

Institutional Review Board
Dr. Dennis Landin, Chair
130 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.5983
irb@lsu.edu
lsu.edu/research

New Protocol/Modification/Continuation: New Protocol

Review Date: 3/20/2017

Approved X Disapproved _____

Approval Date: 3/21/2017 Approval Expiration Date: 3/20/2020

Exemption Category/Paragraph: 2a; 4a

Signed Consent Waived?: No

Re-review frequency: (three years unless otherwise stated)

LSU Proposal Number (if applicable):

Protocol Matches Scope of Work in Grant proposal: (if applicable)

By: Dennis Landin, Chairman 

PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING –
Continuing approval is CONDITIONAL on:

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants, including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.
8. **SPECIAL NOTE:** When emailing more than one recipient, make sure you use bcc. Approvals will automatically be closed by the IRB on the expiration date unless the PI requests a continuation.

* All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at <http://www.lsu.edu/irb>

ACTION ON EXEMPTION APPROVAL REQUEST



TO: Keena Arbuthnot
ELRC

FROM: Dennis Landin
Chair, Institutional Review Board

DATE: July 2, 2015

RE: IRB# E9409

TITLE: Dual Enrollment Studies

Institutional Review Board
Dr. Dennis Landin, Chair
130 David Boyd Hall
Baton Rouge, LA 70803
P: 225.578.8692
F: 225.578.5983
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New Protocol/Modification/Continuation: New Protocol

Review Date: 7/2/2015

Approved X Disapproved _____

Approval Date: 7/2/2015 Approval Expiration Date: 7/1/2018

Exemption Category/Paragraph: 1; 4a

Signed Consent Waived?: NA. All data are existing.

Re-review frequency: (three years unless otherwise stated)

LSU Proposal Number (if applicable):

Protocol Matches Scope of Work in Grant proposal: (if applicable)

By: Dennis Landin, Chairman 

PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING –
Continuing approval is **CONDITIONAL** on:

1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants, including notification of new information that might affect consent.
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7. Notification of the IRB of a serious compliance failure.
8. **SPECIAL NOTE:**

**All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at <http://www.lsu.edu/irb>*

APPENDIX B: SUMMARY OF VARIABLES

	UGF w/& without DE: all CCUR on SRR &/or all w/a College Code prior to HS grad date w/grades UGF w/& without AP credit – all course credit awarded UGF w/& without IB credit –all course credit awarded
2010-2011 2011-2012 2014-2015 COHORT YEARS	Fall, Spring, Summer Terms
DATABASE: Admissions (ADM)	Gender/Age/RACE Parent Education level from application for Admission Parents: Mother: Married/Single or Deceased and/or Father: M/S or D APP TYPE: Domestic or International HS:LA/OOS HS Name ACT highest Equivalents: highest composite/subs-cores: Math/ENGL College Core GPA/HONRS GPA/Cumulative HS GPA DE (DE &/or CCUR GRADES): individual grades if applicable (on DEVL) College Codes for DE &/or CCUR DE cumulative average (on TERM) AP Credit Awarded if applicable (on DEVL) IB Credit Awarded if applicable (on DEVL) HS Courses with DE/AP or IB designation on HSEV
DATABASE: Student Records & Registration (SRR)	all students with terms of CCUR on SRR &/or all w/a College Code prior to HS grad date grades Subsequent coursework grades in any instance where student has previous credit in DE, AP &/or IB. Total # of hours completed Total # of semesters enrolled (VSEM) Institution and Cumulative GPA (VACA) Degree date: (VCAN & VDEG)
DATABASE: Financial Aid Database: (FAD) 1st semester of enrollment @ Institution	Parental income TOPS: Y/N Scholarship awarded: Y/N Pell Grant recipient: Y/N Pelican Promise recipient: Y/N

APPENDIX C: SURVEY INSTRUMENT

Survey Information	
1. Please indicate which of these programs you participated in while you were in High School?	Advanced Placement Program (AP) only Dual Enrollment (DE) only International Baccalaureate (IB) only AP and Dual Enrollment IB and Dual Enrollment AP and IB None (THEN SKIPS TO QUESTION #13)
2. What type of course credit did you receive as a result of participation in AP, Dual Enrollment, and/or IB courses?	High School Credit only College Credit only Both High School and College Credit
3. Indicate the number of college credit hours that you were awarded as a result of participation in AP, DE and/or IB programs:	None earned 1-6 hours 7-12 hours 13-21 hours 22 or more
4. Please indicate the location and teacher type who taught your AP, DE or IB courses?	High School teacher on High School Campus College Professor on High School Campus Professor at Community College Professor at four year University Online
5. What type of high school did you attend?	Public Private Charter Homeschool Online
6. Indicate the size of your graduation class:	Less than 100 100 to 350 More than 350
7. Please indicate your gender:	M/F/Other
8. What is your ethnicity?	African American/Black American Indian/Alaska Native Asian Hispanic/Latino White Other
9. What is the highest level of education that your father/guardian attained?	Less than High School High School Graduate Some College 2-year degree 4 year degree Master's degree Doctorate or professional Degree (i.e.: PhD, MD or JD)

10. What is the highest level of education that your mother/guardian attained?	Less than High School High School Graduate Some College 2-year degree 4 year degree Master's degree Doctorate or professional Degree (i.e.: PhD, MD or JD)
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Open Ended Questions:

11). Do you feel that participation in AP, DE and/or IB programs while in high school was helpful in preparing you to take college level courses? Why or why not?

12). In hindsight, would you have preferred to take the courses in college instead of taking them as AP, DE or IB? Why or why not?

13). How did enrollment in these courses help you feel about your preparedness for college? Why or why not?

15). Compared to other people who did not participate in these programs, do you feel taking these courses made you more prepared for college? Why or why not?

FOR THOSE STUDENTS WHO INDICATED THAT THEY TOOK NONE OF THE PRE-COLLEGE PROGRAMS, SURVEY LOGIC WILL SKIP TO QUESTION #14:

14). Please indicate why you did not participate in AP, DE, or IB programs in high school by selecting all that apply.

I wasn't interested*

These programs were not available at my high school

It was too expensive

I wasn't eligible

Other, please elaborate: FREE TEXT

**If student selects "I wasn't interested" then survey will bring up question: Why weren't you interested in AP, Dual Enrollment, and/or IB courses? Then continue on to #15*

15). Do you feel your high school courses prepared you for college? Why or why not?

16). Do you feel that participation in AP, DE and/or IB programs in high school would have been helpful in preparing you to take college level courses? Why or why not?

17). Looking back, do you wish that you would have participated in AP, DE or IB programs instead of waiting to take all the courses in college? Why or why not?

18). Do you feel that your peers who participated in AP, DE or IB programs had an advantage in college? Why or why not?

VITA

Guadalupe M. Lamadrid, a native of New Iberia, Louisiana, received her Bachelor's Degree in Piano Performance (1984), Master of Arts in Agency Counseling (1987), and Master of Arts in Applied Research (2016) from Louisiana State University (LSU).

She is a Licensed Professional Counselor in the State of Louisiana since 1988 and has dedicated the last 29 years to working with young adults as they navigate the transition from high school to college on through to graduation. Upon graduating with her Masters' Degree in Counseling, she accepted a position with the A.B. Freeman School of Business at Tulane University as a Career Counselor. In this role, she prepared and shepherded students at both the undergraduate and graduate level in all aspects of the career and job search process.

After two years, she left Tulane to join LSU's College of Humanities and Social Sciences (formerly College of Arts & Sciences) as College Counselor. In this role, she provided academic counseling to students enrolled in the College from the point of entry on through to graduation. After eleven years, and progressive promotions for her outstanding service, she attained the Lead Counselor position for the College. She was recruited by Academic Affairs at LSU for the Associate Director of Admissions, a position which she held until January 2017. This position allowed her to combine her years of academic counseling, institutional knowledge and business process expertise into an administrative position where she re-engineered the admissions application process to a 24 hour turn-around time for applicant decisions and built a solid team which oversaw the admission of freshmen classes of increasing quality, size and diversity.

She was accepted into the College of Education majoring in Higher Education Administration and anticipates graduating with her Ph.D. in August 2017. She began working at the Louisiana Board of Regents in January of 2017 as Senior Policy Analyst and Writer, where

she plans on using her years of professional experience and skills acquired through her Ph.D. studies to help inform and craft post-secondary policy and legislative programming at the state level.