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Ellen Lea Fischer

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Laying the Foundation: An Investigation of Bachelor’s Degree Attainment Rates of Early College High School Graduates

by

Ellen L. Fischer

Dissertation
Submitted to the Department of Leadership and Counseling
Eastern Michigan University
In partial fulfillment of the requirements for the degree of

DOCTOR OF EDUCATION

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February 29, 2016
Ypsilanti, Michigan
Dedication

This project is dedicated to the students of the Early College Alliance—past, present, and future.

It is an honor to witness you grow, learn, strive, and achieve your goals.
Acknowledgments

I feel extremely fortunate to have been assigned an incredible advisor, Dr. Barbara Bleyaert, who graciously agreed to become my even-more-incredible dissertation chair. Her technical assistance, timely advice, and useful, honest feedback were all invaluable throughout my coursework and research. But even more helpful was her uncanny ability to be there for me, in exactly the right way and at exactly the right time, to push me always to the next step in this process. She is a gifted and passionate educator and a fantastic coach.

I am grateful, also, to the members of my dissertation committee. Dr. Price, with his wealth of experience in the field and in academia, provided instruction and advice. Dr. Saunders’ insightful feedback helped me to refine my thinking both in terms of the research design and theoretical framework. Dr. Carpenter’s expertise in statistics was critically important as I worked through my analysis. Although Dr. Anderson was not on my committee, he devoted considerable time to helping me with my quantitative methods and analysis questions. This assistance made it possible for me to really get going once my data became available.

The faculty and staff of the Early College Alliance program deserve a large dose of gratitude. Every one of them puts so much heart and soul into this work at the ECA; their passion and skill is a major factor in the success of our ECA students. They have also been incredibly supportive of me as I have worked to complete this research. Within my workplace, I am especially thankful for the mentorship and friendship of David Dugger, the Executive Director of the Washtenaw Educational Options Consortium. His outside-the-box thinking, and his ability to translate this vision into reality, has been exciting to watch and be part of over the seventeen years we have worked together.
I am very lucky to count among my professional mentors (and heroes) Dr. Chery Wagonlander, the first principal of Michigan’s first early/middle college: Mott Middle College in Flint, Michigan. Her advice helped me to start down the path toward this doctoral degree, and her expertise has informed my own growth and education about the early/middle college reform movement.

Finally, I would like to acknowledge the reality that I would never have reached this milestone in my life without the incredible support, patience, and sustaining love of my family and friends. My brother and sister-in-law, Tim and Tara Fischer, and my good friends Jennie Williams, Laura Bowman, Leslie Brooker, and Bonnie Nolan have been amazingly supportive, giving, and patient. My friend and organizational coach, Molly Boren, helped me to organize my life in such a way that accomplishing this goal was possible. Dr. Jennifer Smith gave generously of her expertise as a statistician at precisely the right moments.

My parents, Theodore and Lea Fischer, helped with editing, meals, and boundless moral support. My spouse, Monica Asis, was my sounding board, strategist, coach, and life-saver. When push came to shove, she held everything together so that I could write, and write, and write. Our children, Mulugeta, Malik, and Sanaya, patiently waited for me while I wrote, and wrote, and wrote. My heart is filled with gratitude for all of these people, and others, who have, in small and large ways, enabled me to reach this goal in my life.
Abstract

This quantitative study explored the post-secondary success of the graduating classes of 2010 and 2011 from one early college high school in Washtenaw County, Michigan. The Early College Alliance (ECA) program is located on the campus of Eastern Michigan University (EMU), a public four-year university. It is a consortium program providing a unique and supported dual enrollment opportunity to high school students. After mastering both the academic and socioemotional skills required for success in college, ECA students earn up to 60 undergraduate credits at EMU and graduate from high school with both a high school diploma and a significant head start on a Bachelor’s Degree.

The study resulted in two major findings. First, ECA graduates have earned Bachelor’s Degrees at far higher rates than their non-ECA peers (at EMU, the ECA rate was 68%, \( N = 47 \) as compared with 23% of the non-ECA students, \( N = 4111 \)), with most ECA graduates continuing their education at Eastern Michigan University. Entering ECA students exhibited gaps in academic performance measures such as college credits earned while in high school, high school GPA, and ACT score based on demographic characteristics, gaps that mirrored those found in the Washtenaw County and all-EMU populations. The academic indicators were highly predictive of degree attainment among the non-ECA groups, with underrepresented students less likely to complete degrees. However, despite academic performance gaps among entering ECA students, no significant differences in degree attainment were found based on race, gender, income, or familial level of education. Interestingly, participation in the ECA program was a major predictor of degree attainment for Black students. While limited by a small sample size and a narrow focus on only one early college program, this study provides an important and intriguing initial look at the post-secondary outcomes of early college graduates.
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CHAPTER I

Introduction

Many school reform analyses begin with information about the dire and declining state of the nation’s education systems, and indeed there is no end to the list of problems plaguing schools. However, the early college high school movement offers such promise for making a positive impact in its small corner of the world of education that this story must begin as a story of good news, and the potential for great news. Early college high schools offer a very different educational pathway than traditional public high schools, the core distinction being the opportunity to earn a significant amount of college credit—up to an Associate’s Degree or 60 credits toward a Bachelor’s Degree—through a system of supported dual enrollment (Early College High School Initiative, 2013).

The Early College High School Initiative (ECHSI), an organization funded through Bill and Melinda Gates’ Jobs for the Future (JFF), not only promotes early college high schools, but also has established a fairly specific definition of the model (2013). Typical design principles include the direct teaching of “college readiness” skills, both academic and behavioral, with alignment of curriculum between the high school and college courses. In addition, strong mentoring relationships between teachers and students are carefully cultivated, and professional learning communities that include staff, students, and families are established. The “power of the site” principle refers to the way that early college high schools use the physical location of their post-secondary partners, the college campus, to leverage student engagement and achievement. Finally, many early college high schools specifically focus on enrolling students who are traditionally underrepresented in college: students of color, low-income students, and students who are the first in their families to go to college (ECHSI, 2013).
The first early college high school, Simon’s Rock, was founded in Great Barrington, Massachusetts, in 1966. A private school initially established for young women earning Associate of Arts degrees, the program soon expanded to include men. In 1979, Simon’s Rock merged with Bard College to offer a four-year, liberal arts degree to young people. The program has expanded significantly, to include branches on several campuses. A history of the early college movement would not be complete without mentioning Simon’s Rock, but it exists as a very singular model within the universe of early colleges—a costly, private, residential program (“Fifty Years of Early College Excellence,” 2015).

The vast majority of today’s early college high schools have their roots in the middle college high school movement, which dates back to 1974 with the founding of Middle College High School at LaGuardia Community College in New York (Middle College National Consortium [MCNC], 2012). Designed to address the needs of students at risk of dropping out of high school, the program brought students onto a college campus and wove high expectations, strong relationships with faculty, and targeted support into a unique environment where students thrived. The opportunity to earn college credit—tuition and books paid for by the program—offered a great incentive (MCNC, 2012).

The middle college concept eventually spread throughout the country and evolved, giving rise to the newer early college model (ECHSI, 2013). Early colleges differ from middle colleges in that they offer, and often require, a great deal more college credit in order to graduate. Barnett, Maclutsky, and Wagonlander (2015) further explained the distinction between the two very similar models:

While middle college high schools offer an opportunity to take college classes, early college high schools create academic plans that allow students to earn at least a year’s
worth of college credit and even an associate’s degree by the time they graduate high school (p. 40).

Michigan’s first middle college was founded in 1991 on the campus of Mott Community College ("About MMC," n.d.). Organized under the authority of the Genesee Intermediate School District, the new Mott Middle College operated very much in the vein of the earliest middle colleges on the east coast; students from the Flint Public Schools and surrounding areas who were at risk of dropping out of high school were recruited to form the first cohorts on MCC’s campus. In 1997 the Washtenaw Technical Middle College (WTMC) opened on the campus of Washtenaw Community College in Ann Arbor, Michigan. WTMC is a charter school, operating under the authority of Washtenaw Community College and the Washtenaw Intermediate School District (Washtenaw Community College, 2008). These programs remained the sole early/middle college opportunities in the state until 2006, when a $2 million grant by the State of Michigan specifically invited the formation of a new cohort of three additional early/middle college high schools (Begin, 2006). Among the three new schools that emerged from this grant cycle was the Early College Alliance at Eastern Michigan University (ECA), which welcomed its first cohort of students in the 2007-2008 school year.

While Michigan’s first two middle colleges were taking shape, the Michigan legislature took some initial steps toward increased policy support for the broader option of dual enrollment. In 1996, the Post-Secondary Enrollment Options Act of 1996 (2009) required school districts to provide, advertise, and pay for dual enrollment opportunities for all eligible students. This legislation was reinforced in 2000 by the Career and Technical Preparation Act of 2000 (2009). Both of these statutes imposed responsibilities for school districts, intermediate school districts, and post-secondary institutions. The policies defined “eligible students” by identifying college-
level cut scores on various standardized tests, but also permitted local districts to utilize their own criteria (Michigan Department of Education, 2012).

Going far beyond the spirit of this legislative push for dual enrollment, leaders in Michigan’s early and middle colleges forged ahead to develop not only their own individual programs, but also organizational support for new programs. Influenced by her involvement with the Middle College National Consortium (MCNC), Mott Middle College’s principal, Chery Wagonlander, pulled together the developing expertise of the first early and middle colleges in Michigan for twice-yearly conferences. The goal was to provide “peer-to-peer technical assistance” to starting programs, and received funding toward that end from the Mott Foundation. In 2005, these efforts gave rise to a newly-formed state chapter of the Middle College National Consortium: the Michigan Early Middle College Association, or MEMCA (Jenkins & Wagonlander, September, 2015).

As more early college schools and programs have taken shape in the state, MEMCA works to ensure that the best practices emerging in the early/middle college movement, both within the state and nationwide, are included in the design of the new models (Wagonlander, personal communication, Oct. 14, 2015). The Leadership Council of MEMCA includes representatives from the leaders of established programs, Intermediate School Districts, post-secondary institutions, and—critically—the Michigan Department of Education (MDE). MDE works closely with several interconnected groups focused on early college at the state level; this partnership has created regulatory support for the unique needs of early college high schools, as well as enhanced oversight of the many new schools and programs by experienced practitioners (Jenkins & Wagonlander, September, 2015).
This policy-practitioner partnership has been put to the test over the past several years. The latest tally of early college high schools in Michigan highlights an explosion of activity in this sector of educational reform in the state, as well as an expansion of unique programs that specialize in “enhanced” dual enrollment. According to MDE’s “Early/Middle College High Schools and Programs in Michigan” listing (2015a), there are currently 23 fully-fledged early college high schools, along with 67 different early/middle college dual enrollment programs in the state. An August, 2015 summary of early/middle colleges in the state reported 28 of Michigan’s 30 community colleges as participating with an early or middle college, as well as 24 of the 56 Intermediate School Districts or Regional Educational Service Agencies (Michigan Department of Education, August, 2015).

While the initial push for early and middle college models focused first on high-school completion and then college access for at-risk youth, the current climate calls for an emphasis on the logical next step: post-secondary degree completion. The overall statistics on college completion in the United States are dreary, especially for traditionally underrepresented student populations. Before the conversation about equity in terms of college access and persistence can even begin, high school graduation presents a significant hurdle for the nation’s poorest students. Goldberger (2007) outlined the compounding disparities in educational outcomes between students from the lowest income levels and those from the middle and highest income levels, starting with high school completion rates at 65% for the lowest socioeconomic group as compared with 91% for the middle and upper groups (p. 29). These large gaps persist in measures of academic preparation for college, enrollment in college, and degree attainment.

Early and middle college high school programs offer a promising starting point for addressing the barriers that students encounter with respect to college access and success. For
students enrolled in such programs, college access is mandatory to varying degrees, many setting the bar at 60 college credits earned at the same time as a high school diploma (Barnett, Maclutsky, & Wagonlander, 2015). Tuition, fees, and books are paid for by the schools, reducing some of the financial barriers that limit access to traditional first-year college students. Many early and middle college designs specifically target the enrollment of underrepresented students, directly impacting the college enrollment gap (Cunningham & Matthews, 2007; Kaniuka & Vickers, 2010). Furthermore, the culture in many of these programs is carefully created to purposefully empower students to see themselves as college-level learners.

**The Washtenaw County Context**

Washtenaw County, with an estimated 2014 population of just over 350,000, is the 6th largest county in Michigan (Michigan Department of Technology, Management, and Budget, 2010-2012). Located in Southeast Michigan, the county is home to two major public universities, a highly ranked community college, and several private post-secondary institutions ("Washtenaw County Quick Facts," March 23, 2011). Perhaps unsurprisingly, a U.S. Census Bureau table (2010-2014) comparing demographics trends of Washtenaw County and the state of Michigan reported a much higher percentage of Bachelor’s Degree holders in the county than the state at large: 51.3%, as compared with the state average of 25.9%. The same source indicated that median household income in Washtenaw County is roughly $10,000 greater than that in the state as a whole.

With favorable characteristics in general, there are some divides within Washtenaw County that pose a persistent concern for county officials in the education, healthcare, business, and municipal sectors. Wide discrepancies in key measures of well-being can be seen with the U.S. Census Bureau table expanded to include comparisons of the cities of Ann Arbor, in the
central part of the county, and Ypsilanti, in the eastern segment. The percentage of Bachelor’s Degree holders, for example, varies widely, with the figure 70.6% in Ann Arbor, as compared with 36.9% in Ypsilanti. Median household income also shows a skewed distribution within the county, with Ann Arbor’s average income level over $21,000 higher than that of Ypsilanti. Ann Arbor has fewer Black residents compared with Ypsilanti: 7.7% compared with 29.2%. These and other selected U.S. Census Bureau data are shown below in Table 1 in order to more fully describe the context in which the Early College Alliance was created.

Table 1. Comparisons of demographic data in the cities of Ypsilanti and Ann Arbor, Washtenaw County, and the state of Michigan (US Census Bureau, 2010-2014, Quick Facts Beta Tables).

<table>
<thead>
<tr>
<th></th>
<th>Ypsilanti city, Michigan</th>
<th>Ann Arbor city, Michigan</th>
<th>Washtenaw County, Michigan</th>
<th>Michigan</th>
</tr>
</thead>
<tbody>
<tr>
<td>White alone, percent, April 1, 2010 (a)</td>
<td>61.5</td>
<td>73.0</td>
<td>74.5</td>
<td>78.9</td>
</tr>
<tr>
<td>Black or African American alone, percent, April 1, 2010 (a)</td>
<td>29.2</td>
<td>7.7</td>
<td>12.7</td>
<td>14.2</td>
</tr>
<tr>
<td>Asian alone, percent, April 1, 2010 (a)</td>
<td>3.4</td>
<td>14.4</td>
<td>7.9</td>
<td>2.4</td>
</tr>
<tr>
<td>Two or More Races, percent, April 1, 2010</td>
<td>4.3</td>
<td>3.6</td>
<td>3.4</td>
<td>2.3</td>
</tr>
<tr>
<td>Median value of owner-occupied housing units, 2009-2013</td>
<td>$123,100</td>
<td>$230,700</td>
<td>$198,400</td>
<td>$121,700</td>
</tr>
<tr>
<td>Bachelor’s degree or higher, percent of persons age 25 years+, 2009-2013</td>
<td>36.9</td>
<td>70.6</td>
<td>51.3</td>
<td>25.9</td>
</tr>
<tr>
<td>Median household income (in 2013 dollars), 2009-2013</td>
<td>$33,406</td>
<td>$55,003</td>
<td>$59,055</td>
<td>$48,411</td>
</tr>
</tbody>
</table>

The Early College Alliance (ECA) operates as a consortium program—a partnership between Washtenaw County’s public school districts and Washtenaw Intermediate School District (WISD), in collaboration with its post-secondary partner, Eastern Michigan University (EMU). The governance structure of the ECA is as unique as the program itself. In fiscal year 2014, the superintendents of all nine Washtenaw County schools (Ann Arbor, Chelsea, Dexter, Lincoln, Manchester, Milan, Saline, Whitmore Lake, and Ypsilanti) and the Washtenaw
Intermediate School District secured approval from their boards to form the Washtenaw Educational Options Consortium (WEOC).

WEOC oversees three “secondary options” programs that had been separately open to students in most of the county’s school districts: Washtenaw International High School (an International Baccalaureate program), the Washtenaw Alliance for Virtual Education (a specialized program that blends online and in-person learning), and the Early College Alliance. All three WEOC programs are located on the eastern end of Washtenaw County in the city of Ypsilanti. The county’s superintendents oversee WEOC through a Joint Steering Committee that operates in a manner similar to a school board. The Executive Director of WEOC manages all three educational programs in a manner similar to a district-level superintendent.

Funding for all the WEOC programs comes from the state of Michigan’s school funding structure. Public schools in the state receive the majority of their funding from the state government, with local revenue and federal funding supplementing the state’s allocation of per-pupil funds. WEOC students retain membership in their public school districts or become members in a Washtenaw County school district (through a “school-of-choice” option) in order to participate in WEOC programs. A percentage of the state’s per-pupil foundation allowance is distributed to the WEOC program in which the student is enrolled. In the case of the ECA program, the school district retains 5% of the state funding, in addition to all of the federal monies that typically follow a student. Eastern Michigan University contributes to the partnership by providing tuition at a discounted rate.

Each district allows a certain number of students to enter the program through its district each year using a variety of enrollment policies that are determined by the WEOC Joint Steering Committee. While many students leave their district high schools in order to take advantage of
the opportunity to earn 60 college credits, roughly 30% of each year’s incoming cohort come to the program from private, charter, out-of-county, or home school settings.

As a cooperative venture, the ECA program allows students to retain membership in the public high school district through which they enroll. Students who wish to do so may take part in extracurricular activities, including sports, performing arts, school dances, and other activities that take place on the high school campus. Approximately 45% of ECA students continue to take part in district-sponsored events. Many ECA students also become part of the campus community at EMU, joining clubs, volunteering, and obtaining on-campus employment. A growing list of ECA students have sought out credit-based college experiences, participating in EMU’s bands or orchestras, choirs, dance troupes, drama performances, and ROTC, to name a few.

Many of the services available to students within a traditional public high school setting are duplicated at the Early College Alliance, often in coordination with either the county’s partner districts, Eastern Michigan University, or both. Students with disabilities are served through special education and under 504 Plans; an ECA teacher consultant helps to ensure that accommodations are provided within ECA classes, that students connect with EMU’s Office of Students with Disabilities to arrange accommodations in college classes, and that needed ancillary services are provided by partner district staff. ECA provides after-school tutoring for those in ECA classes, and teaches students to use EMU’s resources for tutoring support in EMU classes (ie., Math Lab, Writing Center, supplemental instruction, department tutors, etc.).

Although not in place when the program began, a school lunch program has been operating since the 2013-2014 school year. One of the ECA’s partner districts distributes lunches, with free, reduced-price, and full-price options available just as in the traditional
buildings. Transportation remains a hurdle for students, however; families must provide transportation to and from the campus. While EMU’s central campus is serviced by several public bus routes and is within walking distance of some Ypsilanti residents, transportation is likely a barrier that limits participation in the program.

The Early College Alliance relies on a thoughtful and unique structure in its staffing, professional roles, approach to the school year and calendar, and student support services in order to successfully facilitate the dual enrollment of young students on a Bachelor’s college campus. The school year mirrors that of Eastern Michigan University, allowing students in high school and college courses to adhere to the same, campus-wide schedule. ECA courses are delivered in a block format; a “full time” high school schedule is comprised of four classes, with an additional science laboratory course for those students enrolled in high school science—very similar to the minimum course load required of college students for “full time” status. High school ECA classes meet in EMU classrooms and are distributed across the campus. This feature illustrates the early college principle of “power of the site”; ECA’s high school students are embedded within the fabric of the university, observing and being influenced by the adult expectations surrounding them throughout their school day.

The Early College Alliance structures faculty time and responsibilities to allow them to provide a highly individualized educational experience to students. Full-time ECA teaching faculty serve as CORE (Counseling, Oversight, Resource, and Educate) advisors, a vitally important role that is both distinct from and complementary to their roles in the classroom. In order to provide faculty with the time to fulfill this role, each teacher teaches three classes in the fall semester, leaving one-fourth of the school day for planning and CORE advising. In the winter term, teachers spend half the day in the classroom, with the other half devoted to CORE
advising. The months of May and June (EMU’s “summer 1” term) are mostly devoted to CORE advising, with minimal teaching responsibilities. Time during each semester is also carved out for instructional team meetings: days-long opportunities for the entire teaching staff to discuss the individual needs of each student in high school classes.

The Early College Alliance is currently in its 8th full year of operation, and the pattern of a typical school year has been established at this point. An explanation of the way students move into and through the program follows—beginning with Enrollment and ending with Program Completion.

In mid-October, the WEOC Executive Director, along with the ECA Principal and other administrators hold a series of ECA Informational Meetings. These meetings are designed to inform prospective families about the benefits of the program. The information includes a heavy emphasis on the values, structure, pedagogy, and methods that are foundational to the ECA. The meetings take place in each of the ECA’s participating school districts, at Eastern Michigan University, and at various other venues in and out of the county. Students apply for admission in their 9th or 10th grade year to begin the program in the 10th or 11th grade. Enrollment packets, with a deadline of mid-January, are distributed in the hope of identifying a solid list of the next year’s new students by mid-February. In March and April, new students begin a series of skills assessments to identify baseline academic measures in reading, writing, and mathematics. After these assessments are completed and scored, each new student is assigned a CORE Advisor.

The presence of a supportive adult mentor for each student within an early college program is one of the fundamental design principles underlying most early college high schools; CORE Advisors fill that role at the ECA. CORE Advisors are full-time ECA faculty—certified high school teachers whose roles encompass both classroom teaching and serving as mentors and
advisors to a group of roughly 50 students. In May and June, the teaching and related responsibilities for these faculty members diminishes in order to allow time for very specific and highly individualized conversations between the new students, their families, and their new CORE Advisors. The CORE Advisors help to explain the structure of the program, get to know the student and family, and establish the relationship of the CORE as the primary point of contact between the family and the school.

Over the summer, new students attend an orientation event. This is their first chance to spend time on the campus of Eastern Michigan University and get a real sense of the space they will inhabit once school starts in the fall. New students obtain their EMU ID cards and their my.Emich account credentials. They receive more detailed ECA-related information from their CORE Advisors and the ECA administration. Returning students provide campus tours as well as their own perspectives on being an ECA student.

On the first day of school, new students spend a half-day at a team-building “Challenge” program operated by the University of Michigan. Because any new cohort of students comes from over 40 different prior educational settings—including home school, private schools, charter schools, and out-county schools, in addition to the ECA partner district schools—the opportunity to facilitate interpersonal connections among students before classes begin is very important. The facilitators of these sessions focus not only on building rapport among students, but also on developing the inner strength to transition successfully from the old school environment to the new one at the ECA.

New students typically attend four high school classes each day in math, science, social studies, and English. The academic curricula are designed to teach the high school content required by the state, and—more importantly—the skills and behaviors required for success in
that content area at the college level. Teams of ECA teachers have refined a separate “soft skills” curriculum that is taught by every teacher in every classroom, each period of the day for the first six weeks of school. With a combination of teacher-developed activities and Downing’s (2010) *On Course* textbook, the soft skills portion of the program is devised to explicitly teach the behaviors and mindsets that lead to success in college and in life.

Students in ECA courses earn both academic grades and soft skills “credentials” that provide information about students’ college readiness—both academic and behavioral. After five weeks, the entire ECA instructional team meets to discuss each student’s progress at a long “Soft Skills Review Day.” Teachers provide credentials that indicate each student’s progress toward college readiness: U for “Unsatisfactory,” N for “Needs Improvement,” and S for “Satisfactory.” CORE Advisors take detailed notes of each of their students’ strengths and weaknesses. All faculty members provide written comments on the school’s student information system for students and parents to view.

After Soft Skills Review Day, students in ECA classes, along with those who are in their first semester in EMU classes, schedule Student-Parent Conferences with their CORE Advisors. These conferences allow students to report out on their own performance; they are encouraged to prepare for the presentation, dress professionally, and take the lead in the discussion of their grades and soft skills performance. CORE Advisors facilitate where needed, and help the student and family to identify the next steps forward for each student. For some students, the next steps will include a conversation about possible college courses for the next semester. For others, identifying needed supports or prioritizing school makes up the discussion of next steps.

Direct instruction of soft skills ends after Review Day; students are expected to begin demonstrating these skills independently at this point. Feedback from teachers, CORE Advisors,
and other faculty members continues. At the 12-week mark, the instructional team meets again, this time to provide final credentials that will determine which students will take college classes in the next semester. At this two-day “Soft Skills Credentialing” meeting, a fourth credential is added: R, for “Recommended.” A credential of R in an ECA course means that a student has been recommended for enrollment into an EMU course in that content area; he or she has demonstrated both academic and behavioral college readiness, and the instructor expects that this student will be successful in a college course in that discipline in the next term.

Approximately 20% of new students move into full-time college coursework in their second semester at the ECA. Roughly 30% take one or more EMU classes, with the balance of their schedule being ECA (high school) classes. The remaining 50% continue with a full-time ECA schedule, working on developing their academic and soft skill readiness for college. By the time students move into their second year in the program, their schedules usually look very much like any other EMU freshman’s schedule, with 12-14 credit hours in General Education coursework each fall and winter term.

In order to complete the program, students must complete at least one EMU class in each of the core content areas: English, mathematics (two college classes required), science, social studies, and world languages OR diversity/global awareness. Specific courses that reflect the standards in the Michigan Merit Curriculum are also required; these requirements can be met through prior high school coursework, ECA high school classes, or EMU classes. In addition to academic college coursework, students must take at least one ECA high school course in each semester. For most second and third-year students, this requirement is met by a mandatory transition-focused course through which much of the guidance/counseling curriculum is delivered. Because ECA students start college early, they are typically very close to completing
their General Education requirements as they finish high school. This means that their first year as an independent college student, or First-Time-In-Any-College (FTIAC), is also often the year that they begin taking coursework in their major area of study.

**Statement of the Problem**

Despite the conventional expectation that high schools are preparing students for success in college, the evidence points to a dramatic mismatch in expectations at the high school level versus the reality of what it takes to succeed once enrolled in college. A National Student Clearinghouse (NSC) StudentTracker Report (2014) for Washtenaw County found that 83% of the county-wide class of 2012 enrolled in some type of post-secondary program in the first two years following graduation. However, the persistence rate of students from the first to second year in the county is not nearly as strong, and subsequently declines further; only 51% of the students who started on the college pathway have earned a 4-year or 2-year degree within the first 6 years after high school graduation (NSC, 2014).

At the same time, institutions of higher education, especially those with non-selective enrollment practices, struggle to justify their existence amid degree-completion rates at the 50% mark and below. Eastern Michigan University’s 6-year degree-completion rate, for example, hovers at 37% (Education Trust, 2015). While this figure is somewhat misleading because it does not take into account those who started at EMU but completed a degree elsewhere, the accountability pressures that post-secondary institutions are facing have forced colleges and universities to find new ways to support students, many of whom are woefully unprepared for the transition from high school to college (Tinto, 2012).

Furthermore, disparities in access to and completion of college credentials for students of color and economically disadvantaged students magnify the social inequities that education
should be working to rectify—a problem at both the secondary and post-secondary levels. The twin issues of underpreparation at the high school level and low degree-attainment rates at the college level disproportionately affect students of color, those that are the first in their families to attend college, and students living in poverty (Engle & Tinto, 2008).

**Purpose of the Study**

The purpose of this study is threefold. First, the researcher seeks to examine the 4-year degree attainment rate of students who have completed high school through the Early College Alliance program. Differences in degree attainment on the basis of student characteristics such as race, gender, socioeconomic status, and familial level of education will also be explored. The second purpose is to compare the rate of degree attainment of ECA graduates with that of non-ECA, Washtenaw County graduates who enrolled at EMU immediately following high school graduation. The third purpose is to compare the Bachelor’s degree attainment rates of Early College Alliance graduates who remain at EMU with those of non-ECA graduates at Eastern Michigan University.

**Significance of the Study**

The strength of the early/middle college model in terms of both access and college readiness suggests that graduates of such programs will also have strong rates of persistence toward degree completion. While many of the risk factors that tend to undermine persistence are present in the targeted student population served by early/middle colleges, it is a strong possibility that the access and readiness focus of these programs at least partially remedy these potential problems. For example, in *The Toolbox Revisited*, Adelman (2012) found that first-year undergraduate students who completed at least 20 college credits by the end of their first year were significantly more likely to graduate from college, and that meeting this threshold had the
potential to help close the gap in degree attainment between white and minority students (p. xxv). Since early college high school students typically earn well over twenty college credits before they even finish high school, this threshold has already been met. It follows that many early/middle college students will, with the proper college access structures in place, move more seamlessly into post-secondary work. Further, since they have a significant head start on college when they graduate from high school, they should be more likely to complete their post-secondary degrees.

While early/middle colleges, by their design, bridge the gap between high school and college, not enough information has been published to this point about the impact of these programs on college degree attainment. Because many early/middle college programs take place on community college campuses, research related to Bachelor’s degree completion is scarce. This study will help to address these holes in the literature about the early college high school movement by providing critical insight into the post-secondary outcomes of Early College Alliance graduates. Locally, this information will be immediately useful to ECA’s consortium partners in the 9 participating districts in Washtenaw County as well as at Eastern Michigan University. At the state level, this study will contribute timely empirical evidence to the conversation that is currently leading to an explosion of various types of early and middle college programs statewide.

This study adds to the relatively small, but growing, amount of research specific to this educational reform movement. As a deep look at the structure, function, and results of early college high schools in aggregate as well as an examination of these data for underrepresented students, this information may also provide insight into the vexing problems that affect the efforts of students and educators to bridge the gap between high school and college.
Definition of Terms

Several terms that will be employed throughout this research study and report are explained in the following section. Many of the terms have multiple meanings; this section clarifies the manner in which they will be utilized in this study.

*College access:* The means by which students develop an awareness of the concrete steps that one must take to gain admission to a post-secondary institution (i.e., college entrance exams, financial aid forms, application processes, etc.) as well as the aspiration to attend college.

*College continuation rate:* The rate at which high school graduates enroll in college in the fall semester following high school graduation (Engle & Tinto, 2008).

*College knowledge:* An expression that captures a student’s understanding of the concrete aspects of the college access definition.

*College readiness:* This study will rely on Conley’s (2007) operational definition of college readiness:

[T]he level of preparation a student needs in order to enroll and succeed—without remediation—in a credit-bearing general education course at a postsecondary institution that offers a baccalaureate degree or transfer to a baccalaureate program. “Succeed” is defined as completing entry level courses at a level of understanding and proficiency that makes it possible for the student to consider taking the next course in the sequence or the next level of course in the subject area (p. 5).

*Early college high school:* Supported dual-enrollment program in which high school students earn a significant amount of college credit while simultaneously earning their high school diplomas. While some definitions of this term specify certain programmatic design features, this definition will remain purposefully broad in that respect.
Persistence: In the higher education context, a term that describes a student’s progress through a post-secondary program all the way to graduation (Tinto, 2012, p. 127).

P – 16 Educational System: Also referred to as the “p – 20” or the “k – 16” educational system, these terms describe a vertically aligned vision of education, beginning prior to kindergarten and continuing through a post-secondary degree or credential—and often beyond, into a student’s first career placement.

Soft Skills: Non-academic or behavior skills critical for success in college, career, and life. At the Early College Alliance, this term also refers to a specific curriculum in which these discrete skills are taught, practiced, and evaluated by teachers and students themselves. Examples of soft skills in the ECA program include attendance behaviors, communication skills, follow-through, and self-advocacy.

Underrepresented (in Higher Education) Students: Students who belong to groups for whom significant gaps exist in terms of college enrollment and success. Examples include students living in poverty, students of color, and those who are the first in their family to earn a college degree.

Theoretical Framework

The elements of successful post-secondary degree completion fall into three main categories: access, readiness, and persistence. College access refers to the ability of students to go through the steps necessary to attend college: aspiring to attend college, applying to college, securing financing for college, and navigating the bureaucratic hurdles involved in starting classes on the first day of the term (Bloom, 2008; Long & Riley, 2007). College readiness includes the skills and dispositions that enable students to be successful once enrolled in post-secondary coursework (Conley, 2013; Conley, 2007; Hungerford-Kresser & Amaro-Jiménez,
College persistence is the factor that ultimately leads to graduation (Tinto, 2012; Nakajima, Dembo, & Mossler, 2012; Engle & Tinto, 2008). Taken together, these three categories provide a useful theoretical framework for analyzing the post-secondary degree completion of early college high school graduates. The scholarship within each category yields important insights specific to students underrepresented in higher education, and this focus underlies the theoretical framework upon which this study is built.

**College access.** College access is highly influenced by what has been termed a “college-going culture,” which refers to community and high school cultural expectations for applying to college (College Board, 2006). A college-going culture includes symbols, language, and systematic use of college-related resources—such as college fairs, counseling, assistance with college applications and the FAFSA, and the like (Jones, Bensimon, & Dowd, 2011; College Board, 2006). College access varies tremendously from community to community. Access is easy and the college-going culture strongly embedded in communities that tend to have a higher percentage of high-income households—many of them white (Bloom, 2008).

Long and Riley (2007) grouped barriers to college access into three main categories: financial, academic, and logistic. The perception that college is unaffordable is rooted in reality: the cost of college has increased 40% in the last 10 years (College Board, 2015, p. 3), and this comes on the heels of a 270% jump in tuition rates between 1976 and 2005 (College Board, 2006, as cited in Long & Riley, 2007, p.40). While grant money covers tuition and fees for many of the most economically disadvantaged students, it falls short of meeting the totality of their financial need, which includes housing and books (College Board, 2015, p. 4). Student loans required to cover the additional expenses create additional barriers (Engle & Tinto, 2008).
Bloom (2008) critiqued existing college access programs in an ethnographic study of thirteen high school seniors, diverse in terms of race and social class, who were immersed in the college application process. She argued that college access includes practical “college knowledge” of the type to be gained by campus visits, awareness of cost and the financial aid process, and the obvious need to complete high school. College access also has to do with less tangible forms of knowing that involve both social and cultural capital that may be much more difficult to directly teach: “College going capital is very rarely built through direct instruction; instead, it is deeply rooted in a series of personal experiences of college campuses built over long periods of time” (Bloom, p. 4). Middle-class students often have exposure to this type of social and cultural capital by virtue of their families’ existing comfort level with the mechanisms for navigating the college-going process, and by their connections to people who can help along the way—advantages that low-income and first-generation students do not have. College access programs can better help underrepresented students if the pedagogical focus shifts from the direct teaching of discrete steps in the college-going process to one that allows “them to build knowledge through their own experience at the same time that they widen the range of social contexts in which these experiences take place” (Bloom, p. 6).

**College readiness.** The second factor affecting college degree completion is college readiness. Conley (2007) provided a comprehensive model of college readiness that incorporates both academic and non-academic skills. According to his definition, a student who is “college ready” is one who:

…is able to understand what is expected in a college course, can cope with the content knowledge that is presented, and can take away from the course the key intellectual dispositions the course was designed to convey and develop. In addition, the student is
prepared to get the most out of the college experience by understanding the culture and structure of postsecondary education and the ways of knowing and intellectual norms of this academic and social environment (p. 5-6).

Conley’s model conceptualized college readiness as the interplay among four domains: key cognitive strategies, key content, academic behaviors, and contextual skills and awareness. Of these four, key content comes the closest to what is typically considered “college readiness”—the academic content measured at some level by tests such as the ACT. The other elements of the model draw in non-academic skills, including study skills, problem-solving abilities, awareness of college and college access, and the interpersonal skills necessary for succeeding in college coursework.

College readiness describes the academic and non-academic behaviors that prepare students for success in college coursework once they are admitted into those classrooms. Commonly-cited disparities in preparation for college highlight academic gaps using factors such as ACT’s College Readiness Benchmarks. With a large data set collected over many years, ACT’s Benchmarks indicate the likelihood that a student testing at certain score levels will go on to earn passing (C or better) grades in introductory-level mathematics, science, and English college coursework. The 2014 ACT report on national college readiness presented scores from the nation’s 2012 graduates who took the ACT, and found that only 25% met the College Readiness Benchmarks in all subjects (p. 1). When disaggregated by race, the disparities are striking; only 5% of African-American students who took the ACT met the Benchmarks in all four subjects. The percentage was slightly higher for Native American and Hispanic students, at 11% and 13%, respectively, while 32% of White and 42% of Asian students met the same
standard (p. 5). Clearly, inadequate academic preparation for college presents significant barriers for American students who are college-bound, the barriers highest for minority students.

In their research highlighting the experiences of underrepresented minority students, Hungerford-Kresser and Amaro-Jiménez (2012) argued for the expansion of the definition of college readiness. They held that, especially for low-income students and students of color, college readiness involves an “identity process, fluid and complex, rather only than a list of skills or strategies that students are not prepared for” (p. 2). Students coming from communities not well-represented in their college notice and must deal with their status as “outsiders,” finding ways to both distinguish themselves from the majority-culture students as well as identify with them (p. 9). Often, however, the lived realities of underrepresented students conflict with the expectations of higher education—such as obligations to the family of origin for financial or practical support. These types of conflicts impede the post-secondary success of the most academically prepared and “soft skills”-ready college student, leading Hungerford-Kresser and Amaro-Jimenez (2012) to conclude that “…identity processes and particularly minority students’ cultural identities may complicate college readiness” (p. 9).

Persistence to degree. Once students reach the doors of the college or university, persistence to degree completion is the next major hurdle. As previously stated, the national statistics on the rate of Bachelor’s Degree completion over a six-year period fall between 51.5% and 59.4% (National Center for Educational Statistics, 2014b). Underrepresented students are much less likely to complete a Bachelor’s Degree within six years; pronounced graduation gaps exist for students of color, low-income students, and first-generations students (Green, 2006; Rogers & Summers, 2008; Tinto, 2012). As Tinto (2012) pointed out, “…we have not yet been successful in translating the opportunity access provides into college completion…” (p. 4).
The low academic skills that many students demonstrate in high school result in a greater need for remediation upon college entry. Kurlaender and Howell (2012) reported that nearly one quarter of students at four-year universities require remedial coursework of some type, the percentage for Black and Hispanic students being even higher. Citing data collected by the National Educational Longitudinal Study, Kurlaender and Howell argued that “students who arrive at college in need of remedial or developmental course work are less likely to succeed — in their academic performance, persistence, and degree completion — in college” (p. 6). Other researchers (Adleman, 2006; Long & Riley, 2007) have found that the need for remediation may not have a directly negative impact on degree completion, but still qualify as barriers. As Adleman explained, “remediation stalls student momentum” toward introductory coursework that leads to a degree (p. 47).

Considerable research into college persistence has attempted to identify other factors that influence a student’s continued enrollment and eventual completion of a college degree program. Persistence is influenced by multiple and interrelated variables, including self-efficacy, motivation and goal-setting, academic achievement, parental level of education, socio-economic status, number of courses taken per term, age upon college entry, type of institution, race, English proficiency, and student engagement—both academic and social—in the college setting (Nakajima, Dembo, & Mossler, 2012; Engle & Tinto, 2008; Tinto, 2012). Tinto’s (1993) “interactionalist model” of student persistence is a well-known framework that outlines the interactions among various student-level factors (ie., demographics) with both the academic and social contexts operating in a college setting that affect students’ experiences and, ultimately, their degree completion (as cited in Barnett, 2011, p. 196). Tinto’s model stressed the importance
of student integration into the college setting as a key predictor of persistence in four-year university settings.

While various student-level factors are correlated with student success at earning a college degree, Tinto (2012), Barnett (2011), and Engle & Tinto (2008) have emphasized the role of the institution in student retention. Focusing specifically on students underrepresented in higher education, Engle and Tinto (2008) asserted:

…even after taking their demographic backgrounds, enrollment characteristics, and academic preparation into consideration, low-income and first-generation students are still at greater risk of failure in postsecondary education. This suggests that the problem is as much the result of the experiences these students have during college as it is attributable to the experiences they have before they enroll (p. 3).

In his 2012 book, Completing College: Rethinking Institutional Action, Tinto identified specific ways in which postsecondary institutions can create conditions that enhance the “during college” experiences of students and lead to increased persistence. These include holding high expectations, providing appropriate support to help students navigate the academic and non-academic aspects of college, utilizing assessment data and giving students relevant and useful feedback, and facilitating opportunities for student involvement on campus (p. 7).

The role of early college high schools. The theoretical framework just described is further positioned within the larger context of the p-16 educational system. The p-16 (or p-20) concept speaks to the need for an integrated system of education, aligned all the way from preschool through college, and even into career or graduate-level education (Chamberlin & Pucker, 2008). It includes partnerships across the boundaries of preschool, elementary, secondary, and post-secondary education, as well as between the arenas of business, education, and politics. At
each level of this study’s theoretical framework—college access, college readiness, and college persistence—the design of early college high schools offers potential solutions to the problems that beset the p-16 educational system at the juncture of high school and college.

Early college high schools provide leverage in terms of college access in several ways. First, providing dual-enrollment college credit at no cost to the student and family essentially provides up to a two-year college scholarship for early college students. As Engle & Tinto (2008) emphasized, the financial burden of college (particularly the higher-cost four-year institutions) poses a significant barrier for students with strained financial resources. The opportunity to get a significant foothold in the world of college free of charge boosts access in a very practical sense.

Another key way that early college high school programs have a positive impact on college access involves the “power of the site” early college design principle. The types of “college knowledge” that empower students’ college-going behavior are embedded in early college programs that bring students onto college campuses, provide the resources of college support services and help students understand how to make use of them, and offer authentic college course-taking experiences that build an actual post-secondary transcript (Barnett, Maclutsky, & Wagonlander, 2015).

The early college high school model directly influences the college readiness aspect of the theoretical framework, as well. In order for students to successfully engage in college course-taking, the alignment of high school and post-secondary expectations is paramount. Both academic preparation and social-emotional preparation factor into the process by which early college high schools teach and assess college readiness. The grades students earn in college coursework each semester provide critical data that highlight the early college program’s success
in terms of facilitating the development of college-ready students; this “external validation” of early college high schools provides a unique feedback loop that allows these programs to measure their success in a highly relevant way (D. Dugger, personal communication, 2015).

The ways in which early college high schools systematically address the first two elements of the theoretical framework, college access and college readiness, together help to pave the way for success in the third element, college persistence. Many aspects of the early college high school model that have been articulated in the previous sections mitigate risk of college departure, particularly for underrepresented students. The following diagram (Figure 1) illustrates the proposed interaction of the theoretical constructs of college access and readiness with persistence factors—which, it is hoped, will lead to Bachelor’s Degree attainment.

![Figure 1: Model of College Access, Readiness, and Persistence Theoretical Framework](image)

**Research Questions**

This study centers around three research questions:

1. What is the rate of Bachelor’s Degree attainment of Early College Alliance students who graduated from high school in 2010 and 2011?
   
a. What is the average “time-to-degree” for ECA graduates who completed Bachelor’s Degrees prior to December, 2015?
b. What are the differences in the rates of post-secondary degree attainment of ECA graduates based on race and gender?

2. How do the rates of Bachelor’s Degree attainment of ECA graduates who remained at Eastern Michigan University compare with the overall degree-attainment rates of non-ECA Washtenaw County graduates who enrolled at EMU?

3. What are the differences in the rates of post-secondary degree attainment of ECA graduates who remained at Eastern Michigan University as compared with non-ECA graduates at Eastern Michigan University?

Research Design/Methods

This study employed a non-experimental quantitative design to examine the researcher’s questions about the correlation of participation in an early college high school program with completion of a Bachelor’s Degree. The first question explored the overall rate of Bachelor’s Degree attainment of Early College Alliance graduates. The second question compared these Bachelor’s Degree attainment rates with that of the non-ECA Washtenaw County graduates who enrolled in Eastern Michigan University. The third question compared Bachelor’s Degree attainment rates of Early College Alliance graduates with their non-ECA classmates in the larger population of FTIACs at EMU. The independent variable in these situations was participation or non-participation in the ECA program. Sub-questions in the proposed study involved a deeper look at whether there were differences in degree attainment based on student characteristics, again exploring the extent to which any identified gaps in Bachelor’s Degree attainment were different than similar gaps in non-ECA students in Washtenaw County and non-ECA students at Eastern Michigan University. The independent variables in these last two questions were student subgroup variables (race/ethnicity, gender, socioeconomic status, and family level of education)
and academic indicator variables (high school GPA, ACT Composite scores, and number of dual enrollment credits). The dependent variables in this study were degree completion and, for Question 1, time to degree.

Data for this study came from two main sources. To examine Bachelor’s Degree completion within the group of ECA students who completed high school in 2010 or 2011, the researcher made use of internal, student-level data from ECA’s records. These were compiled using EMU data files and National Student Clearinghouse data files. To examine degree-completion at EMU in Questions 2 and 3, the researcher requested and received data from the Institutional Research and Information Management (IRIM) department at Eastern Michigan University.

Chi-square and Independent t –test analyses were conducted in order to point out differences within each group and between groups in terms of demographic characteristics and academic indicators. Multiple logistic regression analyses were conducted to determine whether significant differences in post-secondary degree attainment existed between ECA subgroups, between ECA graduates and non-ECA graduates in Washtenaw County, and between ECA graduates and non-ECA graduates at Eastern Michigan University.

Delimitations

This study focused on the outcomes of only one Michigan early college, the Early College Alliance at Eastern Michigan University. This scope of this study was further delimited to Washtenaw County public high school graduates who enrolled at Eastern Michigan University as First Time in Any College (FTIAC) students between September, 2010 and January, 2012. Specific comparisons against the larger population of university students were delimited to
Eastern Michigan University students who enrolled as FTIACs between September, 2010 and January, 2012.

Limitations

Several limitations constrain the extent to which the findings of this study can be generalized. First, focusing on a small subset of students prevents generalization of the results to other student populations. Next, the data sets contained limitations in terms of the accuracy of the college-going data, especially for the subset of graduates that included early college students.

There was a further limitation in terms of the amount of disaggregation possible, given the data sets. Income level and ACT scores were not reported in Data Set #1. Certain race/ethnicity categories contained a very small number of students, especially for the ECA subset of the population. For these reasons, the race/ethnicity categories that were used by this study were limited to Black/African American, White, and Other.

The major limitation of this study involved an internal threat to validity in the form of selection bias. It may be difficult to compare ECA students fairly with non-ECA students—especially at the county level—since the characteristics that pushed them to select the ECA and complete the program may have made them more likely to finish college.
CHAPTER II

Review of the Literature

Introduction

Over the last decade, concerns about the low levels of college degree attainment among American college students have taken a prominent position in the conversation about the challenges facing the nation’s educational system. Gaps in college enrollment directly after high school on the basis of race have narrowed in the last ten years, but still persist, especially when combined with disparities on the basis of income and first-generation status. In their 2013 College Board Report, Baum, Ma, and Payea summarized the data on college continuation rates, or the rates at which students move directly from high school to college: between 2002 and 2012, the college continuation rate for the lowest-income group increased by only two percentage points, from 50%-52%, while the middle income group rate increased by ten percentage points, from 55%-65%. During that same time frame, students from the highest income group increased their already-high continuation rate from 78% to 82% (p. 6). The overall trend was positive in terms of continuation rates, but the gap in enrollment between the rich and poor is cause for concern.

Although the growth in college enrollment is expected to continue over the next several years, the fact remains that far too many students who begin a post-secondary degree program fail to complete it (National Center for Educational Statistics, 2014b). Nationally, only 59% of all students who enrolled in college in 2006 with the stated intention of earning a 4-year Bachelor’s Degree had completed that degree by 2012 (National Center for Educational Statistics, 2014b). Students traditionally underrepresented in higher education tend to leave or stop out at higher rates; the rate of degree attainment for African-American students during that
time frame was 40.2%, and for Hispanics, 51.9% (National Center for Educational Statistics, 2014b). Engle and Tinto (2008) distilled the problem into a stark statement: “…the fastest growing segments of the population, low-income and minority youth, have historically been the least likely to earn college degrees” (p. 5).

Barriers to degree attainment occur at various points and in several ways at the level of both college access and college readiness. College readiness may be summarized as the academic and social/emotional preparation that leads to successful completion of college coursework (Conley, 2007). A rigorous high school curriculum supplies the first element of college readiness, for those students who are successful in college. In his 2006 analysis of factors leading to post-secondary success, Adleman found that the “academic intensity of the high school curriculum still counts more than anything else in precollegiate history in providing momentum toward completing a bachelor’s degree” (p. xviii).

Many students, however, lack the type of academic rigor that can prepare them for the challenges of college. Over 25% of students require remedial coursework before starting on the pathway to their degrees. The need for remediation may not, in and of itself, negatively affect degree completion rates, but it factors into the analysis of the barriers caused by academic underpreparation (Engle & Tinto, 2008; Long & Riley, 2007); taking remedial courses adds time and money to the process of earning a degree.

In addition, the pattern of remedial course-taking on the basis of student subgroups once again highlights gaps in educational opportunity based on race/ethnicity, income level, and other factors. In a relatively new report available on its interactive school data website, Michigan’s Center for Educational Performance and Education Information (CEPI) published the statewide figure for remedial coursetaking in Michigan’s colleges among Michigan’s high school...
graduates. The overall figure among 2013 graduates who entered 4-year colleges and universities was 7.9%. However, African-American students enrolled in remedial coursework at 4-year colleges and universities at the much higher rate of 18.3%, and economically disadvantaged students did so at a rate of 11.2%. Figure 2 represents these discrepancies graphically.

![Figure 2: Percentage of Michigan high school graduates enrolled in any remedial coursework in a Michigan 4-year college or university. This graph shows the total percentage and that of the three largest subgroups from the graduating class of 2012-2013 (Michigan’s CEPI).](image)

While remedial coursework is designed to remedy the deficiencies of the secondary school system—to “bring students up to speed”—participation in such courses suggests significant academic weaknesses that are likely to pose additional roadblocks for academically underprepared students.

An often-overlooked barrier that impedes the post-secondary success of many students involves low skills in an area of college readiness that is not so easily measured or quantified. Competencies that include self-advocacy, interdependence, problem-solving, and appropriate communication in the college context are rarely formally taught, yet college success often hinges on students’ mastery of them (Conley, 2007; Downing, 2014). Study skills, note-taking, and test-taking are examples of what Conley (2007) calls academic behaviors; these skills are expected in
college, but often not taught in the high school classroom. The lack of these and similar skills, even when a student’s academic skill set is intact, leads to failure for many students.

College access refers to the development of the “college-bound” mindset, as well as the practical steps required of students in order to gain entry into post-secondary education. As discussed by Bloom (2008), college access reflects several interrelated factors. It includes the aspiration to attend college, the expectation of college attendance, and the belief in one’s ability to succeed in college. It includes “social capital,” referring in this case to opportunities to gain exposure to and experience with the structures of college admissions, often by virtue of one’s personal connections with those familiar with the world of higher education. It includes practical aspects of college-going behavior, as well: completing financial aid forms, filling out college applications, and following through with the administrative tasks necessary to begin enrollment in college. At each of these points along the pathway to college, students can encounter roadblocks that prevent them from accessing higher education or continuing in college once they begin. The roadblocks tend to be most significant for low-income, first-generation students, for whom the “multiple and institutionally embedded kinds of help that are needed for even middle-class students to navigate the complexities of the college application process” are often not available (Bloom, 2008, p. 5).

Critically, college access also includes the ability to pay for the ever-increasing cost of a higher education—not only initially, but throughout the college experience. The high cost of college is a significant problem for many students, but can easily pose insurmountable financial pressures for low-income students. Nationally, the cost of college represents roughly 60% of the total yearly income of those in the lowest income quintile—as opposed to 17% of the yearly income for all families; in Michigan, it reflects 77% of the net yearly income of the most
economically disadvantaged families (National Center for Higher Education Management System, 2015).

While federal grants, such as Pell Grants, cover some of the costs of college attendance, a significant gap exists between the total cost of attendance and the amount of aid awarded to low-income students. This gap amounts to an average of $6,000 in unmet need for economically disadvantaged students and families (Engle & Tinto, 2008; Welbeck, Diamond, Mayer, & Richburg-Hayes, 2014). Loans can make up some of this difference, but loan repayment creates additional challenges. As Engle & Tinto (2008) pointed out, this is especially true for low-income students who need to take out loans but never complete their degrees:

These students must pay back their loans without the extra earning power associated with attaining their degrees – and without the parental or family resources that might be available to their more socioeconomically advantaged peers who leave in debt (p. 23).

The rising costs of college, the relative decline of need-based grants, and the corresponding emphasis on merit-based grants create a “perfect storm” disproportionately (and negatively) affecting first-generation and low-income students (Engle & Tinto, 2008, p. 24).

Completion of a college credential holds a great deal of importance in the current economic climate, especially for marginalized populations. Baum, Ma, and Payea (2013) summarized the evidence of the benefits of higher education: “…for most people, education beyond high school is a prerequisite for a secure lifestyle and significantly improves the probabilities of employment and a stable career with a positive earnings trajectory” (p. 7). The problem of increasing not only access to higher education, but also success at earning a degree—particularly for underrepresented students—has far-reaching implications.
The early college high school model offers a promising structure for making a positive difference in this area. This literature review will first explore the larger conversation about the alignment of pre-school through college educational system, including a close look at the ways in which the system is not aligned currently. Next, the expansion of dual enrollment in general terms, and the placement of early college high schools along that continuum of college credit-earning opportunities for high school students will be addressed. Finally, this chapter will highlight several examples of recent research about early colleges, paying respect to the growing body of knowledge about this topic and situating the present study within that specific context.

**P-16 Educational System**

Early college high schools have taken their place as a highly successful example of an emerging theme in the education research and policy conversation: education as a “p-16” system. This phrase, and the similar “p-20” or “k-16” variations, describes a seamless educational pipeline that begins in preschool (or kindergarten) and continues through a two- or four-year degree (Chamberlin & Plucker, 2008). P-16 initiatives require the collaboration of stakeholders from each of the educational levels, as well as business and community leaders and policy-makers. Envisioning a system such as this allows educators and policy-makers to focus a lens on those places in the current structure where mismatches in expectations between levels exist, and to attempt to address these incongruities through alignment of curriculum and expectations across the grade levels through college graduation (Chamberlin & Plucker, 2008).

The gap between the worlds of high school and college is a particularly confounding one. The significant structural and practical differences between secondary and post-secondary schools are obvious, yet their significance in terms of student success (or lack thereof) is widely overlooked, perhaps because of the surface similarities between the two systems. For example,
high schools and colleges both feature classrooms, instructors, textbooks, homework, tests, grades, and credentials. Even the broad categories of content area specialization are often comparable: mathematics, English/communication, humanities/social studies, science, the arts, and physical education. In the case of Bachelor’s degree programs, the expectation of time commitment in years-to-credential is the same as in high school: four years. Both systems also typically include a social dimension and options for student engagement outside of class, including athletics, music, drama, clubs, and the like. Students, families, and even educators often assume that college will basically be a continuation of what students have been experiencing, many quite successfully, in high school (Conley, 2007).

These surface similarities between the secondary and post-secondary worlds, however, belie important distinctions that educators at both levels have largely ignored. In his 2005 book *College Knowledge*, Conley observed:

Parents would likely be shocked to learn that the relationship between the high school instructional program and college success is imprecise at best. High schools are designed to get students to graduate, and in the case of college-bound students, to make them eligible for admission to college…They are not necessarily designed to enable students to succeed in college (p. 3).

Once admitted, students often find the realities of college much more challenging, requiring strategies in listening, note-taking, reading, studying, critical thinking, and time management that they may not have learned or needed to use in high school (Conley, 2005; Conley, 2007). The accountability structure of most colleges, with an emphasis on students’ self-motivation and a lack of instructor oversight, sets a trap for students who have relied on the high school faculty and their parents to monitor and often manage their performance. Where basic
attendance and homework completion may have been sufficient for success in high school, the more nuanced socioemotional skills such as self-advocacy and interdependence, along with personal attributes such as grit and self-control become equally important in a college setting (Downing, 2014; Duckworth & Gross, 2014). Such non-academic skills are rarely directly taught to high school students, much less consistently expected from them in a typical high school.

Navigating the transition between high school and college can be especially challenging for students traditionally underrepresented in high education. Green (2006) invoked the “educational pipeline” metaphor to illustrate this point: “historically underserved students continue to face difficulties as they attempt to progress through the educational pipeline, and leaks at critical points of transition are leaving them vulnerable” (p. 23).

The p-16 educational initiative does not advocate any specific reform or model for aligning the existing levels of education. At the transition point of high school-to-college, however, early college high schools provide explicit instruction and support to help bridge the gap. Early college high schools, by virtue of their unique structures as dual enrollment programs, serve as exemplars of successful p-16 models.

**P-16 and Dual Enrollment**

Dual enrollment, in which high school students earn college credit, offers a logical starting place for streamlining the transition from high school to college. Traditional dual enrollment allows students to spend a portion of their school day at their local high schools, but take college classes at the college itself. Other options for earning college credit include International Baccalaureate (IB) programs, Advanced Placement (AP) courses and tests, and direct college credit (or concurrent enrollment)—all of which generally provide the chance to earn college credit in the high school building. Career and technical education (CTE) programs
can result in college credit in specific career and technical courses through articulation agreements with local colleges (Michigan Department of Education [MDE], n.d.).

Dual enrollment has been found to have a positive impact in terms of college readiness, enrollment, and even persistence to degree. Struhl and Vargas (2012) examined college completion based on general dual enrollment data in Texas. Their quasi-experimental study controlled for race, socioeconomic status, first-generation college status, and math test scores. The study found that 54.2% of students who took part in dual enrollment completed a post-secondary degree within 6 years of high school graduation, as compared with 36.9% of non-dual enrolled students (p. 11). Adelman (2006) identified another benefit of dual enrollment in The Toolbox, Revisited, finding that earning 20 college credits within the first year of college seems to be a threshold for continued persistence to degree. He recommend expanding dual enrollment to provide a minimum of six “true” college credits while in high school: “…six is good, 9 is better, and 12 is a guarantee of momentum” (p. xx).

A 2007 study by researchers from the National Center for Career and Technical Education (Karp, Calcagno, Hughes, Jeong, & Bailey) examined the effect of dual enrollment on several short- and long-term student post-secondary outcomes. They compared rates of high school graduation, enrollment in college, and persistence into the second year of college for students in Florida and in a CTE program in New York. Both dual enrollment programs were provided at no cost to students. The researchers found that participation in dual enrollment increased the likelihood of several positive student outcomes related to post-secondary participation: dual enrolled students were more likely to graduate from high school, enroll in college—specifically, enroll full-time in 4-year institutions, and to remain in college after two years. In addition, the study found that former dual-enrollees had higher college GPAs and had
earned more college credits after three years than non-dual-enrollees (p. 5). The researchers were also able to study the impact of these effects on subgroups in their Florida data, finding that, “in many cases, male and low-income students benefited more from dual enrollment than their peers” (p.7).

Despite its potential benefits, participation in dual enrollment has not been widespread. Gracia-Wing (2015, May) reported that only 11% of Michigan’s students have taken advantage of the various types of dual enrollment opportunities in the state, even though legislation dating back to 1996 has attempted to encourage the practice. Nationally, traditional dual enrollment has appealed to a relatively small number of students, most of whom are very likely to be college-bound regardless of the dual enrollment opportunity. Referring to most dual enrollment opportunities across the nation, Barnett and Stamm (2010) pointed out that “the preponderance of state policies are designed to provide advanced educational programs for high-achieving students” (p. 6).

While dual enrollment offers many benefits to students, traditional dual enrollment programs have not typically provided tuition-free college courses. In its 2015 “50-State Comparison” of dual enrollment policies with respect to funding, the Education Commission of the States (ECS) reported only 8 states with policies requiring the state or school district to pay the tuition for dual enrollment credit. Fourteen states leave the funding mechanism up to local entities, with 11 offering multiple funding models. Students and parents are required to pay for the dual enrollment credit in 9 states, with the remainder of states reporting shared responsibility for these costs between families and the state or local governments. Michigan technically falls into the “shared responsibility” category, with dual enrollment credit paid for by the school district under certain conditions set forth in district policy, and families responsible for certain
costs (for example, if a student fails to earn credit in the college course, the family must reimburse the district). When the financial burden for dual enrollment falls on the student and family, the extent to which the benefits are accessible are significantly limited (ECS, 2015).

Enter early college high schools—a supported dual enrollment model that specifically seeks to facilitate college access and success for a wide range of high school students, including (and often especially) those underrepresented in higher education. Despite the differing implementation designs of the hundreds of early colleges across the country, these programs and schools tend to adhere to a basic set of principles (ECHSI, 2013; Webb & Gerwin, 2014). They provide a good deal more than simply the chance to take college classes while still in high school. They infuse high academic rigor into their high school coursework, specifically teach “college ready” behaviors, place high value on student-staff relationships that sustain and empower student achievement, and deliberately create a culture that supports and respects all members of the learning community. In addition, the collaboration between the high school program and its partner college or university is cultivated to ensure that outcomes are aligned, communication is open, and the pathway to college is readily accessible (ECHSI, 2013). In the context of this thoughtful, cooperative venture, early/middle college students can find great success (Born, 2006).

Early College High Schools—Bridging the Gap

The theoretical framework underlying this study rests firmly within the scope of the p-16 educational system, directly superimposed on the “grades 9-14” section of the p-16 continuum. As depicted in Figure 3, this framework proposes that early college high schools influence both college access and college readiness, leading to increased college persistence toward degree completion.
Because of their location on college campuses, early college high schools alleviate many barriers at the “access” level; students become familiar with the campus and its culture, and they learn how to plan a course of study, choose courses, and research program offerings. Financial barriers to college are minimized with the provision of up to 60 college credits, including textbooks. Perhaps most critically, early college high school students not only hold high aspirations for their further college involvement, but they express a high degree of self-efficacy with respect to their ability to reach those high goals. This is not surprising; early college students feel confident that they can succeed in college because they have already done so. An analysis of the 2012-2013 performance of students in twelve Michigan early/middle college high schools found that the 512 12th grade students in the study had earned an average of 40 credits by the end of their senior year—with grades of C or higher in 88% of those classes (Barnett & Kim, 2015).

Early college high schools directly address college readiness at many levels, as well. On the academic front, there are several ways in which early college high schools must ensure that their high school courses are aligned with the standards of their college partners. First, many
colleges and universities require “college level” scores on academic placement tests. ACT’s COMPASS tests and the College Board’s Accuplacer tests are common among Michigan’s colleges (Barnett & Kim, 2015). The teachers in early college high schools are charged with ensuring that students who do not initially place at college level on the required tests are provided with high-quality, rigorous classroom experiences that will enable them to build academic skills.

Once students move into college courses, early college high school teachers receive external validation of their practice; if teachers have not prepared students effectively for college in this setting, then students will not be able to pass the college course in that content area (D. Dugger, personal communication, 2015). Conley (2005) said of early college high schools: “These schools can…teach regular high schools important lessons about how to articulate the curriculum so that the high school and college experiences become more continuous and the transition from high school to college is less abrupt” (p. 62).

Non-academic college readiness skills, or soft skills, are explicitly taught in the early college high school model. Students are not left to figure out how to navigate the world of the community college or university; they are provided with specific instruction that prepares them to communicate effectively with instructors and older classmates, develop organizational and time management strategies, hone their note-taking, studying, and test-taking skills, demonstrate a high degree of maturity and responsibility, and advocate for themselves so that they can get the help they need to be successful. In Michigan, regulatory support for including soft skills instruction in early college curricula can be found directly on the application for an Early/Middle College designation. Applicants must provide a description of the “…‘college readiness’
curriculum that addresses academic preparation and alignment, study skills development and social maturity skills necessary for college success” (Michigan Department of Education, 2015).

Taken together, the unique elements of the early college high school model that promote college access and teach authentic college readiness have great potential to influence college persistence, and eventual degree attainment. By minimizing the factors that place students at risk of college departure, and by enhancing the factors that lead to persistence, early college high school programs are emerging p-16 models that may offer promising insights into improving Bachelor’s Degree attainment rates.

**Early College High School Exemplars**

While early college high schools are not new features on the educational reform landscape, neither have they been widely adopted. Recent years, however, have seen a marked increase in both the attention paid to these and other supported dual enrollment opportunities by policy makers, and the subsequent expansion of the model both nationally and within Michigan. This expansion has been accompanied by a significant increase in the research specifically focused on early college high schools. This section of the literature review highlights studies that are instructive in terms of research design, content, or both.

Muñoz, Fischetti, and Prather (2014) used a rigorous, quasi-experimental study to explore the impact of an early college “redesign” on academic performance in a high-poverty, high-minority urban setting in Kentucky. Using the early college as the treatment group and two traditional high schools as the control groups, the researchers created comparisons by matching variables at both the school and student level (p. 40). They found that, controlling for confounding variables such as race, gender, free/reduced lunch participation, and prior test scores, students in the early college experienced greater first-year success as measured by
standardized achievement tests—with students who were actually taking college courses demonstrating the most gains (p. 49-50). While their study was limited by the newness of the program (measuring first-year student success in the first year of the redesigned program), it pointed to the promising nature of an early college program that was beginning to operationalize the design features of the Early College High School Initiative (2013) and Conley’s college readiness model (2007). The specific focus on a school serving underrepresented students added to the potential strength of this model to make a difference in closing educational attainment gaps.

The focus on the impact of an early college education on outcomes for underrepresented students was taken up in Bramucci’s 2014 dissertation. His study took advantage of the North Carolina’s statewide support for early college high schools and its publicly-available data systems to compare five early college program outcomes with a local traditional high school and overall statewide data. He examined academic performance, graduation rates, attendance records, and suspensions. Bramucci’s study was largely descriptive; he recorded much more favorable outcomes for all of the early college high schools compared with the traditional school and the state as a whole, but these data were not directly comparable due to lack of a control for any of the confounding variables.

Bramucci, however, found an interesting pattern in his analysis of the achievement gap pattern over four years. He collected statewide assessment test scores from the cohort of students starting with the 2008-2009 school year. The early college group presented with achievement gaps on these tests on the basis of race, gender, and SES—similar to discrepancies found in the traditional school and in the state at large (2014, pp. 88-89). Over the course of four years, the gap narrowed among all groups—but in all of the early college high schools, it nearly
disappeared (p. 89). This study spoke to the potential capacity for early colleges—with their high expectations and strong incentives for student performance—to narrow achievement gaps that persist among underrepresented students even into the post-secondary setting.

Shifting from the early college’s impact on high school outcomes to its effects in the college setting, a 2014 study by the American Institutes for Research examined post-secondary degree completion rates of students from ten early college high schools in California. This randomized study took advantage of a lottery system of enrollment in which many more students applied and were qualified for admission to the early college than actually were accepted and enrolled. In this study, Berger, Turk-Bicakci, Garet, Knudson, and Hoshen (2014) compared the students who graduated from the early college with those who applied but did not “win” the lottery. The researchers found that early college students enrolled in an institute of higher education at higher rates (p. 10) and completed post-secondary degrees at higher rates than the non-early college students (p. 14). Significantly, the researchers found that “…among minority students, Early College students were nearly 10 times more likely to obtain a college degree than comparison students (29.4 percent vs. 3.0 percent)” (p. 15). The impact of early college on the degree-attainment of low-income students was similarly pronounced, with low-income early college students 8.5 times more likely to have earned a degree than non-early college students (p. 15).

One of the profound strengths of the early college model is the extent to which the programs facilitate the holistic development of students. Nakkula and Foster (2007) studied the “psychological alignment” (p. 151) that they observed among students in two separate Early College High School Initiative (ECHSI) schools. The authors noted how the early college models
facilitated the “educational identity development” (p. 154) of high school students, enabling them to see themselves as college-capable by virtue of actually succeeding in college:

A psychological orientation toward college success, rooted in firsthand experiences of such success, is likely to be more realistic, more hardy, than one exclusively rooted in imagining what college will be like, based on reading about it or talking with others who have attended (p. 155).

Nakkula and Foster also drew in lessons learned in the higher education world about college identity formation, particularly for underrepresented students. Students of color in the early colleges in their study demonstrated positive academic self-concepts; they viewed academic success as part of their “expected selves” because this expectation had been “...grounded in the reality of experienced college success” (p. 157).

Summary

The p-16 educational system provides a lens that focuses attention simultaneously on the k-12 and higher education worlds in an effort to smooth the transition into college and beyond. This framework has contributed to a great deal of interest on the part of educators and policy makers alike in the expansion of specific types of dual enrollment opportunities for high school students. The early college high school model is emerging to take its place as one such promising opportunity, with existing studies documenting positive outcomes in terms of high school graduation, student engagement, college enrollment and credit-earning, and some initial good news in terms of two-year degree attainment. Particularly important is the early college model’s capacity to improve outcomes for underrepresented students. The present study will add depth and detail on this topic by analyzing four-year degree attainment for a group of early college graduates.
CHAPTER III

Research Design and Methodology

The early college model provides high school students with a strong foundation for post-secondary success. Although program designs vary, most early colleges carefully teach critical college-going skills and behaviors in the areas of college access and college readiness. This specific focus on both direct teaching and the practical application of learned skills in the actual college setting leads this researcher to question the post-secondary outcomes of graduates of a specific early college high school model in Washtenaw County: the Early College Alliance at Eastern Michigan University.

Research Design

Creswell (2009) identified three major components involved in a research design: philosophical worldviews or paradigms, strategies of inquiry, and research methods (p. 5). This section begins with an analysis of the first and third elements in Creswell’s framework—the choice of both worldview and research design. It ends with a discussion of the second component—“strategies of inquiry.”

In determining the research design for conducting this study, the researcher began by identifying a “pragmatic” worldview, where the emphasis is on choosing the techniques that lead to workable solutions to real-world problems (Creswell, p. 11). While Creswell suggested that researchers operating from a pragmatic worldview would utilize a mixed methods research design, this investigator chose to examine only quantitative data for the current project. The rationale behind this choice began with the research questions; these, in turn, stemmed from the lack of current research on the specific topic of Bachelor’s Degree attainment rates for early college graduates. Because the three research questions involved “examining the relationship
among variables” (Creswell, p. 4), the choice to use quantitative analyses was made. While the researcher certainly sees value in taking this work a step further and exploring the participants’ perspectives in the early college setting and uncovering what meaning their experiences hold for them, evaluating the effectiveness of the program in terms of college degree completion rates is an important first step. The focus on this discrete outcome also serves a pragmatic purpose: to contribute solid research to the body of knowledge about early colleges—which in turn, it is hoped, will lead to increased support for these programs locally and beyond.

Strategies of inquiry, as described by Creswell (2009), are “types of…designs or models that provide specific direction for procedures in a research design” (p. 11). Further insight into the classification of this research proposal’s nonexperimental “strategy of inquiry” was taken from Johnson’s (2001) article, “Toward a New Classification of Nonexperimental Quantitative Research.” Johnson argued that nonexperimental quantitative research could be most clearly classified on the basis of “major research objective” (p. 8) and the “time dimension” (p. 9) involved in the data collection. Descriptive, predictive, and explanatory nonexperimental research designs comprise the “research objective” axis of Johnson’s typology; retrospective, cross-sectional, and longitudinal types of data collection make up the “time dimension” axis (p. 10).

According to Johnson’s (2001) useful typology, the current study is classified as a cross-sectional, explanatory study. Cross-sectional studies collect data specific to each case within a short time frame and compare them “across the variables of interest” (p. 9). Explanatory studies attempt to “test an explanatory model” (p. 9) or examine the effect of a treatment. This study will utilize non-identifying student-level (cross-sectional) data to help explain the impact of student involvement in the Early College Alliance program.
**Research Questions**

Given the demonstrated strength of the early college model to positively influence high school graduation and post-secondary admissions rates among participants, this study was conceived in an attempt to document the extent to which completing high school via the Early College Alliance program, in particular, correlates with the attainment of a Bachelor’s Degree.

This study centered around three research questions:

1. What is the rate of Bachelor’s Degree attainment of Early College Alliance students who graduated from high school in 2010 and 2011?
   a. What is the average “time-to-degree” for ECA graduates who completed Bachelor’s Degrees prior to December, 2015?
   b. What are the differences in the rates of post-secondary degree attainment of ECA graduates based on race and gender?

2. How do the rates of Bachelor’s Degree attainment of ECA graduates who remained at Eastern Michigan University compare with the overall degree-attainment rates of non-ECA Washtenaw County graduates who enrolled at EMU?

3. What are the differences in the rates of post-secondary degree attainment of ECA graduates who remained at Eastern Michigan University as compared with non-ECA graduates at Eastern Michigan University?

**Methodology**

This study employed a nonexperimental, cross-sectional explanatory design. Question 1 was largely answered by descriptive measures; however, the researcher used inferential statistical procedures to compare subgroups within the set of ECA graduates. Questions 2 and 3 made use of inferential statistical procedures to compare groups (Washtenaw County graduates at Eastern...
Michigan University, and the broader group of all EMU students, respectively) based on exposure to a naturally-occurring “treatment”—the supported dual enrollment offered by the Early College Alliance program.

**Population.** The researcher studied two distinct groups using two different data sets. First, ECA graduates from the classes of 2010 and 2011, whose high school graduation spanned the months of April, 2010 through December, 2012, made up the group of ECA students whose members could include Bachelor’s Degree recipients for the purposes of this study. This larger group of ECA students \( (n=97) \) comprised the unit of analysis for Question 1. Members of the class of 2011 who entered college in the fall following graduation had 4 years to work toward degree completion; those from the class of 2010 had 5 years. To answer Questions 2 and 3, the focus shifted to “first time in any college” (FTIAC) students with beginning enrollment terms of fall, 2010 through winter, 2012. Question 2 specifically compared the FTIACs at EMU who came from Washtenaw County with FTIACs at EMU who had been Early College Alliance students, while Question 3 compared the entire group of FTIACs at EMU with those from the ECA.

**Data Sources.** After obtaining Human Subjects approval for this study, the researcher collected student-level data from two major sources. Data Set #1 was compiled from internal school records from the Early College Alliance program. Data Set #2 was collected via a formal data request to Eastern Michigan University’s Institutional Research and Information Management (IRIM) Department. The request asked for non-identifying student-level data that included the following demographic characteristics: race, gender, Pell-Grant eligibility, school district, high school of origin, high school GPA, SAT and/or ACT scores, year of high school graduation, college credit earned in high school, and post-secondary degree earned. Other
variables included in Data Set #2 (but not used in the analyses) were admission code, first-term EMU GPA, first year EMU GPA, and number of credits earned in the first year.

The researcher’s data request to Eastern Michigan University’s department of Institutional Research and Information Management (IRIM) began with IRB approval from the University Human Subjects Review Committee. The request was entered via an online request form. Data received from both sources were stored on a PC with secure password protections. Following the study, the data files will be deleted permanently.

The answers to Question 1 served to describe Bachelor’s Degree completion rates from the very first groups of students who completed high school through the Early College Alliance program. First, Data Set #1 was prepared utilizing internal degree completion data from the ECA program itself. The ECA data were compiled using information from Eastern Michigan University and the National Student Clearinghouse (NSC). Because they came from actual school data files, these data were not anonymous. A letter granting permission to use these data was provided by the Executive Director of the Washtenaw Educational Options Consortium. Neither the EMU nor NSC data files were complete; therefore, the ability to use both files with student-level information helped to create a more accurate picture of the total number of ECA degree-completers. Both the percentage of ECA graduates from the classes of 2010 and 2011 and their average time-to-degree were calculated. These statistics were disaggregated by race, gender, and graduation cohort.

Questions 1b, 2, and 3 were answered using multiple logistic regression analyses based on the two sets of data. Question 1 utilized Data Set #1, the school-based data set described above. Questions 2 and 3 utilized Data Set #2, the anonymous data file requested through EMU’s Institutional Research and Information Management department.
Data Analysis. This study employed both descriptive and inferential analyses of both sets of data. Descriptive analyses identified the demographic and academic characteristics of the groups of interest. Inferential analyses were utilized to explore the relationships between and within these groups. Chi-square analyses and independent $t$–tests were both used to detect statistical significance in the observed differences between subgroups. The major variable of interest in this study was Bachelor’s Degree completion, a dichotomous dependent variable with only two possible values: degree earned (yes) or degree not earned (no). Logistic regression tests were conducted to predict whether or not students earned their Bachelor’s Degrees, and which of the predictor (independent) variables increased the likelihood of degree completion. Table 2 presents an overview of the variables, including descriptions, type of variable, and the questions in which each was used throughout the analysis.
Table 2. Description of variables in the study.

<table>
<thead>
<tr>
<th>*Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Variables</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Gender</td>
<td>Categorical IV, dummy-coded</td>
<td>1 = Female</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Race, Black</td>
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<td>Race, White</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Race, “Other”</td>
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<td>1 = Pell-Eligible (low-income)</td>
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<td></td>
<td></td>
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<td>First-Generation</td>
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<td>1 = First-Generation</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>Graduation Cohort</td>
<td>Categorical IV</td>
<td>2010</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2011</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Incoming GPA</td>
<td>Continuous IV</td>
<td>HS GPA prior to entering ECA</td>
</tr>
<tr>
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<td></td>
<td></td>
<td>HS GPA</td>
<td>Continuous IV</td>
<td>HS GPA upon enrollment at EMU</td>
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<td></td>
<td></td>
<td>ACT Composite</td>
<td>Continuous IV</td>
<td></td>
</tr>
<tr>
<td>x</td>
<td></td>
<td></td>
<td>College, post-ECA</td>
<td>Categorical IV, dummy-coded</td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = Not EMU</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Beginning Coll. Credit</td>
<td>Continuous IV</td>
<td>Number of dual-enrollment college credits while in HS</td>
</tr>
<tr>
<td>x</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = Not Wash. County</td>
</tr>
<tr>
<td>x</td>
<td></td>
<td></td>
<td>ECA</td>
<td>Categorical IV, dummy-coded</td>
<td>1 = ECA graduate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = Not ECA graduate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Time-to-Degree</td>
<td>Continuous DV</td>
<td>Number of years + semesters from FTIAC term to GRAD term</td>
</tr>
<tr>
<td>x</td>
<td></td>
<td></td>
<td>Degree Earned</td>
<td>Categorical DV, dummy-coded</td>
<td>1 = BA/BS degree earned</td>
</tr>
<tr>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0 = No record of degree earned OR 2-year degree earned</td>
</tr>
</tbody>
</table>

Notes: *Q1 (shaded in light grey) utilizes a different data set (Data Set #1) than do Q2 and Q3 (Data Set #2). The dependent variables are shaded in dark grey, at the bottom.

Logistic regression is a method used to explore the relationship between one or more predictor (or independent) variables and an outcome (or dependent) variable when the outcome variable is dichotomous (Hosmer, Lemeshow, & Sturdivant, 2013). Logistic regression is similar to linear regression in some ways; logistic regression predicts the likelihood of an outcome, however, as opposed to predicting a specific value of the dependent variable. When a dependent variable has only two possible outcomes, the outcome data always fall into only one of the two possibilities, making a “line of best fit” model impossible for prediction. Logistic regression
applies a “logit transformation to the dependent variable…to make the relationship between [the] categorical outcome variable and its predictor(s) linear” (Peng, Lee, & Ingersoll, 2002).

Four main assumptions must be verified in a logistic regression analysis. The first assumption is that the cases within the sample are independent of one another, and that the categories are mutually exclusive and exhaustive, containing no overlapping or missing information. The second assumption is the absence of multicollinearity among the independent variables. A lack of influential outliers is the third assumption. The last assumption is that all continuous variables are linearly related to the logit of the dependent variable. This requires that the logarithmic transformation of the continuous variable and its interaction with the original continuous variable are placed back into the logistic regression to measure its relationship (Laerd Statistics, n.d.).

In order to perform a multiple logistic regression, a statistical model through which to test the data must be developed. Various methods of building such models exist; the researcher relied heavily on the seven steps presented by Hosmer, Lemeshow, & Sturdivant (2013). First, all of the independent variables of possible interest were analyzed individually to determine and/or verify the rationale for their inclusion in the logistic regression. Chi-squares were used to analyze the categorical variables in this study, and independent t–tests were used in the case of the continuous variables. Hosmer, et al. (2013) recommended including variables with p–values of .25 or less at this stage of model-building (p. 91).

Steps 2 and 3 in building the logistic regression model involved an iterative process of testing the results of the logistic regression with various combinations of independent variables. This stage began with testing the full model, in which all of the independent variables identified as important in Step 1 were included in the logistic regression. Variables that did not contribute
to the analysis “…at traditional levels of significance” were eliminated in Step 2 (Hosmer, Lemeshow, & Sturdivant, 2013, p. 92). The coefficients of the independent variables in this smaller, reduced model were compared to those in the full model. Changes greater than 20% indicated that the dropped variables were contributing, and should be added back into the model (p. 92). These two steps made up a cycle of taking away variables, testing and comparing, adding variables back in, and re-testing and comparing until the reduced model was as efficient as possible.

In Step 4, Hosmer, et al. (2013) recommended returning to the independent variables not selected in Step 1 and adding them back in to the reduced model. This “double-check” step ensured that the discarded variables truly did not contribute. Adjustments were made based on these further tests, resulting in the preliminary main effects model (p. 92). At Step 5, the variables were examined for violating the important assumptions explained above. Further revisions of the model that were necessary based on this close scrutiny of the variables were made, providing the main effects model (p. 92).

Step 6 required the researcher to check for interactions among the “main effect variables” (Hosmer, et al., 2013, p. 92). This was accomplished by multiplying each independent variable with each of the other independent variables. Each interaction variable was then added to the main effects model, one at a time, to check for their statistical significance within the model. This part of the process resulted in the preliminary final model.

Hosmer, et al. (2013) explained Step 7—getting to the final model—as all of the diagnostic processes that must be used to assess the strength and accuracy of the logistic regression model (p.93). Peng, Lee, and Ingersoll (2002) grouped the components of this assessment process into four categories: the overall model evaluation, the goodness-of-fit
analysis, the statistical tests of the independent variables, and the validation of the predicted probabilities (p. 5). The overall evaluation of the model used in this analysis was the “Omnibus Tests of Model Coefficients” in SPSS, which provides a chi-square figure and significance level for the full model. The “Model Summary” output in SPSS includes a column for the “-2 Log Likelihood,” which was used to compare the various iterations of the reduced models under consideration.

To evaluate goodness-of-fit, the researcher made use of two components of the SPSS outputs. The “Hosmer-Lemeshow Test” provides a chi-square figure testing the null hypothesis that the logistic regression model is a good fit; any statistically significant finding in this test indicates that the model is NOT a good fit. The second goodness-of-fit analysis used the two pseudo-$R^2$ indices reported in the “Model Summary” output in SPSS: Cox & Schnell and Nagelkerke. Various versions of the pseudo-$R^2$ statistic have been developed to approximate the $R^2$ measure in linear regression; the pseudo-$R^2$ provides a measure somewhat analogous to that of explained variation, but the statistic should be interpreted with caution (Peng, Lee, & Ingersoll, 2002). Laerd Statistics (n.d.) recommended utilizing both pseudo-$R^2$ figures as a range, and pointed out that they will have lower values than an $R^2$ in linear regression. The researcher used these ranges to compare among reduced models.

The independent variables in the logistic regressions in this study were tested using the Wald statistic. The SPSS output presents the Wald chi-square statistic, the regression coefficient ($\beta$) and its significance level, and the exponentiation of these coefficients, Exp($\beta$). The beta provides the log-odds of predicting the dependent variable for each independent variable. The exponentiation of the beta coefficient converts the log-odds to the more easily-interpretable odds ratio for each independent variable. Menard (1995) explained that “the odds ratio is the number
by which we would multiply the odds of [falling into the positive category of the dependent variable] for each one-unit increase in the independent variable” (p. 49). Close examination of the odds ratios for each independent variable allowed the researcher to detect the relative strength of each of them in terms of predicting degree completion.

The last element in the analysis of the strength and accuracy of the logistic regression model is the validation of predicted probabilities. The “Classification Table” in SPSS yields five different measures that help to validate the model: the overall percentage correct (also referred to as the percentage accuracy in classification), sensitivity, specificity, positive predictive value, and negative predictive value (Laerd Statistics, n.d.). The percentage accuracy in classification refers to the overall strength of the model in terms of predicting outcomes. This figure is generated for the null model as well as for the full model; the researcher compared the two percentages in each regression to determine whether a change in overall predictive value was evident.

Sensitivity, specificity, positive predictive value, and negative predictive value must be calculated from the numbers populating the “middle” cells of the SPSS Classification Table. Peng, Lee, and Ingersoll (2002) defined sensitivity as “the proportion of correctly classified events,” and specificity as “the proportion of correctly classified nonevents” (p. 8). Positive predictive value is the percentage of correctly predicted cases with the positive category of the dependent variable compared to the total number of cases predicted with the positive category of the dependent variable. Negative predictive value is the percentage of correctly predicted cases with the negative category of the dependent variable compared to the total number of cases predicted with the negative category of the dependent variable (Laerd Statistics, n.d.).
After evaluating the strength and accuracy of the logistic regression model, the logistic regression equation was developed. The equation includes the constant factor, which demonstrates the strength and direction of degree completion odds without any predictor variables included. The coefficients of all of the statistically significant predictor variables are added to the equation.

**Limitations**

There are several factors that will limit the ability of readers to generalize the findings of this study. First, focusing on a small subset of students prevents generalization of the results to other student populations. Follow-up studies will need to be conducted to determine whether outcomes for this particular group of graduates are reflective of a larger pattern that may be generalized. The results from this study, however, are applicable only to these students.

Next, the data sets contain limitations in terms of the accuracy of the college-going data, especially for the subset of graduates that includes early college students. There are missing records from both the National Student Clearinghouse and from EMU—though much less from the latter. Sometimes, a graduate appears on one list, but is missing from the other, and vice versa. It is clear that there are problems in the systems that track early college students, especially after leaving high school.

There is a further limitation in terms of the amount of disaggregation that may be possible, given the data sets. Income level and ACT scores are not reported in Data Set #1. Much more comprehensive student-level data are available in Data Set #2, but several of the ECA student records in Data Set #1 do not appear in Data Set #2, making the \( n \) of ECA students in Data Set #2 even smaller. Certain race/ethnicity categories contain a very small number of
students, especially for the ECA subset of the population. For these reasons, the race/ethnicity categories that are used by this study are limited to Black/African American, White, and Other.

Threats to internal validity in this research design present another limitation. These largely center on selection bias, in which the treatment group members have either been selected according to certain criteria or have self-selected into the treatment; in both cases, the group membership may not be representative in certain respects to the population at large (Campbell and Stanley, 1963; Krathwohl, 2009; Brooks, Chavez, Tritz, & Teasley, 2015). Students who chose to attend the ECA self-selected into the program, choosing an educational experience in high school that is quite different from the traditional path. This suggests either that they were looking for an alternative to the traditional school, that they were focused on attending college, or both.

The researcher assumed that, for the majority of early college students, one or both of these self-selection rationales was true. While non-early college students may also desire an alternative educational experience and/or aspire to college completion, students who actually go through the lengthy process of enrolling in an early college program have already taken proactive steps in this direction. That is, they have already followed through on what can easily be considered the first step of earning their college degree.

**Delimitations**

This scope of this study will be delimited in four major ways. First, the program of interest—the “treatment” in this study—is delimited to only one early college program, the Early College Alliance. Second, the study is delimited to the post-secondary institutional partner on whose campus the Early College Alliance operates: Eastern Michigan University. Third, the EMU students in this sample are delimited to those enrolling as “First Time in Any College”
(FTIAC) students from the fall term of 2010 through the winter term of 2012. Fourth, the subgroup of Washtenaw County students included in the analysis only included those within Data Set #2 (the EMU data set) who graduated from one of Washtenaw County’s public high schools. Private school and charter school enrollees were not included in the analysis of Question 2.

Since only FTIAC records were requested from EMU’s IRIM, the data do not include the entire population of ECA graduates at EMU. Data Set #2 is missing 14 student records, most likely because ECA students who graduated in 2010 or 2011 are missing from the data set if they returned to EMU as transfer students after having started college independently at a different institution. Delimiting the records to only include FTIACs certainly leaves out some early college students, but including the records of transfer students would have introduced other confounding variables.

**Strengths of the Study**

This study, while constrained in several ways, has three major strengths. The first relates to the major dependent variable in the study. The second strength involves the two data sets that were utilized in the analyses. The third strength refers to the overall coherence, organization, and logic of the design.

Because many early colleges partner with community colleges, both in Michigan and nationwide, previous studies of post-secondary outcomes of early college graduates have focused mainly on Associate’s Degree completion rates. Studies by Berger, Turk-Bicakci, Garet, Knudson, and Hoshen (2014) and Struhl and Vargas (2012) measured increased degree-completion rates of early college students and dual enrollees, respectively, finding that participation in such programs had positive effects on 2-year degree attainment, primarily. The
present study is unique in that only Bachelor’s Degree attainment was measured—an important factor, given the ECA program’s location on the campus of a 4-year university.

Second, two data sets provided the researcher with both an internal review of the total number of ECA students with the 2010 and 2011 cohorts, and an external review that permitted comparisons among a much larger unit of analysis. Even though the numbers of ECA students in Data Set #1 and Data Set #2 are different, the proportions of students in each demographic subgroup are nearly identical in each data set, as are the resulting degree-completion data. This provides confidence with respect to the relative accuracy of the data.

The final strength of the study is the solid research design used to describe, compare, and analyze college completion data for the groups and subgroups within this study. The researcher systematically examined demographics, academics, and degree completion for each question. Descriptive analyses provided a starting point for the inferential tests that analyzed comparisons between and across subgroups. Logistic regression models tested the impact of variables that emerged as important in the comparison step on degree completion rates. The design is one that may be replicated as future cohorts of ECA students graduate, and expanded to take into account a much larger unit of analysis in the future.
CHAPTER IV

Presentation and Analysis of Data

The purpose of this study was to explore the rates of Bachelor’s Degree completion for groups of early college high school graduates in Washtenaw County. Early college high school students finish high school with up to 60 college credits successfully completed. The researcher theorized that the enhanced college access that such programs provide, combined with the specialized teaching of college readiness skills that typically define the pedagogical focus of early college high schools, may lead to an increase in college persistence and, ultimately, completion of a college degree. While the proliferation of early college high school programs around the nation has led to promising research in terms of high school outcomes, college enrollment, and student and faculty satisfaction, the current research project adds to the field of knowledge by virtue of its focus on Bachelor’s Degree completion outcomes.

The three research questions answered in the analysis utilized two different data sets. The first question examined Data Set #1: school-level degree completion data for the Early College Alliance (ECA) program. The second and third questions made use of Data Set #2: enrollment and graduation information from Eastern Michigan University’s incoming students in 2010 and 2011, obtained by EMU’s Institutional Research and Information Management Department. The various types of data were analyzed to develop answers to the following research questions:

1. What is the rate of Bachelor’s Degree attainment of Early College Alliance students who graduated from high school in 2010 and 2011?
   a. What is the average “time-to-degree” for ECA graduates who completed Bachelor’s Degrees prior to December, 2015?
b. What are the differences in the rates of post-secondary degree attainment of ECA graduates based on race and gender?

2. How do the rates of Bachelor’s Degree attainment of ECA graduates who remained at Eastern Michigan University compare with the overall degree-attainment rates of non-ECA Washtenaw County graduates who enrolled at EMU?

3. What are the differences in the rates of post-secondary degree attainment of ECA graduates who remained at Eastern Michigan University as compared with non-ECA graduates at Eastern Michigan University?

The researcher began with school-level records to identify the actual number of students who comprised the group of 2010 and 2011 graduates. This was a helpful starting place for ECA-specific information. It listed all of the ECA completers from those cohorts, and included degree completion data from both EMU and non-EMU post-secondary institutions. National Student Clearinghouse (NSC) data files made available to the school for the purposes of post-secondary tracking supplied information about which ECA students completed Bachelor’s Degrees. A separate EMU data file of the outcomes of ECA students who continued their post-secondary education at EMU identified additional college graduates. Despite problems in the tracking of ECA and other early college students, use of both data sets enabled the researcher to gather necessary information on all students in the study.

The second and third research questions broadened the study to include comparisons of Early College Alliance students with non-early college graduates. Anonymous data were requested and received from Eastern Michigan University’s Institutional Research and Information Management department. The records in this data set included “First Time in Any College” (FTIAC) students who enrolled at EMU between fall, 2010 and winter, 2012 semesters.
Both county-of-residence and prior high school fields permitted a closer look at the Washtenaw County students from the ECA’s public high school partners for Question 2. The entire data set was used for the all-EMU analysis in Question 3.

**Question 1: Degree Completion Rates of Early College Alliance Students**

In question 1, the researcher examined school-level data to determine the most complete picture of the post-secondary degree completion outcomes of the classes of 2010 and 2011. The data set provided by the Early College Alliance included some demographic and academic information about the program’s graduates, and yielded the most comprehensive Bachelor’s Degree completion statistics for the two cohorts of high school graduates under consideration in this study, the classes of 2010 and 2011 (N=97). Demographic information included race and gender. Academic information included a figure for prior high school GPA for most of the students.

The Bachelor’s Degree completion statistics for these data are comprehensive in that the researcher was able to construct an accurate listing of which students earned their degrees by combining personal information from the program’s EMU and National Student Clearinghouse data. Accuracy and completeness of the information could be verified because it included student names.

**Demographic characteristics of ECA sample.** The graduating classes of 2010 (n =46) and 2011(n =51) were among the first groups of students to complete high school through the Early College Alliance program. The two groups shared many demographic characteristics, which are reported here as the aggregate of both classes and summarized in Figure 4. A larger percentage of this group of students was female (58%). In terms of race/ethnicity, the majority of the group was White (69%), with 25% Black or African-American. Race/ethnicity categories of
“Native American,” “Asian,” “Hispanic,” and “Two or More” were combined, as only a total of 6% of the group fell into any of these categories.

A large proportion (63%) of the ECA’s graduates continued their post-secondary education as independent students at Eastern Michigan University (see Figure 4). The gender profile of both groups was largely identical, with a majority of the students being female. Of the students who remained at EMU, a somewhat higher percentage were Black (30%), and a slightly lower percentage were White (64%). Of the 36 students in this sample who did not continue at EMU, only 21 records of attendance at a different post-secondary institution could be confirmed. Of those who attended a different post-secondary institution, a much larger majority were White (88%), and only 10% Black. Gender differences in this group were minimal. The 15 students whose post-ECA enrollment could not be verified mirrored the racial makeup of the group at large, but two-thirds of these were female. Figure 4 depicts the demographic characteristics of the total group of ECA graduates, those who continued at EMU, those who attended a different college or university, and those whose post-ECA enrollment status was unknown.

![Figure 4: A comparison of demographic characteristics of the Early College Alliance students (classes of 2010 and 2011) in total and those who attended EMU following graduation.](image-url)
**Academic comparison of ECA subgroups.** Grade point average figures were determined for the total group of ECA graduates, as well. Although “high school GPA” upon graduation was not a data element collected by the ECA program for a variety of reasons, the GPA of students entering the ECA program was collected for the majority of the group (N = 76) and serves as a proxy for “HS GPA” data here: the mean incoming GPA of the ECA students included in this aspect of the study was 3.37 (SD=.52). Independent t –tests were conducted to determine whether differences between subgroups in terms of incoming GPAs were statistically significant. The results, presented in Table 3, indicated differences on the basis of race that almost reached a statistical level of significance at the p < .05 level. Black students’ mean GPA was lower than White students’ mean GPA by .28 points, t(74) = -1.913, p = .053.

Table 3: Independent T-tests Results Comparing Incoming GPA by Race and Gender.

<table>
<thead>
<tr>
<th></th>
<th>Levene’s Test for Equality of Variances (Sig.)</th>
<th>M1/M2</th>
<th>SD1/SD2</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>Std. Error Difference</th>
<th>95% Confidence Interval of the Difference</th>
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</thead>
<tbody>
<tr>
<td>Gender(F)</td>
<td>.939</td>
<td>3.42/3.31</td>
<td>.53/.50</td>
<td>.905</td>
<td>74</td>
<td>.368</td>
<td>.11</td>
<td>.12</td>
<td>-.13 to .35</td>
</tr>
<tr>
<td>Black</td>
<td>.527</td>
<td>3.15/3.43</td>
<td>.63/.47</td>
<td>-1.963</td>
<td>74</td>
<td>.053</td>
<td>-.28</td>
<td>.14</td>
<td>-.56 to .00</td>
</tr>
<tr>
<td>White</td>
<td>.324</td>
<td>3.44/3.19</td>
<td>.47/.61</td>
<td>1.913</td>
<td>74</td>
<td>.060</td>
<td>.25</td>
<td>.13</td>
<td>-.01 to .51</td>
</tr>
</tbody>
</table>

**Analysis of Bachelor’s Degree attainment of ECA graduates.** Slightly more than half (53%) of the total group of ECA graduates had completed a Bachelor’s Degree at the time of this analysis. Figure 5 presents this information graphically. A few December, 2015 EMU graduates were reported, but most of the EMU data were current as of August, 2015; the NSC data were last reported in May, 2015. For the students who completed the program in 2010, this time-frame has provided 5 years to work toward degree completion, and more of these students (63%) completed degrees. For the 2011 graduates, only four years have elapsed. Their Bachelor’s Degree attainment rate is much lower, at 43%.
There are differences in degree attainment on the basis of race and gender, as well. Black students completed their degrees at a rate of 46%, as compared to a rate of 52% for White students. The small number of students who made up the composite race category, “Other race,” nearly all finished their degrees (83%). Females completed their Bachelor’s Degrees at higher rates than males, 55% to 49%. In order to test the significance of these demographic differences in college degree attainment, a sequence of chi-square analyses were conducted. None of the tests were significant at the $p < .05$ level, as shown in Table 4.

Table 4: Chi-Square Results Comparing Degree Completion Rates of ECA Students by Race and Gender.

<table>
<thead>
<tr>
<th>Bachelor’s Degree Attainment by Demographic Subgroup</th>
<th>$\chi^2$</th>
<th>df</th>
<th>Sig.</th>
<th>$\phi$</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>.582</td>
<td>1</td>
<td>.446</td>
<td>-.077</td>
<td>.446</td>
</tr>
<tr>
<td>White</td>
<td>.010</td>
<td>1</td>
<td>.921</td>
<td>-.010</td>
<td>.921</td>
</tr>
<tr>
<td>Gender (F)</td>
<td>.411</td>
<td>1</td>
<td>.522</td>
<td>.065</td>
<td>.522</td>
</tr>
</tbody>
</table>

The majority of ECA graduates (63%) continued to work toward their Bachelor’s Degrees at Eastern Michigan University. Of that group ($N=61$), the researcher was able to verify that a degree was earned by 67%. The degree-completion figure for ECA graduates who did not remain at EMU was much lower, at 48%. It should be noted that the vast discrepancy in these figures is likely due to the incomplete data available for non-EMU students—and the relatively complete data that can be obtained by virtue of the ECA’s partnership with EMU. The degree completion rates of ECA students who remained at EMU differ by race and gender. Females completed college at a rate of 71%, compared with males (62%). White students completed degrees at a rate of 66%, with Black students completing at a lower rate of 61%. Figure 5 shows degree completion rates for the overall group, as well as by post-ECA college enrollment category.
A logistic regression was conducted to determine the combination of predictors that contributed to an increased likelihood of earning a degree. Predictor variables that were explored in the model included gender, race, HS GPA, EMU enrollment, and the interactions among these. Adhering to the Hosmer and Lemeshow (2013) steps to building a logistic regression model, 2 x 2 chi-square tests were performed to judge the suitability of the categorical variables (race, gender, and EMU enrollment) for inclusion in the model, and an independent t-test evaluated the same for the continuous variable, HS GPA. Interestingly, only HS GPA and EMU enrollment met the conditions for inclusion in the model; the researcher tested the model with the other variables, nonetheless, but only HS GPA and EMU enrollment positively predicted Bachelor’s Degree attainment for the group of ECA graduates. The final model in this analysis is represented by the equation:

\[
\log \left( \frac{p}{1-p} \right) = -5.44 + 1.41(GPA) + 1.39 (EMU)
\]
This model was significant, $\chi^2(2, N = 76) = 13.470, \ p = .001$. The Hosmer-Lemeshow Goodness-of-Fit Test yielded a $p$ – value of .408, indicating that the model is a good fit. The pseudo $R^2$ ranged from 16.2% (Cox & Snell) to 21.7% (Nagelkerke), and correctly predicted 63.2% of the graduates. Sensitivity was 71.4%, and specificity was 52.9%. The model demonstrated positive predictive value of 65.2%, and negative predictive value of 60.0%. The likelihood of ECA graduates earning a Bachelor’s Degree was strongly positively associated with higher academic skills, as measured by prior HS GPA, as well as continuing their education at EMU. The presence of each variable increased the odds of earning a degree by over four times—significant $p = .010$ and $p = .011$, respectively. Table 5 displays the results of the analysis.

Table 5: Logistic Regression Predicting Bachelor’s Degree Completion for ECA Graduates.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$\beta$</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Odds Ratio Exp$\beta$</th>
<th>95% CI for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>Incoming HS GPA</td>
<td>1.405</td>
<td>.543</td>
<td>6.695</td>
<td>1</td>
<td>.020**</td>
<td>4.074</td>
<td>1.406</td>
</tr>
<tr>
<td>EMU Enrollment</td>
<td>1.392</td>
<td>.548</td>
<td>6.461</td>
<td>1</td>
<td>.011**</td>
<td>4.024</td>
<td>1.375</td>
</tr>
</tbody>
</table>

Note: ** $p < .01$.

**Time-to-degree for ECA graduates.** In Question 1, Part A, the researcher sought to determine the length of time it took ECA students to earn their degrees. EMU’s Institutional Research and Information Management department’s Data Analyst, A. Fox, provided the formula commonly used to measure time-to-degree: subtract “First Term” from “Grad Term” and divide the resulting number by 100 (personal communication, January 13, 2016). This method provides a whole number which reflects the number of calendar years—not school years—it took to complete a degree; the fractional part of the number provides an approximation of the time of degree completion within the year based on the student’s last semester. By way of example: students who graduated from high school in the spring of 2010, began college
independently in the fall term of that same year, and earned their degrees at the conclusion of the fall term of 2014 would have a calculated 4.0 in their “time-to-degree” column—corresponding to 4 “fall semesters” of enrollment. A student who began college at the same time (fall, 2010) and completed a degree following the winter term, 2015 would have 4.1 units in their “time-to-degree” column.

The average time-to-degree for the entire group of ECA graduates was 2.96. Of those who have thus far completed a 4-year degree, it has taken them nearly three years. The students who completed high school in 2010 through the ECA program have had more time to work toward these degrees, and it has taken a bit longer to get there—over three years. For the subgroups shown in Table 6, the time-to-degree figure generally increases as the percentage of degree-earners increases, as would be expected.

Table 6: Time to Degree for ECA Graduates (2010, 2011) by Race and Gender

<table>
<thead>
<tr>
<th></th>
<th>Time to Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total ECA (N=97)</td>
<td>2.96</td>
</tr>
<tr>
<td>ECA Class of 2010 (n =46)</td>
<td>3.13</td>
</tr>
<tr>
<td>ECA Class of 2011 (n =51)</td>
<td>2.74</td>
</tr>
<tr>
<td>Black (n =24)</td>
<td>3.09</td>
</tr>
<tr>
<td>White (n =67)</td>
<td>2.88</td>
</tr>
<tr>
<td>Other Race/Ethnicity (n =6)</td>
<td>3.18</td>
</tr>
<tr>
<td>Male (n =41)</td>
<td>2.92</td>
</tr>
<tr>
<td>Female (n =56)</td>
<td>2.98</td>
</tr>
</tbody>
</table>

Question 2: Comparisons of Early College Alliance Graduates and Non-Early College Alliance Graduates in Washtenaw County

The second research question shifted the analysis from an internal study of ECA graduates to students from Washtenaw County public high schools who enrolled at Eastern Michigan University beginning in the fall semester, 2010 through the winter term, 2012. The
The data set utilized in the remainder of the study is Data Set #2. This is an anonymous data file obtained by formal request from EMU’s Institute for Research and Information Management. The large file, containing 4,111 anonymous student records, contained a “county of residence” variable. The researcher split the file to perform the analysis of Washtenaw County FTIACs at EMU, with 576 students in the overall group, and 47 ECA graduates included within that number.

Viewed in a slightly different way, the Washtenaw County group was again split to contain only those Washtenaw County students with one of the county’s public high schools, which accounted for 80.0% of the total county-wide group (n = 422). All but 9 of the Early College Alliance graduates were included in this group, a mismatch likely due to errors in the record; since all ECA graduates retain membership in their Washtenaw County districts and receive their diploma from these districts, all of the former ECA students should appear on the EMU record with one of the ECA’s partner high schools listed. The ECA students who were coded with a Washtenaw County district made up 8.0% of the Washtenaw County sample.

Because of the unique relationship between the ECA and its partner districts, the Washtenaw County partner districts were the focus of the data analysis involving Washtenaw County. The ECA group in this section will include the total number of ECA students within the ECA sample (n = 47). Table 7 displays the numbers of students within the EMU data set who came to EMU from the county’s public schools, along with the numbers of students who attended the ECA program through each of the ECA’s partner districts. The groups that comprise the unit of analysis for Question 2 are highlighted.
Table 7: Numbers of Washtenaw County Students and ECA Students, by Public High School, Enrolled as FTIACs at EMU

<table>
<thead>
<tr>
<th>High School</th>
<th>Number of Students</th>
<th>Number of ECA Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washtenaw County-Total</td>
<td>576</td>
<td>47</td>
</tr>
<tr>
<td>Ann Arbor Public Schools</td>
<td>192</td>
<td>-</td>
</tr>
<tr>
<td>Community High School</td>
<td>9</td>
<td>-</td>
</tr>
<tr>
<td>Huron High School</td>
<td>97</td>
<td>-</td>
</tr>
<tr>
<td>Pioneer High School</td>
<td>86</td>
<td>-</td>
</tr>
<tr>
<td>Chelsea High School</td>
<td>12</td>
<td>-</td>
</tr>
<tr>
<td>Dexter High School</td>
<td>25</td>
<td>-</td>
</tr>
<tr>
<td>Lincoln High School*</td>
<td>36</td>
<td>13</td>
</tr>
<tr>
<td>Manchester High School</td>
<td>8</td>
<td>-</td>
</tr>
<tr>
<td>Milan High School*</td>
<td>23</td>
<td>8</td>
</tr>
<tr>
<td>Saline High School</td>
<td>69</td>
<td>-</td>
</tr>
<tr>
<td>Whitmore Lake High School*</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Willow Run High School*</td>
<td>17</td>
<td>-</td>
</tr>
<tr>
<td>Ypsilanti High School*</td>
<td>32</td>
<td>15</td>
</tr>
<tr>
<td>TOTAL Number from Washtenaw County Public School Districts</td>
<td>422</td>
<td>38</td>
</tr>
</tbody>
</table>

Notes: *Ann Arbor Skyline graduated its first class in 2012, which falls outside the time frame delimited in this study. *In 2013, Willow Run High School merged with Ypsilanti High School to form a new district: Ypsilanti Community Schools. Both WRHS and YHS were independently graduating students in the years this study covers. *Denotes original ECA partner districts.

Demographic characteristics of the Washtenaw County sample. The students from Washtenaw County who enrolled at Eastern Michigan University as FTIACs between fall, 2010 through winter, 2012 shared demographic characteristics with the subgroup of ECA students within the sample, although there were some differences between the Washtenaw County group and the overall population of EMU FTIACs. Figures 6, 7, and 8 present these demographic figures for the total group of EMU FTIACs, the Washtenaw County partner schools that make up the comparison group for this part of the analysis, and the ECA student subgroup.

The larger group of EMU enrollees contained a lower percentage of White students (55%) than the Washtenaw County group (64%), with correspondingly higher percentage of Black students (30%, as compared with 15%). In terms of gender, the larger EMU group and the ECA subgroup each contained slightly higher numbers of female students (over 66% of ECA’s
graduates in these data were female), with the Washtenaw County subgroup showing more even
distribution of males and females.

The proportion of Pell-Eligible students was highest within the EMU group as a whole, at
56%, and then decreased slightly in the ECA and Washtenaw County subgroups. Over 30% of
the total EMU group, as well as the ECA subgroup reported being the first in their families to
pursue a Bachelor’s Degree; only slightly over 20% of the Washtenaw County subgroup (see
Figures 6, 7, and 8).

Figure 6: Race/ethnicity percentages for all EMU FTIACs, those from Washtenaw County partner school
districts, and those from ECA.

Figure 7: Gender percentages for all EMU FTIACs, those from Washtenaw County partner school
districts, and those from ECA.
Chi-square tests were performed to determine whether significant differences were present in the demographic characteristics of the Washtenaw County sample, as compared with both the larger EMU sample and the smaller ECA subgroup. The results of the chi-square tests are presented in Table 8, below. The chi-square results indicated that there were no significant differences between the ECA and Washtenaw County groups in any demographic category, although Black students were underrepresented in the Washtenaw County sample at a level that came the closest to statistical significance, $\chi^2 (1, N= 461) = 3.238, p = .072$. It should be noted that the “Other Race” category also yielded a significant chi-square, with these students underrepresented in the ECA subgroup; however, one of the cells in the 2 x 2 table contained less than five students, making the analysis not as statistically valid.

Washtenaw County students were, however, significantly different than the larger population of EMU FTIACs in every demographic category except gender. Statistically significant chi-squares ranged from $\chi^2 (1) = 7.659, p = .043$ for “Other race” to $\chi^2 (1) = 48.727, p = .000$ for Black students. Every demographic category, with the exception of “female,” was lower in the Washtenaw County group than in the larger EMU population (see Table 8).
Table 8: Chi-Square Results Comparing Demographic Characteristics of Washtenaw County Students at EMU with the Subgroup of ECA Students and the Larger Population of EMU FTIACs.

<table>
<thead>
<tr>
<th>Comparisons</th>
<th>Dem. Subgroup</th>
<th>$\chi^2$</th>
<th>df</th>
<th>Sig.</th>
<th>$\phi$</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washtenaw County compared with ECA</td>
<td>Black</td>
<td>3.238</td>
<td>1</td>
<td>.072</td>
<td>.084</td>
<td>.072</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>.259</td>
<td>1</td>
<td>.611</td>
<td>.024</td>
<td>.611</td>
</tr>
<tr>
<td></td>
<td>Pell-Eligible</td>
<td>.840</td>
<td>1</td>
<td>.359</td>
<td>.043</td>
<td>.359</td>
</tr>
<tr>
<td></td>
<td>First-Generation</td>
<td>2.036</td>
<td>1</td>
<td>.154</td>
<td>.066</td>
<td>.154</td>
</tr>
<tr>
<td></td>
<td>Gender (F)</td>
<td>1.914</td>
<td>1</td>
<td>.167</td>
<td>.064</td>
<td>.167</td>
</tr>
<tr>
<td>Washtenaw County compared with EMU</td>
<td>Black</td>
<td>48.727</td>
<td>1</td>
<td>.000***</td>
<td>-.109</td>
<td>.000***</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>19.672</td>
<td>1</td>
<td>.000***</td>
<td>.069</td>
<td>.000***</td>
</tr>
<tr>
<td></td>
<td>Other Race</td>
<td>7.659</td>
<td>1</td>
<td>.006**</td>
<td>.043</td>
<td>.006**</td>
</tr>
<tr>
<td></td>
<td>Pell-Eligible</td>
<td>32.690</td>
<td>1</td>
<td>.000***</td>
<td>-.089</td>
<td>.000***</td>
</tr>
<tr>
<td></td>
<td>First-Generation</td>
<td>24.283</td>
<td>1</td>
<td>.000***</td>
<td>-.077</td>
<td>.000***</td>
</tr>
<tr>
<td></td>
<td>Gender (F)</td>
<td>3.556</td>
<td>1</td>
<td>.059</td>
<td>-.029</td>
<td>.059</td>
</tr>
</tbody>
</table>

Note: * $p < .05$, ** $p < .01$, *** $p < .001$

Academic comparisons of Washtenaw County subgroups. Pre-collegiate academic performance measures were examined for the Washtenaw County students who enrolled as FTIACs at EMU between fall, 2010 and winter, 2012. GPA and ACT Composite scores were both analyzed for differences in three separate groupings: 1. Within the Washtenaw County partner districts, 2. Between Washtenaw County partner districts and the total non-Washtenaw County students in the EMU data set, and 3. Between Washtenaw County partner districts and the ECA FTIACs. Independent $t$–tests were performed to determine whether differences in any of these areas was statistically significant.

Within Washtenaw County, mean differences in high school GPAs were significant for two categories of race (Black/Not Black and White/Not White) and gender. Black students in the Washtenaw County sample came to EMU with GPAs .34 points lower, on average ($M = 2.81$, $SD = .39$), which was significant at the $p < .000$ level, $t(99.11) = -6.168$, $p = .000$. Levene’s Test for Equality of Variances was significant; the results for unequal variances were reported in this case. White students within the county showed a correspondingly significant higher GPA, on average, $t(420) = 4.965$, $p = .000$. Females in Washtenaw County enrolled at EMU with GPAs
.19 points higher than males, also significant at the $p < .000$ level. Table 9 presents the results of the Independent $t$-tests.

The comparisons of Washtenaw County’s high school GPAs with those of the larger group of EMU FTIACs did not yield any significant differences. ECA students, however, had high school GPAs that were higher than the group of Washtenaw County students. This was true overall, and in every demographic category except first-generation status (see Table 9).

Overall, ECA students’ GPAs were .40 points higher than their non-ECA Washtenaw County peers, $t(467)=5.382$, $p = .000$. Significant mean differences ranged from .29 for females ($t(257) = 3.270$, $p = .000$) to .52 for males ($t(208) = 4.298$, $p = .000$). Black students from the ECA matriculated to EMU with mean GPAs of 3.15, as compared with a mean GPA of 2.81 for their non-ECA Washtenaw County counterparts, $t(72) = 2.474$, $p = .016$. White students from the ECA entered EMU with .36-point difference in GPAs, $t(301) = 4.140$, $p = .000$.

The mean GPA of Pell-Eligible students from the ECA was 3.37, compared with 3.05 for low-income students in Washtenaw County, $t(34.44) = 3.857$, $p = .000$. Levene’s Test for Equality of Variances was significant for this group; therefore, results for “equal variances not assumed” were reported.
Table 9: Independent T-tests Results for Mean HS GPA, Washtenaw County Partner Districts Subgroups, and Comparisons with All-EMU FTIACs and ECA FTIACs.

<table>
<thead>
<tr>
<th>Comparisons</th>
<th>Subgroup</th>
<th>Levene’s Test for Equality of Variances (Sig.)</th>
<th>$M_{1}$/$M_{2}$</th>
<th>$SD_{1}$/SD$_{2}$</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>Std Error Difference</th>
<th>95% Confidence Interval of the Difference Lower</th>
<th>95% Confidence Interval of the Difference Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washtenaw County Subgroup Comparison HS GPA</td>
<td>Gender (F/M)</td>
<td>.873</td>
<td>3.18/2.99</td>
<td>.47/47</td>
<td>4.100</td>
<td>420</td>
<td>.000***</td>
<td>.19</td>
<td>.05</td>
<td>.10</td>
<td>.28</td>
</tr>
<tr>
<td></td>
<td>Black</td>
<td>.023</td>
<td>2.81/3.15</td>
<td>.39/47</td>
<td>-6.168</td>
<td>99.11</td>
<td>.000***</td>
<td>-.34</td>
<td>.05</td>
<td>-.45</td>
<td>-.23</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>.331</td>
<td>3.18/2.94</td>
<td>.47/45</td>
<td>4.965</td>
<td>420</td>
<td>.000***</td>
<td>.23</td>
<td>.05</td>
<td>.14</td>
<td>.33</td>
</tr>
<tr>
<td></td>
<td>Other Race</td>
<td>.945</td>
<td>3.04/3.11</td>
<td>.47/48</td>
<td>-1.086</td>
<td>420</td>
<td>.278</td>
<td>-.06</td>
<td>.06</td>
<td>-.17</td>
<td>.05</td>
</tr>
<tr>
<td></td>
<td>Pell-Elig.</td>
<td>.049</td>
<td>3.05/3.13</td>
<td>.51/45</td>
<td>-1.601</td>
<td>357.39</td>
<td>.110</td>
<td>-.08</td>
<td>.05</td>
<td>-.17</td>
<td>.02</td>
</tr>
<tr>
<td></td>
<td>1st Gen.</td>
<td>.470</td>
<td>3.15/3.08</td>
<td>.50/47</td>
<td>1.250</td>
<td>420</td>
<td>.212</td>
<td>.07</td>
<td>.06</td>
<td>-.04</td>
<td>.18</td>
</tr>
<tr>
<td>Washtenaw County/All-EMU HS GPA Comparison</td>
<td>Overall</td>
<td>.301</td>
<td>3.09/3.09</td>
<td>.47/50</td>
<td>.298</td>
<td>3934</td>
<td>.766</td>
<td>.00</td>
<td>.03</td>
<td>-.04</td>
<td>.06</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>.550</td>
<td>3.18/3.16</td>
<td>.47/49</td>
<td>.573</td>
<td>2323</td>
<td>.566</td>
<td>.02</td>
<td>.03</td>
<td>-.05</td>
<td>.09</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>.196</td>
<td>3.00/2.98</td>
<td>.47/50</td>
<td>.434</td>
<td>1609</td>
<td>.664</td>
<td>.02</td>
<td>.04</td>
<td>-.06</td>
<td>.09</td>
</tr>
<tr>
<td></td>
<td>Black</td>
<td>.920</td>
<td>2.81/2.84</td>
<td>.39/42</td>
<td>-.684</td>
<td>1196</td>
<td>.494</td>
<td>-.04</td>
<td>.05</td>
<td>-.14</td>
<td>.07</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>.624</td>
<td>3.18/3.22</td>
<td>.47/49</td>
<td>-.1347</td>
<td>2132</td>
<td>.178</td>
<td>-.04</td>
<td>.03</td>
<td>-.11</td>
<td>.02</td>
</tr>
<tr>
<td></td>
<td>Other Race</td>
<td>.391</td>
<td>3.04/3.13</td>
<td>.47/50</td>
<td>-.569</td>
<td>602</td>
<td>.117</td>
<td>-.09</td>
<td>.06</td>
<td>-.20</td>
<td>.02</td>
</tr>
<tr>
<td></td>
<td>Pell-Elig.</td>
<td>.179</td>
<td>3.05/3.01</td>
<td>.51/49</td>
<td>1.020</td>
<td>2190</td>
<td>.308</td>
<td>.04</td>
<td>.04</td>
<td>-.04</td>
<td>.11</td>
</tr>
<tr>
<td></td>
<td>1st Gen.</td>
<td>.640</td>
<td>3.15/3.05</td>
<td>.45/49</td>
<td>1.840</td>
<td>1326</td>
<td>.046</td>
<td>.10</td>
<td>.05</td>
<td>-.01</td>
<td>.20</td>
</tr>
<tr>
<td>ECA/ Washtenaw County HS GPA Comparison</td>
<td>Overall</td>
<td>.793</td>
<td>3.49/3.09</td>
<td>.45/48</td>
<td>5.382</td>
<td>467</td>
<td>.000***</td>
<td>.40</td>
<td>.07</td>
<td>.25</td>
<td>.53</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>.534</td>
<td>3.47/3.18</td>
<td>.49/47</td>
<td>3.270</td>
<td>257</td>
<td>.001**</td>
<td>.29</td>
<td>.09</td>
<td>.12</td>
<td>.47</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>.377</td>
<td>3.51/2.99</td>
<td>.37/47</td>
<td>4.293</td>
<td>208</td>
<td>.000***</td>
<td>.52</td>
<td>.12</td>
<td>.28</td>
<td>.76</td>
</tr>
<tr>
<td></td>
<td>Black</td>
<td>.768</td>
<td>3.15/2.81</td>
<td>.49/39</td>
<td>2.474</td>
<td>72</td>
<td>.016**</td>
<td>.34</td>
<td>.14</td>
<td>.07</td>
<td>.61</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>.287</td>
<td>3.54/3.18</td>
<td>.40/47</td>
<td>4.140</td>
<td>301</td>
<td>.000***</td>
<td>.36</td>
<td>.09</td>
<td>.19</td>
<td>.53</td>
</tr>
<tr>
<td></td>
<td>Other Race</td>
<td>.027</td>
<td>3.84/3.04</td>
<td>.18/47</td>
<td>8.478</td>
<td>7.81</td>
<td>.000***</td>
<td>.80</td>
<td>.09</td>
<td>.58</td>
<td>1.01</td>
</tr>
<tr>
<td></td>
<td>Pell-Elig.</td>
<td>.039</td>
<td>3.37/3.05</td>
<td>.36/51</td>
<td>3.857</td>
<td>34.44</td>
<td>.000***</td>
<td>.32</td>
<td>.08</td>
<td>.15</td>
<td>.49</td>
</tr>
<tr>
<td></td>
<td>1st Gen.</td>
<td>.207</td>
<td>3.20/3.15</td>
<td>.42/50</td>
<td>4.047</td>
<td>105</td>
<td>.685</td>
<td>.05</td>
<td>.13</td>
<td>-.21</td>
<td>.32</td>
</tr>
</tbody>
</table>

Notes: ** p < .01, *** p < .001; * The n for this group was very small, and this statistic should be interpreted with caution.

ACT composite scores were also analyzed utilizing the same groupings as with the GPA analysis. Table 10 displays the results of these tests. Within the Washtenaw County group, ACT composite scores did not differ significantly between males and females. Black students within the county, however, entered college with average ACT scores nearly 3 points lower than that of their non-Black classmates ($t(418) = -5.764$). ACT scores were approximately 1.6 points lower for both Pell-Eligible ($t(418) = -4.477$) and First-Generation students ($t(418) = -3.504$), and nearly 2 points higher for White students ($t(218) = 5.121$). All of these tests were significant at $p = .000$.

ACT scores were not significantly different for students in the “Other Race” category.

Compared across groups, Washtenaw County students had significantly higher ACT scores than did the larger group of EMU students, both overall and in every subgroup except White and “Other Race” categories. The mean ACT score for Washtenaw County students was
22.2, as compared with 20.9 for the larger group, \( t(3752) = 6.152, p = .000 \). Mean differences for the categories with significant results ranged from .96 for females to 1.51 for males. The mean ACT scores of ECA students, on the other hand, were not significantly different from those of the non-ECA Washtenaw County group. The results of the independent \( t \)-tests are presented in Table 10, below.

Table 10: Independent \( t \)-tests Results for Mean ACT Composite Scores, Washtenaw County Partner Districts Subgroups, and Comparisons with All-EMU FTIACs and ECA FTIACs.

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Subgroup</th>
<th>Levene's Test for Equality of Variances [Sig.]</th>
<th>( M_1/M_2 )</th>
<th>SD_1/SD_2</th>
<th>( t )</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>Std. Error Difference</th>
<th>95% Confidence Interval of the Difference Lower</th>
<th>95% Confidence Interval of the Difference Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washtenaw County Subgroup Comparison ACT Composite</td>
<td>Gender</td>
<td>.636</td>
<td>21.8/22.6</td>
<td>3.83/3.93</td>
<td>-2.006</td>
<td>418</td>
<td>.045</td>
<td>-.76</td>
<td>.38</td>
<td>-1.51</td>
<td>-1.62</td>
</tr>
<tr>
<td></td>
<td>Black</td>
<td>.155</td>
<td>19.7/22.6</td>
<td>3.46/3.80</td>
<td>-5.764</td>
<td>418</td>
<td>.000***</td>
<td>-2.95</td>
<td>.51</td>
<td>-3.96</td>
<td>-1.94</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>.978</td>
<td>22.9/22.9</td>
<td>3.77/3.78</td>
<td>5.121</td>
<td>418</td>
<td>.000***</td>
<td>1.97</td>
<td>.38</td>
<td>1.21</td>
<td>2.73</td>
</tr>
<tr>
<td></td>
<td>Other Race</td>
<td>.645</td>
<td>21.8/22.3</td>
<td>3.77/3.92</td>
<td>-.987</td>
<td>418</td>
<td>.324</td>
<td>-.46</td>
<td>.47</td>
<td>-1.38</td>
<td>.46</td>
</tr>
<tr>
<td></td>
<td>Pell-Elig.</td>
<td>.494</td>
<td>21.2/22.9</td>
<td>3.73/3.85</td>
<td>-4.477</td>
<td>418</td>
<td>.000***</td>
<td>-1.68</td>
<td>.38</td>
<td>-2.42</td>
<td>-1.94</td>
</tr>
<tr>
<td>1st Gen.</td>
<td>.789</td>
<td>20.9/22.6</td>
<td>3.88/3.83</td>
<td>-3.504</td>
<td>418</td>
<td>.001**</td>
<td>-1.59</td>
<td>.45</td>
<td>-2.49</td>
<td>-1.70</td>
<td></td>
</tr>
<tr>
<td>Washtenaw County/All-EMU ACT Composite Comparison</td>
<td>Overall</td>
<td>.806</td>
<td>22.2/20.9</td>
<td>3.89/3.83</td>
<td>6.152</td>
<td>3752</td>
<td>.000***</td>
<td>1.22</td>
<td>.20</td>
<td>.83</td>
<td>1.61</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>.936</td>
<td>21.8/20.9</td>
<td>3.83/3.78</td>
<td>3.616</td>
<td>2235</td>
<td>.000***</td>
<td>.96</td>
<td>.26</td>
<td>.44</td>
<td>1.47</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>.891</td>
<td>22.6/21.1</td>
<td>3.93/3.89</td>
<td>5.009</td>
<td>1515</td>
<td>.000***</td>
<td>1.51</td>
<td>.30</td>
<td>.92</td>
<td>2.10</td>
</tr>
<tr>
<td></td>
<td>Black</td>
<td>.003</td>
<td>19.7/18.2</td>
<td>3.46/2.52</td>
<td>3.198</td>
<td>65.85</td>
<td>.002**</td>
<td>1.42</td>
<td>.44</td>
<td>.53</td>
<td>2.30</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>.544</td>
<td>22.9/22.5</td>
<td>3.77/3.60</td>
<td>1.546</td>
<td>2088</td>
<td>.122</td>
<td>.67</td>
<td>.24</td>
<td>-.10</td>
<td>.83</td>
</tr>
<tr>
<td></td>
<td>Other Race</td>
<td>.726</td>
<td>21.8/21.2</td>
<td>3.77/3.72</td>
<td>1.261</td>
<td>503</td>
<td>.208</td>
<td>.55</td>
<td>.44</td>
<td>-.31</td>
<td>1.42</td>
</tr>
<tr>
<td></td>
<td>Pell-Elig.</td>
<td>.465</td>
<td>21.2/19.9</td>
<td>3.73/3.53</td>
<td>4.560</td>
<td>2138</td>
<td>.000***</td>
<td>1.26</td>
<td>.28</td>
<td>.72</td>
<td>1.81</td>
</tr>
<tr>
<td>1st Gen.</td>
<td>.237</td>
<td>20.9/20.1</td>
<td>3.88/3.53</td>
<td>2.004</td>
<td>1298</td>
<td>.041</td>
<td>.79</td>
<td>.39</td>
<td>.03</td>
<td>1.55</td>
<td></td>
</tr>
<tr>
<td>ECA/ Washtenaw County ACT Composite Comparison</td>
<td>Overall</td>
<td>.640</td>
<td>22.5/22.2</td>
<td>4.15/3.89</td>
<td>.560</td>
<td>464</td>
<td>.576</td>
<td>.34</td>
<td>.61</td>
<td>-.85</td>
<td>1.54</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>.851</td>
<td>22.4/21.8</td>
<td>4.19/3.83</td>
<td>.820</td>
<td>257</td>
<td>.413</td>
<td>.61</td>
<td>.74</td>
<td>-.85</td>
<td>2.07</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>.519</td>
<td>22.7/22.6</td>
<td>4.22/3.93</td>
<td>.089</td>
<td>205</td>
<td>.930</td>
<td>.09</td>
<td>1.06</td>
<td>-.19</td>
<td>2.18</td>
</tr>
<tr>
<td></td>
<td>Black</td>
<td>.491</td>
<td>18.3/19.7</td>
<td>2.50/3.46</td>
<td>-1.133</td>
<td>71</td>
<td>.241</td>
<td>-1.35</td>
<td>1.14</td>
<td>-.53</td>
<td>.93</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>.691</td>
<td>23.9/22.9</td>
<td>3.71/3.77</td>
<td>1.502</td>
<td>299</td>
<td>.134</td>
<td>1.07</td>
<td>.71</td>
<td>-.33</td>
<td>2.48</td>
</tr>
<tr>
<td></td>
<td>Other Race</td>
<td>.856</td>
<td>22.0/21.8</td>
<td>4.06/3.77</td>
<td>.119</td>
<td>90</td>
<td>.906</td>
<td>21</td>
<td>1.74</td>
<td>-.25</td>
<td>3.66</td>
</tr>
<tr>
<td></td>
<td>Pell-Elig.</td>
<td>.844</td>
<td>21.6/21.2</td>
<td>3.76/3.73</td>
<td>.468</td>
<td>199</td>
<td>.640</td>
<td>.40</td>
<td>.84</td>
<td>-1.27</td>
<td>2.06</td>
</tr>
<tr>
<td>1st Gen.</td>
<td>.452</td>
<td>21.1/20.9</td>
<td>3.46/3.88</td>
<td>.208</td>
<td>104</td>
<td>.836</td>
<td>.22</td>
<td>1.07</td>
<td>-1.89</td>
<td>2.33</td>
<td></td>
</tr>
</tbody>
</table>

Notes: * \( p < .05 \), ** \( p < .01 \), *** \( p < .001 \), *the \( n \) for this group was very small, and this statistic should be interpreted with caution.

Another academic performance indicator that was examined in this study was the number of dual enrollment credits students had earned prior to starting college at EMU. Of the 422 students in this group, 68 of them, or 16%, earned some college credit. The number of credits earned ranged from 0 to 45, the (non-zero) mode being 6, and the mean 1.43. The standard deviation for the number of college credits earned was, for most of the subgroups compared, fairly large. Table 11 shows that the dual enrollment credit earned within this group was relatively consistent across the demographic subgroups, with the glaring exceptions of Black and
“Other Race” students. The average number of credits earned for both of these groups was much lower than the overall figure. Independent $t$-tests confirmed that this difference was significant for Black students, $t(421) = -2.046, p = .041$, but not for “Other Race” students, $t(421) = -1.624, p = .105$.

Table 11: *Comparison of College Credits Earned in High School by Washtenaw County Students at EMU, by Race, Gender, Income, and Familial Level of Education.*

<table>
<thead>
<tr>
<th>College Credits Earned in High School</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Washtenaw County Partner Schools (n=422)</strong></td>
<td>1.43</td>
<td>4.52</td>
</tr>
<tr>
<td><strong>Pell-Eligible (n =179)</strong></td>
<td>1.34</td>
<td>4.57</td>
</tr>
<tr>
<td><strong>First-Generation (n =91)</strong></td>
<td>1.51</td>
<td>4.05</td>
</tr>
<tr>
<td><strong>Female (n =228)</strong></td>
<td>1.53</td>
<td>4.80</td>
</tr>
<tr>
<td><strong>Male (n =194)</strong></td>
<td>1.32</td>
<td>4.17</td>
</tr>
<tr>
<td><strong>Black (n =64)</strong></td>
<td>0.38</td>
<td>1.46</td>
</tr>
<tr>
<td><strong>White (n =271)</strong></td>
<td>1.91</td>
<td>5.34</td>
</tr>
<tr>
<td><strong>Other (n =87)</strong></td>
<td>0.74</td>
<td>2.60</td>
</tr>
</tbody>
</table>

**Analysis of Bachelor’s Degree completion for Washtenaw County students.** Among the group of EMU FTIACs who attended a public high school in Washtenaw County, 23% had earned a Bachelor’s Degree as of August, 2015. This figure aligns with the overall degree completion rate of the larger group of EMU FTIACs. Early College Alliance students have earned degrees at a much higher rate of 68%. Figure 9 displays these overall graduation rates.

*Figure 9: Bachelor’s Degree completion rates of EMU FTIACs, those from Washtenaw County only, and ECA graduates.*
Refining this comparison based on the demographic subgroups under study brought to light significant discrepancies in degree attainment with the Washtenaw County subgroup, and between these students and the ECA participants. Overall, and in every subgroup, ECA students finished degrees at much higher rates than did the general population of Washtenaw County graduates. A chi-square testing the strength of this difference was significant, $\chi^2 (1) = 32.910, p=.000$. Chi-square tests comparing ECA rates of degree completion and those of non-ECA Washtenaw County students in every subgroup yielded significant results at the $p < .001$ level.

An even more interesting finding was the relatively minimal differences in Bachelor’s Degree completion rates within the ECA sample. Chi-squares comparing subgroups of ECA students on the basis of race, gender, income, and familial level of education yielded no significant scores. This lack of variation between outcomes on the basis of these student characteristics stands in marked contrast to the comparison group of Washtenaw County students. The analysis of graduation rates using Data Set #2 corroborates the findings in Question 1, which utilized a different data set and reached very similar conclusions. Figure 10 depicts the Bachelor’s Degree completion rates of ECA and non-ECA Washtenaw County students at EMU by student subgroup.
The researcher conducted a logistic regression to identify the factors that affected degree completion for Washtenaw County students. Predictor variables that were explored in the model included the categorical variables race, gender, income level as measured by Pell eligibility, familial level of education, and ECA participation. Three continuous variables were also tested: high school GPA, ACT Composite score, and dual enrollment credits upon entering EMU. In order to build the logistic regression model, chi-square tests were performed to judge the suitability of the categorical variables for inclusion in the model, and an independent $t$-test evaluated the same for the continuous variables. Although ACT scores had an impact in terms of the model’s goodness-of-fit, the overall model was stronger without this variable, perhaps because there is some collinearity between HS GPA and ACT score. High school GPA and dual enrollment credit made for the strongest predictors of college degree attainment. The final model in this analysis is represented by the equation:

$$\log \left( \frac{p}{1-p} \right) = -5.484 + .031(Coll.\ Credit) + 1.32(HS\ GPA)$$
This model was significant, $\chi^2(2, N = 469) = 78.161, p = .000$. The Hosmer-Lemeshow Goodness-of-Fit Test yielded a $p$ – value of .959, indicating that the model is a good fit. The pseudo $R^2$ ranged from 15.4% (Cox & Snell) to 22.2% (Nagelkerke), and correctly predicted 76.8% of the graduates. Sensitivity was 28.1%, and specificity was 95.0%. The model demonstrated positive predictive value of 67.9%, and negative predictive value of 77.9%. The likelihood of Washtenaw County graduates earning a Bachelor’s Degree was strongly positively associated with higher academic skills, as measured by prior HS GPA; for every unit increase in HS GPA, the likelihood of earning a college degree within the time frame under study increased almost four-fold. Dual enrollment credit also contributed to the likelihood of earning a degree, though somewhat less strongly (odds ratio = 1.032). Table 12 displays the results of the analysis.

**Table 12: Logistic Regression Predicting Bachelor’s Degree Completion for Washtenaw County Public School Graduates at EMU.**

<table>
<thead>
<tr>
<th></th>
<th>$\beta$</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Odds Ratio</th>
<th>Exp$\beta$</th>
<th>95% CI for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dual Enrollment Credit</strong></td>
<td>.031</td>
<td>.006</td>
<td>24.738</td>
<td>1</td>
<td>.000***</td>
<td>1.032</td>
<td>1.02</td>
<td>1.05</td>
</tr>
<tr>
<td><strong>Incoming HS GPA</strong></td>
<td>10.321</td>
<td>.259</td>
<td>26.019</td>
<td>1</td>
<td>.000***</td>
<td>3.748</td>
<td>2.256</td>
<td>6.227</td>
</tr>
</tbody>
</table>

*Note: ** $p < .001.$

**Question 3: Comparisons of Early College Graduates and Non-Early College Graduates at Eastern Michigan University**

The analysis of Question 3 utilized the same data set (Data Set #2) as in Question 2. Question 3 expanded the unit of analysis to include a comparison of Early College Alliance students at EMU with all non-ECA graduates who were “first time in any college” (FTIACs) from Fall, 2010-Winter, 2012. This date range allowed two semesters for 2010 and 2011 graduates to enroll for the first time in college following high school graduation. Because some Early College Alliance students completed high school in December, rather than May or June, this date range accounted for these mid-year graduates.
Demographic characteristics of EMU sample. Data Set #2 was obtained from EMU’s Institutional Research and Information Management department and contained 4,202 records. Closer inspection revealed high school graduation dates well before the expected dates of 2010 and 2011; 76 records were eliminated as a result, leaving 4,111 records as the overall N of this set. Female students made up a majority of the group, at 59%. In terms of race, 55% of the students were White, 30% were Black, and 15% reported another race/ethnicity. Nearly 56% were economically disadvantaged, as measured by Pell Grant eligibility. Just over 33% reported being the first in their family to attend a four-year college. Figure 11 depicts these descriptive statistics.

Figure 11: Descriptive data showing demographic characteristics of FTIACs entering EMU from Fall, 2010 through Winter, 2012. N=4,111.

The demographic characteristics of the overall group of EMU FTIACs and the ECA graduates are compared in Figure 12. The non-early college student population was comprised of fewer White students, 55% as compared with the ECA’s 68%. More non-ECA students identified as Black: 30%, as opposed to 21% of the ECA students. Students identifying as another race made up 15% of the total population, and 11% of the ECA students. Slightly more
male students comprised the non-early college group (41%) than the early college group (34%), the percentages for females being 59% and 66%, respectively.

A larger discrepancy in Pell-Eligible students was evident in the data, with 56% of the non-early college group being Pell-Eligible, and only 49% of the early college students in the same category (refer to Figure 12). The “first generation category was nearly identical; just over thirty-three percent of the non-early college students reported being the first in their families to pursue a Bachelor’s Degree, compared with 34% of the early college graduates.

Figure 12: Comparison of demographic characteristics for the FTIACs at Eastern Michigan University, overall population and Early College Alliance graduates.

To determine whether the characteristics described above made for statistically significant differences between the total population of FTIACs in this study and the ECA subgroup, a series of 2 x 2 chi-square tests were conducted. None of the discrepancies rose to the level of significance in these tests, indicating that the subpopulations of ECA students were not statistically different from the overall population of EMU FTIACs. Table 13 presents the results of the chi-square tests; none of the cells is highlighted because the results were not significant.
Table 13: Chi-Square Results Comparing Early College Students by Race, Income, Familial Level of Education, and Gender.

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Subgroup</th>
<th>$\chi^2$</th>
<th>df</th>
<th>Sig.</th>
<th>$\varphi$</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early College Alliance Students</td>
<td>Black</td>
<td>1.764</td>
<td>1</td>
<td>.184</td>
<td>-.021</td>
<td>.184</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>3.458</td>
<td>1</td>
<td>.063</td>
<td>.029</td>
<td>.063</td>
</tr>
<tr>
<td></td>
<td>Pell-Eligible</td>
<td>.863</td>
<td>1</td>
<td>.353</td>
<td>-.014</td>
<td>.353</td>
</tr>
<tr>
<td></td>
<td>1st-Generation</td>
<td>.010</td>
<td>1</td>
<td>.922</td>
<td>.022</td>
<td>.922</td>
</tr>
<tr>
<td></td>
<td>Gender (F)</td>
<td>.981</td>
<td>1</td>
<td>.322</td>
<td>.015</td>
<td>.322</td>
</tr>
</tbody>
</table>

**Academic comparisons of EMU subgroups.** Data on the performance of the total group of EMU FTIACs prior to their enrollment in EMU were also collected. High school GPA was reported for most of the sample ($N=4,087$). The average high school GPA of this group was 3.10 ($SD=.50$). There was a large discrepancy in performance among the subgroups within the overall population of EMU FTIACs in this sample. Figures 13 and 14 show the mean differences among subgroups on GPA and ACT score, respectively.

White students had the highest GPAs, 3.22. Black students’ GPAs were significantly lower, on average, at 2.85, with ACT scores also below the average of the group and well below those of White students (18.3). While females had higher GPAs than males (3.17 as compared with 2.99), their ACT scores were only slightly lower (21.0 compared with 21.3). Pell-Eligible and First-Generation students had slightly lower scores, with GPAs of 3.02 and 3.06, respectively, and ACT scores of 20.1 and 20.2, respectively (see Figures 13 and 14).

![Figure 13: Comparison of differences in mean GPAs, EMU and ECA students, by demographic subgroup.](image-url)
Independent $t$-tests were conducted to determine whether the differences in academic performance measures, high school GPA and ACT score, between subgroups were statistically significant. Results of the $t$-tests are displayed in Table 14. The data contained some outliers, although the overall distribution met the assumption of normality. Levene’s test for equality of variances yielded significant $p$-values for the tests for Black/Not Black ($p = .000$) and White/Not White ($p = .002$). The results reported for these cases are the values for “equal variances not assumed.” For every subgroup, the differences were significant in both high school GPAs and ACT scores.

High school GPAs for the group of ECA students were also compared (see Table 14). This analysis included the “admission GPAs” recorded by EMU’s Office of Admissions, whose policy is to weight college courses in the same way as AP and honors classes are weighted. For most Early College Alliance students, this policy results in “heavier” grades for the majority of their high school transcripts, and higher GPAs than would otherwise be expected (R. Cooper,
personal communication, Jan. 13, 2016). It should be noted, as well, that the GPA analyzed in this section is a completely different measure than the GPA examined in Question 1.

As shown in Table 14, differences in grade point averages were significant at the $p < .01$ level on the basis of race for Black and Other Race students ($t(45) = -2.925$ and $t(45) = 3.767$), as well as for first generation students ($t(45) = -3.483$). It should be noted, however, that there were very few students in the Other Race category; these results should be interpreted with caution. As shown in Figure 14, both Black and first-generation students had GPAs .43 points lower than their counterparts, while Other Race students had significantly higher GPAs. Grade point differences for White students and on the basis of gender and income were not statistically significant (refer to Table 14 for $t$-test results).

Independent $t$–tests comparing differences in high school GPAs between ECA and non-ECA FTIACs at Eastern Michigan University yielded significant differences overall, and in every demographic subgroup except first-generation students. The mean GPA for ECA students was 3.49, compared with 3.09 for non-ECA students at EMU, $t(4085) = 5.401$, $p = .000$. Female, Male, White, Black, and Pell-Eligible students all had mean GPAs higher than those of their non-ECA classmates. The Other Race category contained only 5 ECA students; the results for this comparison should be interpreted with caution due to the very low sample size. Table 14 presents the results of the independent $t$–Tests for all the comparisons.
Table 14. Independent T-tests Results for Mean HS GPA, Within EMU and ECA FTIACs and Between EMU and ECA Students, by Subgroup.

<table>
<thead>
<tr>
<th>High School GPA Comparisons</th>
<th>Levene’s Test for Equality of Variances (Sig.)</th>
<th>M1/M2</th>
<th>SD1/SD2</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>Std. Error Difference</th>
<th>95% Confidence Interval of the Difference Lower</th>
<th>95% Confidence Interval of the Difference Upper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within EMU FTIAC Group</td>
<td>Gender(F)</td>
<td>.204</td>
<td>3.16/2.99</td>
<td>49/50</td>
<td>11.314</td>
<td>4085</td>
<td>.000***</td>
<td>.18</td>
<td>.02</td>
<td>.15</td>
</tr>
<tr>
<td></td>
<td>Black</td>
<td>.000***</td>
<td>2.85/3.20</td>
<td>42/49</td>
<td>-23.605</td>
<td>2710.28</td>
<td>.000***</td>
<td>-.36</td>
<td>.02</td>
<td>-.39</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>.002**</td>
<td>3.22/2.94</td>
<td>49/47</td>
<td>-18.834</td>
<td>4001.95</td>
<td>.000***</td>
<td>-.28</td>
<td>.02</td>
<td>-.25</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>.340</td>
<td>3.13/3.09</td>
<td>50/50</td>
<td>1.781</td>
<td>4085</td>
<td>.075</td>
<td>.04</td>
<td>.02</td>
<td>-.00</td>
</tr>
<tr>
<td></td>
<td>Pell-Elig.</td>
<td>.140</td>
<td>3.02/3.19</td>
<td>49/50</td>
<td>-10.960</td>
<td>4085</td>
<td>.000***</td>
<td>-.17</td>
<td>.02</td>
<td>-.20</td>
</tr>
<tr>
<td></td>
<td>1st Gen.</td>
<td>.094</td>
<td>3.06/3.11</td>
<td>49/50</td>
<td>-3.282</td>
<td>4085</td>
<td>.001**</td>
<td>-.05</td>
<td>.02</td>
<td>-.09</td>
</tr>
<tr>
<td>Within ECA FTIAC Group</td>
<td>Gender(F)</td>
<td>.145</td>
<td>3.47/3.51</td>
<td>49/37</td>
<td>-.275</td>
<td>45</td>
<td>.785</td>
<td>.04</td>
<td>.14</td>
<td>-.32</td>
</tr>
<tr>
<td></td>
<td>Black</td>
<td>.884</td>
<td>3.15/3.58</td>
<td>49/39</td>
<td>-2.925</td>
<td>45</td>
<td>.005**</td>
<td>-.43</td>
<td>.15</td>
<td>-.73</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>.126</td>
<td>3.54/3.38</td>
<td>40/53</td>
<td>1.138</td>
<td>45</td>
<td>.261</td>
<td>.16</td>
<td>.14</td>
<td>-.12</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>.014**</td>
<td>3.84/3.44</td>
<td>18/45</td>
<td>3.767</td>
<td>11.8</td>
<td>.003**</td>
<td>.40</td>
<td>.11</td>
<td>.17</td>
</tr>
<tr>
<td></td>
<td>Pell-Elig.</td>
<td>.121</td>
<td>3.37/3.59</td>
<td>36/50</td>
<td>-1.740</td>
<td>45</td>
<td>.089</td>
<td>.22</td>
<td>.13</td>
<td>-.48</td>
</tr>
<tr>
<td></td>
<td>1st Gen.</td>
<td>.963</td>
<td>3.20/3.63</td>
<td>42/39</td>
<td>-3.483</td>
<td>45</td>
<td>.001**</td>
<td>-.43</td>
<td>.12</td>
<td>-.68</td>
</tr>
<tr>
<td>Between ECA and EMU (ECA/EMU)</td>
<td>Overall</td>
<td>.546</td>
<td>3.49/3.09</td>
<td>45/50</td>
<td>5.401</td>
<td>4085</td>
<td>.000***</td>
<td>.40</td>
<td>.07</td>
<td>.25</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>.712</td>
<td>3.47/3.16</td>
<td>49/49</td>
<td>3.524</td>
<td>2414</td>
<td>.000***</td>
<td>.31</td>
<td>.09</td>
<td>.14</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>.224</td>
<td>3.51/2.99</td>
<td>37/50</td>
<td>4.189</td>
<td>1669</td>
<td>.000***</td>
<td>.53</td>
<td>.13</td>
<td>.28</td>
</tr>
<tr>
<td></td>
<td>Black</td>
<td>.823</td>
<td>3.15/2.84</td>
<td>49/42</td>
<td>2.282</td>
<td>1228</td>
<td>.023*</td>
<td>.30</td>
<td>.13</td>
<td>.04</td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>.248</td>
<td>3.54/3.22</td>
<td>40/49</td>
<td>3.650</td>
<td>2232</td>
<td>.000***</td>
<td>.32</td>
<td>.09</td>
<td>.15</td>
</tr>
<tr>
<td></td>
<td>Pell-Elig.</td>
<td>.106</td>
<td>3.37/3.02</td>
<td>36/49</td>
<td>3.492</td>
<td>2264</td>
<td>.000***</td>
<td>.36</td>
<td>.10</td>
<td>.16</td>
</tr>
<tr>
<td></td>
<td>1st Gen.</td>
<td>.243</td>
<td>3.20/3.06</td>
<td>42/49</td>
<td>1.190</td>
<td>1359</td>
<td>.234</td>
<td>.15</td>
<td>.12</td>
<td>-.09</td>
</tr>
</tbody>
</table>

Note: * p < .05, ** p < .01, *** p < .001. *The n for this group was very small, and this statistic should be interpreted with caution.

ACT Composite scores were analyzed as another indicator of academic performance.

There were 3,987 ACT scores reported, with an overall mean of 21.1 (SD = 3.86). Within the overall population of EMU FTIACs, White students had the highest score, 22.6, and Black students the lowest, 18.3. Pell-Eligible students’ ACT scores were 2.41 points below those of higher-income students; first-generation students had scores 1.39 points lower. Independent t-tests revealed all of these differences to be significant at p = .000. Female students also scored slightly lower than males, t(3127.6) = -2.531, p = .011. For all tests but that for “Gender” and “Other Race,” Levene’s Test for Equality of Variances was significant, and the results for “equal variances not assumed” was reported. Table 15 displays the results of all the t-test comparisons for the ACT measure.
Within the group of ECA students, the differences in ACT scores between most of the subgroups did not meet the levels of significance in the independent \( t \)–tests, although Pell-Eligible and first-generation students did have lower ACT scores (1.74 and 2.03 points lower than their counterparts, respectively). Black and White students, however, scored much differently on the ACT—statistically significant at \( p = .000 \), and glaringly discrepant; Black students’ mean score was 18.3 (\( SD = 2.50 \)), while White students’ mean score was 23.9 (\( SD = 3.71 \)). It should be noted that these scores include only 10 student scores for Black students, and 32 for White students (see Table 15).

ECA students enrolled at EMU with mean ACT scores 1.40 points higher than their non-ECA classmates, \( t(3895) = 2.442, p = .015 \). Significant differences at the significance level \( p < .05 \) were also found between ECA and non-ECA female students, White students, and Pell-eligible students. The differences in scores between ECA and non-ECA students in the other demographic subgroups were not statistically significant. Table 15 displays the results of the independent \( t \)–tests within each group, and between ECA and EMU students.
Table 15: Independent T-tests Results for Mean ACT Composite Score, Within EMU and ECA FTIACs and Between EMU and ECA Students, by Subgroup.

<table>
<thead>
<tr>
<th>ACT Scores</th>
<th>Levene’s Test for Equality of Variances (Sig.)</th>
<th>M1/M2</th>
<th>SD1/SD2</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>Std. Error Difference</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td><strong>Within EMU FTIAC Group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender(F)</td>
<td>.057</td>
<td>21.0/21.3</td>
<td>3.8/3.9</td>
<td>-2.531</td>
<td>3895</td>
<td>.011*</td>
<td>-3.2</td>
<td>.13</td>
<td>-.57</td>
</tr>
<tr>
<td>Black</td>
<td>.000***</td>
<td>18.3/22.3</td>
<td>2.6/3.7</td>
<td>-38.497</td>
<td>3127.6</td>
<td>.000***</td>
<td>-3.99</td>
<td>.10</td>
<td>-4.20</td>
</tr>
<tr>
<td>White</td>
<td>.000***</td>
<td>22.6/19.2</td>
<td>3.6/3.3</td>
<td>30.067</td>
<td>3815.2</td>
<td>.000***</td>
<td>3.34</td>
<td>.11</td>
<td>3.13</td>
</tr>
<tr>
<td>Other</td>
<td>.072</td>
<td>21.3/21.1</td>
<td>3.73/3.88</td>
<td>1.120</td>
<td>3895</td>
<td>.263</td>
<td>.20</td>
<td>.18</td>
<td>-.15</td>
</tr>
<tr>
<td>Pell-Elig.</td>
<td>.001**</td>
<td>20.1/22.5</td>
<td>3.5/3.8</td>
<td>-20.109</td>
<td>3517.2</td>
<td>.000***</td>
<td>-2.41</td>
<td>.12</td>
<td>-2.64</td>
</tr>
<tr>
<td>1st Gen.</td>
<td>.000***</td>
<td>20.2/21.6</td>
<td>3.5/3.9</td>
<td>-11.173</td>
<td>2933.2</td>
<td>.000***</td>
<td>-1.39</td>
<td>.12</td>
<td>-1.64</td>
</tr>
<tr>
<td><strong>Within ECA FTIAC Group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender(F)</td>
<td>.597</td>
<td>22.4/22.7</td>
<td>4.19/4.22</td>
<td>-.187</td>
<td>44</td>
<td>.852</td>
<td>-.25</td>
<td>1.32</td>
<td>-.29</td>
</tr>
<tr>
<td>Black</td>
<td>.267</td>
<td>18.3/23.7</td>
<td>2.50/3.76</td>
<td>-4.246</td>
<td>44</td>
<td>.000***</td>
<td>-5.37</td>
<td>1.26</td>
<td>-7.91</td>
</tr>
<tr>
<td>White</td>
<td>.845</td>
<td>23.9/19.5</td>
<td>3.71/3.46</td>
<td>3.856</td>
<td>44</td>
<td>.000***</td>
<td>4.40</td>
<td>1.14</td>
<td>2.10</td>
</tr>
<tr>
<td>Other</td>
<td>.944</td>
<td>22.0/22.6</td>
<td>4.06/4.21</td>
<td>-2.82</td>
<td>44</td>
<td>.779</td>
<td>-.56</td>
<td>1.99</td>
<td>-4.57</td>
</tr>
<tr>
<td>Pell-Elig.</td>
<td>.575</td>
<td>21.6/23.3</td>
<td>3.76/4.39</td>
<td>-1.439</td>
<td>44</td>
<td>.157</td>
<td>-.74</td>
<td>1.21</td>
<td>-4.18</td>
</tr>
<tr>
<td>1st Gen.</td>
<td>.300</td>
<td>21.1/23.2</td>
<td>3.46/4.34</td>
<td>-1.579</td>
<td>44</td>
<td>.122</td>
<td>-.203</td>
<td>1.28</td>
<td>-4.62</td>
</tr>
<tr>
<td><strong>Between ECA and EMU (ECA/EMU)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall</td>
<td>.616</td>
<td>22.5/21.1</td>
<td>4.15/3.86</td>
<td>2.442</td>
<td>3895</td>
<td>.015*</td>
<td>1.40</td>
<td>.57</td>
<td>.28</td>
</tr>
<tr>
<td>Female</td>
<td>.854</td>
<td>22.4/21.0</td>
<td>4.19/3.80</td>
<td>2.108</td>
<td>2322</td>
<td>.035*</td>
<td>.145</td>
<td>.69</td>
<td>.10</td>
</tr>
<tr>
<td>Male</td>
<td>.542</td>
<td>22.7/21.3</td>
<td>4.22/3.94</td>
<td>1.342</td>
<td>1571</td>
<td>.180</td>
<td>1.37</td>
<td>1.02</td>
<td>-.63</td>
</tr>
<tr>
<td>Black</td>
<td>.948</td>
<td>18.3/18.3</td>
<td>2.50/2.62</td>
<td>-.054</td>
<td>1188</td>
<td>.957</td>
<td>.04</td>
<td>.83</td>
<td>-1.67</td>
</tr>
<tr>
<td>White</td>
<td>.769</td>
<td>23.9/22.6</td>
<td>3.71/3.63</td>
<td>2.081</td>
<td>2183</td>
<td>.038*</td>
<td>1.37</td>
<td>.66</td>
<td>.08</td>
</tr>
<tr>
<td>Pell-Elig.</td>
<td>.690</td>
<td>21.6/20.1</td>
<td>3.76/3.57</td>
<td>1.999</td>
<td>2206</td>
<td>.046*</td>
<td>1.53</td>
<td>.77</td>
<td>.03</td>
</tr>
<tr>
<td>1st Gen.</td>
<td>.663</td>
<td>21.1/20.2</td>
<td>3.46/3.56</td>
<td>1.019</td>
<td>1329</td>
<td>.308</td>
<td>.94</td>
<td>.92</td>
<td>-.87</td>
</tr>
</tbody>
</table>

Note: * p < .05. ** p < .01. *** p < .001.

The number of college credits earned by FTIACs prior to college enrollment was also analyzed. Only 742 students in this sample (18%) earned any college credit while in high school. Most earned relatively small amounts of credit, the mode being 3, and the mean 2.6—with a large range from 0 to 100 credits. More White students entered college with credit (23.1%). Only 9.6% of Black students, and 16.5% of “Other Race” students earned college credit in high school (see Table 16). Nineteen percent of female students came to EMU with college credits, while only 16.7% of males earned college credit in high school. Low-income and first-generation students came to college with nearly the same amount of college credits under their belts: 14.8% and 4.4%, respectively. Table 16 presents these figures.
Table 16: Percentage of EMU FTIACs with College Credit Earned in High School.

<table>
<thead>
<tr>
<th>% of Group Entering EMU with College Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Sample</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Black</td>
</tr>
<tr>
<td>White</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>Pell-Elig.</td>
</tr>
<tr>
<td>First-Generation</td>
</tr>
</tbody>
</table>

Independent *t*-tests were conducted to evaluate the differences in the mean number of college credits earned in high school based on the student characteristics outlined above. The test for gender was not significant, *t* (4109) = 1.30, *p* = .201; females came to college with an average of 2.7 credits, and males had 2.3 (refer to Table 17). There was homogeneity of variances in the test for gender, as assessed by Levene’s test for equality of variances, *p* = .056. The remainder of the *t*-tests indicated significant differences in college credit earned. However, the assumption of homogeneity of variances was violated in these analyses, as evidenced by a *p* –value of .000 in Levene’s test for equality of variances. In these cases, the alternate *t* –value for “equal variances not assumed” was reported. Black and Other Race students, as well as low-income and first-generation students, all had significantly lower average numbers of credits. Table 17 presents the results of the independent *t*-tests.

Table 17: Independent *T*-tests Results for the Mean Number of College Credits Earned in High School by Subgroup.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>F</th>
<th>Sig.</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>Std. Error Difference</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1690</td>
<td>2.34</td>
<td>3.64</td>
<td>.06</td>
<td>-1.30</td>
<td>4109</td>
<td>.201</td>
<td>-.37</td>
<td>.29</td>
<td>-.93 - .20</td>
</tr>
<tr>
<td>Black</td>
<td>1238</td>
<td>1.43</td>
<td>63.98</td>
<td>.000**</td>
<td>-5.77</td>
<td>2986.59</td>
<td>.000***</td>
<td>-1.61</td>
<td>.28</td>
<td>-2.16 - 1.06</td>
</tr>
<tr>
<td>White</td>
<td>2247</td>
<td>3.34</td>
<td>89.62</td>
<td>.000***</td>
<td>6.33</td>
<td>4041.94</td>
<td>.000***</td>
<td>1.75</td>
<td>.28</td>
<td>1.21 - 2.29</td>
</tr>
<tr>
<td>Other</td>
<td>626</td>
<td>1.94</td>
<td>10.21</td>
<td>.001***</td>
<td>-2.20</td>
<td>1035.97</td>
<td>.028*</td>
<td>-.73</td>
<td>.33</td>
<td>-1.38 - .05</td>
</tr>
<tr>
<td>Pell-Elig.</td>
<td>2287</td>
<td>1.96</td>
<td>49.40</td>
<td>.000***</td>
<td>-4.57</td>
<td>3517.6</td>
<td>.000***</td>
<td>-1.33</td>
<td>.29</td>
<td>-1.9 - .76</td>
</tr>
<tr>
<td>1st Gen.</td>
<td>1372</td>
<td>2.04</td>
<td>15.40</td>
<td>.000***</td>
<td>-2.68</td>
<td>3066.1</td>
<td>.007**</td>
<td>-.77</td>
<td>.29</td>
<td>-1.34 - .21</td>
</tr>
</tbody>
</table>

Note: * *p* < .05. **p* < .01. ***p* < .001
Analysis of Bachelor’s Degree attainment at Eastern Michigan University. All together, 22% of EMU FTIAC students earned their degrees as of August, 2015. Significant discrepancies in degree completion on the basis of student characteristics were present, with Black students having completed degrees at a rate of 8%, as compared with 29% of White students. Female students completed degrees at a rate of 25%, compared with males at only 18%. First generation and Pell-eligible students earned degrees at rates lower than the average, at 17% and 16%, respectively (see Figure 15).

ECA students completed degrees at much higher rates than did the larger group of EMU FTIACs, with an overall degree completion rate of 68%. As shown in Figure 16, ECA students in every subgroup completed degrees at a statistically similar rate—and, in every case, a much higher rate than their non-ECA peers. The figures are dramatic, especially for student subgroups whose completion rates in the general population are lower than the overall mean: Black students, first-generation students, Pell-eligible students, and males.
Chi-square analyses conducted with the ECA subgroup in the answer to Question 2 confirmed that there were no significant differences in degree completion within the ECA’s subgroups. ECA students earned their Bachelor’s Degrees at a consistent rate, regardless of the demographic subgroup to which they belong. Chi-squares were conducted to compare the rates of degree completion between demographic subgroups within the larger population of EMU students, as well. Significant differences at the $p = .000$ level were found in every category with the exception of Other Race. Chi-squares comparing graduation rates between ECA and EMU students yielded significant findings, both overall and between every subgroup. Table 18 presents the results of the chi-square analyses within the EMU group, within the ECA group, and between ECA and EMU groups.
Table 18: Chi-Square Results Comparing Bachelor’s Degree Attainment Rates Among ECA Subgroups, Among EMU Subgroups, and Between ECA and EMU.

<table>
<thead>
<tr>
<th>Comparison</th>
<th>Group</th>
<th>$\chi^2$</th>
<th>df</th>
<th>Sig.</th>
<th>Sig.</th>
<th>$\phi$</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within ECA</td>
<td>Black</td>
<td>.021</td>
<td>1</td>
<td>.884</td>
<td>.021</td>
<td>.884</td>
<td></td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>1.439</td>
<td>1</td>
<td>.230</td>
<td>.230</td>
<td>-.175</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>2.623</td>
<td>1</td>
<td>.105</td>
<td>.105</td>
<td>.236</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pell-Eligible</td>
<td>.170</td>
<td>1</td>
<td>.680</td>
<td>.680</td>
<td>-.060</td>
<td></td>
</tr>
<tr>
<td></td>
<td>First-Generation</td>
<td>.534</td>
<td>1</td>
<td>.465</td>
<td>.465</td>
<td>.107</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gender (F)</td>
<td>.005</td>
<td>1</td>
<td>.944</td>
<td>.944</td>
<td>-.010</td>
<td></td>
</tr>
<tr>
<td>Within EMU</td>
<td>Black</td>
<td>201.423</td>
<td>1</td>
<td>.000***</td>
<td>-221</td>
<td>.000***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>138.773</td>
<td>1</td>
<td>.000***</td>
<td>.184</td>
<td>.000***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other Race</td>
<td>3.236</td>
<td>1</td>
<td>.072</td>
<td>.072</td>
<td>.028</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pell-Eligible</td>
<td>127.312</td>
<td>1</td>
<td>.000***</td>
<td>-.176</td>
<td>.000***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>First-Generation</td>
<td>39.059</td>
<td>1</td>
<td>.000***</td>
<td>-.098</td>
<td>.000***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gender (F)</td>
<td>28.945</td>
<td>1</td>
<td>.000***</td>
<td>.084</td>
<td>.000***</td>
<td></td>
</tr>
<tr>
<td>ECA with EMU</td>
<td>Overall</td>
<td>56.758</td>
<td>1</td>
<td>.000***</td>
<td>.118</td>
<td>.000***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Black</td>
<td>49.713</td>
<td>1</td>
<td>.000***</td>
<td>.200</td>
<td>.000***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>White</td>
<td>17.051</td>
<td>1</td>
<td>.000***</td>
<td>.087</td>
<td>.000***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other Race</td>
<td>14.929</td>
<td>1</td>
<td>.000***</td>
<td>.154</td>
<td>.000***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pell-Eligible</td>
<td>42.198</td>
<td>1</td>
<td>.000***</td>
<td>.136</td>
<td>.000***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>First-Generation</td>
<td>39.583</td>
<td>1</td>
<td>.000***</td>
<td>.170</td>
<td>.000***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>29.706</td>
<td>1</td>
<td>.000***</td>
<td>.111</td>
<td>.000***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>27.534</td>
<td>1</td>
<td>.000***</td>
<td>.128</td>
<td>.000***</td>
<td></td>
</tr>
</tbody>
</table>

Note: * p < .05. ** p < .01. *** p < .001

A logistic regression was performed to determine the influence of various predictors on the likelihood of earning a Bachelor’s Degree for the larger group of EMU students. The logistic regression model initially included 6 categorical predictor (independent) variables that coded for the following categories: race (Black/Not Black, “Other Race”/Not “Other Race”), income (Pell Eligible/Not Pell Eligible), familial level of education (First Generation/Not First Generation), and Gender (Female/Male), and ECA (yes/no). The effect of the “Other Race” variable was not significant, nor was the ECA variable, given the other predictors; these were dropped from the model. Also included in the model were the continuous predictor variables: High School GPA and Beginning College Credit, which were significant. The logistic regression used in this analysis was:

$$\log\left(\frac{p}{1-p}\right) = -5.510 - .817(\text{Black}) - .381(\text{Pell}) - .298(\text{First Gen}) + .257(\text{Gender}) + 1.396(\text{GPA}) + .029(\text{Coll. Credit})$$
The logistic regression model was significant, $\chi^2(6) = 674.801, p = .000$. The -2 Log Likelihood was 3684.331. The pseudo $R^2$ ranged from 15.2% (Cox & Snell) to 23.2% (Nagelkerke), and correctly predicted 79.4% of the graduates. Sensitivity was 22.1%, and specificity was 96.1%. The model demonstrated positive predictive value of 62.27%, and negative predictive value of 80.94%. The likelihood of earning a Bachelor’s Degree was negatively associated with low-income and first-generation status. Black students were also less likely to finish degrees, by a factor of 2.26. Females were more likely to complete degrees than males. The amount of college credit students had earned prior to starting college was associated with increased likelihood of completing a degree (odds ratio = 1.029), but the relatively small $n$ of the group of students with incoming college credits likely diluted this effect. High school GPA had the most significant impact among the total EMU population; for every point that GPA increased, the chances of completing college increased over four-fold. Table 19 displays the results of the analysis.

Table 19. Logistic Regression Predicting Bachelor’s Degree Completion Based on Gender, Race, Pell Eligibility, First-Generation Status, College Credits Upon Enrollment, and HS GPA.

<table>
<thead>
<tr>
<th></th>
<th>$\beta$</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Odds Ratio</th>
<th>95% CI for Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Exp($\beta$)</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>-.817</td>
<td>.124</td>
<td>43.714</td>
<td>1</td>
<td>.000***</td>
<td>.442</td>
<td>.347 - .563</td>
</tr>
<tr>
<td>Pell-Eligible</td>
<td>-.381</td>
<td>.089</td>
<td>18.295</td>
<td>1</td>
<td>.000***</td>
<td>.683</td>
<td>.574 - .814</td>
</tr>
<tr>
<td>1st-Generation</td>
<td>-.298</td>
<td>.096</td>
<td>9.757</td>
<td>1</td>
<td>.002**</td>
<td>.742</td>
<td>.615 - .895</td>
</tr>
<tr>
<td>Gender</td>
<td>.257</td>
<td>.087</td>
<td>8.845</td>
<td>1</td>
<td>.003**</td>
<td>1.294</td>
<td>1.092 - 1.533</td>
</tr>
<tr>
<td>College Credit</td>
<td>.029</td>
<td>.004</td>
<td>46.041</td>
<td>1</td>
<td>.000***</td>
<td>1.029</td>
<td>1.021 - 1.038</td>
</tr>
<tr>
<td>HS GPA</td>
<td>1.396</td>
<td>.095</td>
<td>215.273</td>
<td>1</td>
<td>.000***</td>
<td>4.038</td>
<td>3.351 - 4.866</td>
</tr>
</tbody>
</table>

Note: ** $p < .01$. *** $p < .001$

Clearly, gender, beginning college credit, and high school GPA produced the most significant increase in the odds of attaining a degree within the larger group. Additional logistic regression analyses were conducted for the four subgroups in the EMU population that showed the largest gaps in degree attainment in the descriptive analysis: Black students, first-generation
students, Pell-eligible students, and males. The models for the Pell-eligible, male, and first-generation groups all included high school GPAs, beginning college credits, ACT scores, and the “Black” categorical variable.

The first-generation model also included gender as significant, and the Pell-eligible model included the categorical variable “first-generation.” Similar to the other logistic regressions conducted in this study, GPA was the most powerful predictor of degree completion by a factor of nearly 4 in every case. Black students in each category were less likely to complete degrees, as were first-generation students in the “Pell-eligible” regression. Among first-generation students, female students were more likely to complete degrees, though the $p$-value for that category was not significant. Summary results of these regressions are shown in Table 20.

Table 20. Summary Results of Logistic Regressions Predicting Bachelor’s Degree Completion for Male Students, First-Generation Students, and Pell-Eligible Students.

<table>
<thead>
<tr>
<th></th>
<th>$\chi^2$</th>
<th>df</th>
<th>Sig.</th>
<th>Equation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st-Generation</td>
<td>211.235</td>
<td>4</td>
<td>.000***</td>
<td>$\log\left(\frac{p}{1-p}\right) = -7.53 - .70(\text{Black}) + 1.28(\text{GPA}) + .05(\text{Coll. Cred}) + .08(\text{ACT}) + .34(\text{Female})$</td>
</tr>
<tr>
<td>Pell-Eligible</td>
<td>290.632</td>
<td>5</td>
<td>.000***</td>
<td>$\log\left(\frac{p}{1-p}\right) = -6.74 - .74(\text{Black}) + 1.39(\text{GPA}) + .03(\text{Coll. Cred}) + .05(\text{ACT}) - .20(\text{1st Gen.})$</td>
</tr>
<tr>
<td>Male</td>
<td>202.632</td>
<td>4</td>
<td>.000***</td>
<td>$\log\left(\frac{p}{1-p}\right) = -6.53 - .81(\text{Black}) + 1.27(\text{GPA}) + .03(\text{Coll. Cred}) + .05(\text{ACT})$</td>
</tr>
</tbody>
</table>

Note: *** $p < .001$

The regression model that predicted Bachelor’s Degree attainment for Black students was distinct from all of the others in two ways. First, the predictor variables that contributed significantly to the model for this subgroup were different, and included Pell-eligibility, high school GPA, ACT score, and ECA participation. Second, the impact of ECA participation for Black students was incredibly high; Black students in the ECA program were over 21 times more likely to complete a Bachelor’s Degree. GPA had the next-largest influence, contributing to the
likelihood of degree completion by a factor of 3.9. The model was significant, $\chi^2 (4) = 80.318, p = .000$, with the pseudo $R^2$ ranging from 6.5% (Cox & Snell) to 15.0% (Nagelkerke). It correctly predicted 92.3% of the graduates. Sensitivity was 9.1%, and specificity was 99.8%, with a positive predictive value of 81.8%, and negative predictive value of 92.4%. The logistic regression equation is as follows:

$$\log\left(\frac{p}{1-p}\right) = -8.31 - .66 (Pell.Elig.) + 1.36(GPA) + 3.068(ECA) + .125(ACT)$$

While participation in the Early College Alliance program does not contribute significantly to the overall degree-attainment outcomes of the larger group of EMU FTIACs, it made a tremendous difference for Black students. The relative importance of ECA participation within this subgroup is likely due to the extremely discrepant degree completion rates of Black students in the overall EMU population as compared with that of Black ECA participants (9% and 70%, respectively).

**Summary**

The analyses of Early College Alliance graduates and their non-ECA classmates at Eastern Michigan University yielded important data about the longer-term impact of the ECA program. The descriptive information provided a starting point for comparisons both within the group of ECA students, and between ECA and non-ECA students both in the larger EMU population and in the subpopulation of Washtenaw County FTIACs at EMU. Inferential statistical analyses found that differences in demographics and post-secondary outcomes were minimal within the ECA group, although academic performance indicators highlighted gaps on the basis of race, income, and familial level of education. Even with these gaps in GPAs and ACT scores, ECA students across every demographic group attained Bachelor’s Degrees at
higher rates than the comparison groups of both Washtenaw County and the total EMU population.
CHAPTER V

Discussion

Although they comprise only a fraction of the secondary schooling experiences that American high school students take advantage of, early college high school programs offer a promising starting place for bridging the gap between high school and post-secondary success. The very definition of “early college high school” includes built-in college access—to a college campus and college-level academic expectations, to tuition-free undergraduate coursework and materials, and to the amount of college credit that is designed to give students a significant head start on college completion. Such schools also provide an explicit and direct teaching of college readiness, in academic content as well as the non-core content skills that lead to success in college classes and in life after college. There are good reasons for the excitement taking hold among various stakeholders, from families to legislators, about this particular educational reform model.

Given the recent proliferation of early college high schools both in the state of Michigan and nationwide, more information about the outcomes of such programs is required to help educators and policy-makers gauge where and how early colleges are successful, and where more work needs to be done to improve their efficacy. This study was designed to help answer questions about the effectiveness of the Early College Alliance program specifically with respect to Bachelor’s Degree completion rates of its graduates.

This study looked at the question of post-secondary outcomes through the information provided in two distinct sets of data. Data Set #1 drew from internal data provided by the Early College Alliance, and included all of the students (N=97) who graduated from high school through the ECA program in 2010 (n = 46) and 2011 (n = 51). These data were used to answer
Question 1: What is the rate of Bachelor’s Degree attainment of Early College Alliance students who graduated from high school in 2010 and 2011? The main dependent variable in this question was a dichotomous categorical variable that signified Bachelor’s Degree completion.

Question 1 contained two additional subquestions. The first of these examined the “time-to-degree” dependent variable for students who earned Bachelor’s Degrees. The second subquestion explored differences in post-secondary outcomes based on the demographic characteristics included within Data Set #1—the categorical independent variables race and gender. Other independent variables included in the analysis for Question 1 were prior high school GPA and high school graduation year.

Data Set #2 was provided by the Institutional Research and Information Management department at Eastern Michigan University, and included 4,111 students who enrolled for the First Time in Any College (FTIAC) from fall, 2010 through winter, 2012. These data contained 27 different variables, allowing for a broad analysis. Questions 2 and 3 were answered using Data Set #2. In Question 2, the unit of analysis was delimited to students who graduated from a public high school in Washtenaw County. Comparisons were made between this smaller group (n = 422) and the Early College Alliance graduates (n = 47). Question 3 expanded the unit of analysis to include the entire group of EMU FTIACs, comparing them with the ECA subgroup. In both Questions 2 and 3, independent variables included race, gender, income (Pell-eligibility), familial level of education, ECA graduate status, high school grade point average (GPA), ACT Composite score, and number of college credits earned while in high school. The dependent variable of interest for both questions was the same: Bachelor’s Degree completion (see Table 2, Chapter III, for the list of variables and their descriptions).
The researcher employed descriptive and inferential statistics to answer the three questions. For each question, the groups of students under study were described in terms of demographic characteristics, academic performance measures, and Bachelor’s Degree outcomes. Differences that emerged from the descriptive analyses were examined for statistical significance using independent $t$–tests for continuous independent variables and chi-squares for categorical variables. For each question, multiple logistic regression tests were conducted to explore the independent variables that combined to predict the likelihood of Bachelor’s Degree completion.

**Findings**

**Question 1.** What is the rate of Bachelor’s Degree attainment of Early College Alliance students who graduated from high school in 2010 and 2011?

a. What is the average “time-to-degree” for ECA graduates who completed Bachelor’s Degrees prior to December, 2015?

b. What are the differences in the rates of post-secondary degree attainment of ECA graduates based on race and gender?

The information used to answer Question 1, Data Set #1, provided the most complete list of Early College Alliance graduates that could be generated. The data set was created by the researcher using three different sources of student information, originating with the actual list of 2010 and 2011 graduates from the school’s student information system. It was important to explore outcomes for this actual group of graduates from a closer perspective because external data tracking systems tend to lose track of ECA students, for a variety of reasons. The demographic data available in this system were limited to race and gender in 2010 and 2011; incoming grade point averages provided a measure of academic performance data for these groups of graduates. While there is almost certainly missing information remaining in these data,
the college degree completion figures were the most comprehensive for this sample because they used student-level data from both EMU and the National Student Clearinghouse (NSC).

The researcher sought first to determine whether the groups of ECA students in this study were representative of the larger community in terms of race and gender. As Barnett and Stamm (2010) pointed out, dual enrollment opportunities have tended to be concentrated among students with relative privilege. Early college programs often seek to remedy the imbalance in opportunity (ECHSI, 2013; Barnett, Maclutsky, & Wagonlander, 2015). While the ECA has maintained a demographic profile consistent with that of the county as a whole, the question of whether the longer-term outcomes of the program continued to reflect this balance was important to answer.

In the descriptive analysis of the ECA graduates of 2010 and 2011, the researcher found that the proportion of White, Black, and Other Race students was aligned with those of Washtenaw County as a whole (see Figure 4, Chapter IV). Most (63%) ECA graduates continued their education at EMU; among these students, demographic characteristics were closely matched with those of the larger EMU student body. Students who continued their post-secondary enrollment at a non-EMU institution included proportionally more White students and fewer Black students.

Overall, Bachelor’s Degree completion could be verified for only slightly more than half of the total group of ECA students \((n = 51)\), with an additional two earning Associate’s Degrees. Students who continued at EMU completed degrees at a higher rate of 67%, while degree completion could only be verified for 43% of the students who attended a non-EMU institution. These data are shown in Figure 5 (Chapter IV). This low number may be due to problems in the record-keeping systems utilized by the National Student Clearinghouse; ECA students are
members of both their public school district and of the ECA program, which has historically led to confusion and errors in student reporting. Post-secondary enrollment data could not be found for 15 students in this sample. This number is almost certainly too high, again reflecting on data tracking constraints.

Bachelor’s Degree completion rates are typically measured with a time-frame of 6 years, or 150% of the expected time to complete a “4-year” degree, although 8-year completion rates are increasingly reported, as well (National Center for Education Statistics, 2010). Because the ECA program opened its doors in the 2007-2008 school year, the 2010 graduating cohort is the first group to complete the program and move on to college as independent students. These graduates—and their non-ECA counterparts—have only had 5 years to finish a degree; the 2011 students have had only 4 years. Of the ECA students in this sample who earned degrees, the average time it took them to complete was almost three years. Students who graduated in 2010 had higher graduation rates (63%), and took a bit longer to complete. Those who graduated in 2011 had a 43% graduation rate, but those who finished their degrees had done so within less time (2.74 years).

Since ECA students enter college with up to 60 college credits already “under their belts,” it may be expected that it would not take as long as is typical to earn a Bachelor’s Degree. Comparing these cohorts of ECA graduates with county- and state-wide cohorts who graduated two years earlier provides helpful context for ECA’s degree completion rates. Table 21, below, utilizes Michigan’s “MI School Data: College Progression by Graduating Class” report to view both Washtenaw County and statewide totals of 4-year degree completers.
Table 21. Comparisons of 4-year degree completion rates of ECA students in the classes of 2010 and 2011 with Washtenaw County and Statewide classes of 2008 and 2009, respectively (*State of Michigan, MI School Data, 2001-2016, College Progression by Graduating Class). % of Students with 4-Year Degrees

<table>
<thead>
<tr>
<th>Graduating Classes</th>
<th>Early College Alliance</th>
<th>Washtenaw County*</th>
<th>State of Michigan*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class of 2010/2008</td>
<td>63%</td>
<td>42%</td>
<td>26%</td>
</tr>
<tr>
<td>Class of 2011/2009</td>
<td>43%</td>
<td>36%</td>
<td>21%</td>
</tr>
</tbody>
</table>

Note: Early College Alliance rates are taken from the current study; ECA data are not reported on the MI School Data reports for these cohorts.

Given the national trend in terms of the number of years students take to complete degrees (NCES, 2014a), it is likely that more ECA students in this cohort will graduate with Bachelor’s Degrees in the coming years. However, the data show that many students who have finished high school through the ECA program are already making good use of their head start on college, posting much higher-than-average graduation rates than those who graduated two years before they did.

Equally important as this overall graduation rate of ECA students is the consistency of graduation rates across demographic subgroups (see Table 6, Chapter IV). Study after study has found that low-income, minority, and/or first-generation undergraduates have lower likelihoods of completing Bachelor’s Degrees (Adleman, 2006; Engle & Tinto, 2007; Goldberger, 2007; Long & Riley, 2007; Rendón, et al., 2000). Contrary to the findings of these researchers, the logistic regression that examined the impact of all of the independent variables in this data set found that the only predictor variables that made a difference in the degree-completion rates within the group of ECA graduates were prior high school GPAs and EMU enrollment. As shown in the next section, the fact that race, in particular, is not a factor in the success rates of ECA graduates makes these outcomes stand out.
**Question 2.** How do the rates of Bachelor’s Degree attainment of ECA graduates who remained at Eastern Michigan University compare with the overall degree-attainment rates of non-ECA Washtenaw County graduates who enrolled at EMU?

Shifting the focus of the study to examine just those students at Eastern Michigan University, Question 2 began with an analysis of the subpopulation coming from Washtenaw County. This was an important focus for two reasons. First, there is a close relationship between Washtenaw County and Eastern Michigan University. According to the 2013 Senate Fiscal Agency’s “Study of Michigan’s Public University Enrollment Patterns by County and Institution,” Eastern Michigan University ranked #1 in the listing of the most common post-secondary destinations of Washtenaw County graduates. The same report indicated that Washtenaw County graduates comprised the second-largest group of students at EMU (Wayne county residents are the largest group).

The second reason for a specific focus on Washtenaw County students at EMU reflects the unique nature of the partnerships that created and continue to sustain the ECA. The Early College Alliance partners with the county’s public schools to provide this specific type of dual-enrollment opportunity for their students. The extent to which the ECA program makes a difference in their students’ longer-term outcomes is key information for these local partners.

To answer Question 2, the researcher utilized Data Set #2. The group of Washtenaw County students was delimited to those from the public high schools in the county and included 422 students. This group was compared with both the total group of Early College Alliance students included in Data Set #2, which included 47 students, and the larger, total group of EMU FTIACs ($N = 4,111$). Descriptive statistics indicated that there were no gender differences between the Washtenaw County group and either the smaller, ECA subgroup or the larger
population of EMU students. Black, Pell-eligible, and first-generation students were all significantly underrepresented in the Washtenaw County group as compared with the overall EMU group. White and Other Race students were overrepresented. In every demographic category, however, the differences between Washtenaw County and ECA graduates did not reach the level of statistical significance. The results of the chi-square analyses are summarized in Table 8; Figures 6 – 8 display the demographic data visually (Chapter IV).

Academic comparisons between Washtenaw County graduates and both ECA and EMU groups included an analysis of high school GPAs, ACT Composite scores, and the number of dual enrollment credits students had earned prior to their FTIAC semester. Prior research has consistently found that 1). Strong pre-collegiate academic indicators contribute to greater success in college; and 2). Large discrepancies in these indicators on the basis of race, SES, and first-generation status hamper the success rates of underrepresented students (ACT, 2014; Adleman, 2006; Engle & Tinto, 2008).

The data in this research project corroborated these findings, to a large extent. Washtenaw County students and their classmates from other counties had similar GPAs upon enrollment. Similar, too, were the discrepancies in GPAs between subgroups; Washtenaw County’s significant differences were between Black and White students, and between Male and Female students, with the latter group in each case entering with the higher GPA. ECA students had incoming GPAs higher than those of the Washtenaw County group in every category except for first generation students (see Table 9, Chapter IV).

ACT composite scores followed a different pattern, in some respects. Black, Pell-eligible, and first generation subgroups in the Washtenaw County data all posted lower ACT scores, but all of the Washtenaw County groups had higher scores than their counterparts within the larger
EMU data. ECA scores on the ACT were not different from the Washtenaw County group—overall, or in any of the subgroups. Table 10 (Chapter IV) presents the results of the analysis of ACT scores. The fact that the mean ACT scores and mean GPAs display such an opposite pattern with respect to the ECA – Washtenaw County comparison is interesting, although outside the scope of this study to delve into further.

The last academic measure examined was the number of college credits that both Washtenaw County and the larger group of EMU FTIACs had earned prior to beginning college. The results confirmed prior findings in terms of both the small overall numbers of dual enrollment credits and the discrepancy in this measure based on race, income, and familial level of education (Barnett & Stamm, 2010). Sixteen percent of the Washtenaw County group had earned dual enrollment credit. The mean number of credits earned in the county was 1.43, with the number of credits earned by subgroup ranging from 0.38 credits for Black students to 1.91 credits for White students. Washtenaw County students in this sample had fewer credits, on average, than their EMU counterparts, both overall and in every subgroup. EMU students, however, showed an almost identical pattern of discrepancies in terms of credit earned across subgroups. Table 22 (below) compares the mean number of dual enrollment credit earned and the associated standard deviations for EMU and Washtenaw County students, along with their demographic subgroups.
Table 22. Comparisons of College Credits Earned Prior to EMU Enrollment, Total EMU FTIACs vs. Washtenaw County EMU FTIACs, by Subgroup.

<table>
<thead>
<tr>
<th></th>
<th>EMU</th>
<th>Washtenaw County</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean # of College Credits</td>
<td>Standard Deviation</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2.6</td>
<td>9.09</td>
</tr>
<tr>
<td><strong>Male</strong></td>
<td>2.3</td>
<td>8.68</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td>2.7</td>
<td>9.37</td>
</tr>
<tr>
<td><strong>Black</strong></td>
<td>1.4</td>
<td>7.49</td>
</tr>
<tr>
<td><strong>White</strong></td>
<td>3.3</td>
<td>10.21</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>1.9</td>
<td>7.29</td>
</tr>
<tr>
<td><strong>Pell-Eligible</strong></td>
<td>2.0</td>
<td>8.26</td>
</tr>
<tr>
<td><strong>First-Generation</strong></td>
<td>2.0</td>
<td>8.33</td>
</tr>
</tbody>
</table>

The analysis of Bachelor’s Degree completion rates among Washtenaw County students at EMU showed that the two groups had completed Bachelor’s Degrees within the time-frame of this study at identical rates of 23%. The completion rates of Washtenaw County’s subgroups mirrored those of EMU, and reflected large and significant discrepancies on the basis of race, gender (males graduating at lower rates), income level, and familial level of education (see Figure 9, Chapter IV). Early College Alliance students defied the trends of non-completion and lower performance across subgroups.

**Question 3.** What are the differences in the rates of post-secondary degree attainment of ECA graduates who remained at Eastern Michigan University as compared with non-ECA graduates at Eastern Michigan University?

The third research question broadened the study further to examine Bachelor’s Degree completion rates of ECA students as compared with the larger group of EMU FTIACs with first-time enrollment terms beginning in fall, 2010 through winter, 2012. The EMU analysis is important for at least two reasons. First, Eastern Michigan University is one of the major partners that enable the Early College Alliance to operate. With both logistical and financial support, EMU has made its mark as one of the first four-year universities to open its doors to an early
college program. One presumes that it has done so, at least in some measure, because of the expectation that the ECA will produce eventual EMU graduates.

Second, EMU is an institution that prides itself on a commitment to educational initiatives on both the k-12 and higher education sides of the p -16 continuum. Known for its history as a “teacher’s college” and its College of Education that remains strong today, EMU has actively been involved in various types of educational reform initiatives within the state on the pre-collegiate level. On the post-secondary side of the p – 16 spectrum, EMU has worked to increase access to college for underrepresented students, receiving recognition as one of the more diverse undergraduate institutions in Southeast Michigan (Larcom, 2014). EMU’s Degree Completion and Retention Plan (2013-2014) reflected a commitment to improving outcomes for all students on campus, including underrepresented students, with a specifically-stated focus on men of color and single parents. Both k -12 education and in-house, higher education issues hold places of institutional importance at EMU. Thus, the impact of EMU’s own early college program is important to the university itself.

Question 3 was answered using Data Set #2. Demographic characteristics of the population of EMU students (N = 4,111) were described and compared with those of the ECA subpopulation (n = 47). Chi-square tests, shown in Table 13, Chapter IV, revealed that the differences in demographics between ECA and non-ECA EMU students were not statistically significant.

As with the comparison in the Washtenaw County data, independent t-test results showed that ECA students started as FTIACs with higher GPAs and ACT scores than did non-ECA students, both overall and in every subgroup except first-generation students. Tables 14 and 15 present the t-test results; Figures 13 and 14 depict the mean differences graphically (Chapter IV).
Both the larger group of EMU students and the smaller ECA group displayed patterns of academic performance reflective of the national trend in terms of demographic subgroup discrepancies (ACT, 2014; Engle & Tinto, 2008); differences were statistically significant in most cases, with lower mean GPAs for males, Black students, Pell-eligible students, and those who were first in their families to pursue a Bachelor’s Degree. Gender differences were somewhat less significant and a bit more varied.

The researcher also analyzed the amount of dual enrollment credit that students came to EMU with. This aspect of the study was important because it is intuitively the case that ECA students have an edge when it comes to completing a college degree simply by virtue of the number of credits they have accumulated toward that end before they even start college. Adleman’s 2006 “Toolbox” study found that college credit earned in high school was an important predictor of college success. This variable was certainly the most obvious quantitative measure that could be attributed to ECA students, and it goes a long way toward defining participation in the program.

While dual enrollment is becoming more prevalent, a very small number ($n = 742$, or 18%) of the overall group of EMU FTIACs in this study enrolled with any college credit earned. The mean number of credits earned was 2.6, with the non-zero mode being 3. Significant discrepancies were evident in terms of the demographic composition of students earning college credit, with 23.1% of White students the highest percentage, and 9.6% of Black students the lowest. Gender was the only subgroup that did not demonstrate significantly different numbers of college credit earned (see Tables 16 and 17, Chapter IV).

Overall degree completion rates in this analysis of the larger EMU population were touched on in Question 2. The overall rate was 23%, with wide variation by subgroup. White
students completed their degrees at the highest rate—29%, while Black students had the lowest rate, at 8%. ECA graduation rates were significantly higher, overall, at 68%. More interesting, however, is the fact that the discrepancies in academic performance data, explained above, within the cohort of ECA students in this study, did not translate to decreased outcomes in terms of graduation rates. Black students, for example, whose GPA and ACT scores were significantly lower than any other subgroup, completed degrees at a rate higher than the total average (70%). This result signifies a dramatic departure from the typical pattern of lower-than-average achievement measures seemingly inevitably leading to lower-than-average degree outcomes for underrepresented (and especially Black) students (Engle & Tinto, 2008). Figure 17 presents the graduation rates of the EMU population, as well as the ECA and Washtenaw County subpopulations, by demographic category.

![Figure 17. Degree attainment rates of Washtenaw County, EMU and ECA FTIACs.](image)

Given the much higher rates of degree completion for ECA students, the researcher sought to determine to what extent, if any, ECA participation was a factor in the success of these students. Logistic regression models were built to test various predictors for their impact on the
likelihood of degree completion. Regressions were performed for the overall group of EMU FTIACs as well as the subgroups with the most discrepant graduation rates: Male students, Black students, first generation students, and Pell-eligible students. All of the models included the continuous variable high school GPA as a very significant predictor, but other variables combined in the models to create equations that differed in terms of their relative impact. Table 23 presents a summary of the logistic regression equations, with the exponentiated beta figure included to show the differing odds ratios that each factor contributed to the model.

Table 23. Comparison of Logistic Regression Chi-Squares, Degrees of Freedom, and Odds Ratios of Predictor Variables.

<table>
<thead>
<tr>
<th>Predictor Variables/Expβ (odds ratio)</th>
<th>EMU Population</th>
<th>Pell-Eligible</th>
<th>First-Generation</th>
<th>Male</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall χ²</td>
<td>df</td>
<td>GPA</td>
<td>Coll. Credit</td>
<td>ACT</td>
<td>Pell-Eligible</td>
</tr>
<tr>
<td>674.80</td>
<td>6</td>
<td>4.04</td>
<td>.68</td>
<td>X</td>
<td>.68</td>
</tr>
<tr>
<td>290.63</td>
<td>5</td>
<td>4.03</td>
<td>1.03</td>
<td>1.05</td>
<td>X</td>
</tr>
<tr>
<td>211.24</td>
<td>5</td>
<td>3.59</td>
<td>1.05</td>
<td>1.08</td>
<td>X</td>
</tr>
<tr>
<td>202.63</td>
<td>4</td>
<td>3.55</td>
<td>1.03</td>
<td>1.05</td>
<td>X</td>
</tr>
<tr>
<td>80.32</td>
<td>4</td>
<td>3.90</td>
<td>X</td>
<td>1.13</td>
<td>.52</td>
</tr>
</tbody>
</table>

The Early College Alliance program, in this analysis, emerged as a major predictor in terms of degree completion rates for the lowest-performing, and therefore most at-risk, subgroup: Black students—and was not a significant factor in the larger group nor any of the other subgroups. In general, the lack of significance of ECA participation in the majority of the regressions may be due to the fact that it was highly correlated with the two most significant predictors in every model, high school GPA and number of college credits earned prior to the FTIAC semester. That is, the definition of ECA students that developed through these data included “high GPA” and “large numbers of college credit,” and these indicators contributed significantly to the likelihood of degree completion.
The fact that ECA participation was so strongly predictive of degree attainment for Black students was likely due to a combination of factors. 1). The academic indicators that demonstrate the most significant predictive power for the overall group, high school GPA, ACT scores, and number of college credits earned while in high school were all much lower than the mean for both EMU and ECA Black students. 2). Black ECA graduates completed degrees at high rates despite lower than average academic indicators, and Black students in the general EMU population completed degrees at much lower rates.

**Significance**

This study was undertaken with both theoretical and practical ends in mind. The theoretical framing that influenced its design and implementation posited that early colleges positively affect students in terms of college *access* and college *readiness*, which in turn leads to increased likelihood of college *persistence* and eventual Bachelor’s Degree attainment. Early colleges are uniquely positioned to have this impact because they are situated directly in the transitional space between high school and college—bridging a gap in the p-16 education system. This study provided data to support this theoretical framework, as well as practical results that confirmed long-term benefits of this particular early college. Indeed, the Early College Alliance graduates across all subgroups outperformed their non-ECA counterparts in terms of Bachelor’s Degree attainment.

While many of the pedagogical elements that make the ECA program successful are not addressed in this quantitative study, inferences can be made as to the variables in these data that influenced college access and college readiness among students in this study. Relying on Data Set #2, which included more variables, the predictors that were chosen as proxies for college
readiness and college access were the continuous academic indicators: high school GPA, ACT composite score, and number of beginning college credits earned.

The academic indicator variables “high school GPA” and “ACT score” may be viewed as variables that measured college readiness within this population. ACT’s published “College Readiness Benchmarks” placed its scores into categories that predict success in first-year college coursework (ACT, 2014). Providing a contrast to ACT’s definition of college readiness, Adleman (2006) utilized a composite “academic resources” variable that included a rigorous high school curriculum, high school GPA, and test scores in the senior year (p. 35). Adleman found this variable to be important not only in terms of post-secondary coursework, but in degree completion, as well (p. 36).

The present study found that both high school GPA and ACT scores had a predictive impact in terms of the likelihood of degree attainment. When compared against both their Washtenaw County and EMU peers, ECA students demonstrated significantly higher means in terms of these quantitative measures of college readiness (see Figures 13 and 14, Chapter IV).

The variable that measured “beginning college credit” may be considered an indicator of college access, particularly at the higher levels of credit earned. Bloom (2008) argued that the most powerful way of providing college access to students, particularly those underrepresented in higher education, is to ensure that high school students gain some familiarity with college and college-going processes—by exposure to college campuses, connections with college students and faculty, and explicit support with logistics such as applications and financial aid forms.

While an AP course that results in a 3-credit start on a college transcript probably does not rise to the level of “exposure to college campuses,” students with more dual enrollment credits are more likely to have had the opportunity to interact with college instructors and
college-level expectations. It should be noted, however, that the present study found that even students with only 1 – 3 beginning college credits in this study showed a jump in degree completion; one-third of this group earned their degrees, as compared with only 18% of students who had earned no college credit.

The categorical variable that coded for ECA participation may be viewed as a composite readiness-access variable that included higher-than-average means on all of the academic indicator variables. The quantitative measures that began to crystallize into a data snapshot of “ECA-ness” were higher-than-average high school GPAs and ACT scores on the readiness variables, and much higher-than-average numbers of beginning college credit, the access variable. It was this combination of factors that, when included in the logistic regressions in this study, predicted degree completion most strongly for most students.

While the overall rates of degree completion among ECA FTIACs is great news, the consistent graduation rates among ECA’s demographic subgroup populations is incredible news. Every author (including this one) who has explored the topic of educational opportunities and outcomes in this country has brought forth evidence of large and intractable gaps between Black students and White students, between rich students and poor students, and between those who are the first in their families to pursue a Bachelor’s Degree and those with a family history of college access and success (Engle & Tinto, 2008; Goldberger, 2007; Long & Riley, 2007; Nakimba, Dembo, & Mossler, 2012; Tinto, 2012).

This study adds to the tale of inequity, confirming achievement gaps within all three populations: ECA, Washtenaw County, and EMU at-large. These findings traced the path toward what seems the inevitable result of such discrepancies in measures of college readiness—gaps in degree attainment. This study, however, found a different result. Despite achievement gaps as
evidenced by lower GPAs and test scores of ECA’s underrepresented students, the researcher found no evidence of corresponding gaps in degree attainment for Black, Pell-eligible, or first-generation students. While this study does not offer explanations for this, the regression model applied within the subpopulation of Black students provided a clue. There is something about “ECA-ness,” for this group of students, that has contributed to an astounding increase in their likelihood of completing college—something that has had an impact well beyond that of the academic indicators, by themselves.

The problems of low Bachelor’s Degree completion, overall, and the huge disparities in outcomes based on demographic characteristics have proven extraordinarily difficult to successfully address. The literature review yielded recommendations for facilitating the success of underrepresented students in higher education. These included, in the high school setting, enhancing college access and readiness by holding high academic expectations for students and providing a rigorous high school curriculum (Engle & Tinto, 2008; Green, 2006; Adleman, 2006); fostering mentoring relationships focused on completing the steps required to apply, enroll in, and pay for college (Bloom, 2008; Corwin & Tierney, 2007; Hungerford-Kresser, & Amaro-Jiménez, 2012); and providing authentic college experiences, including dual enrollment coursework (Conley, 2005; Adleman, 2006; Conley, 2007; Karp, et al., 2007).

In the higher education setting, recommendations included enhancing college persistence in several ways: providing academic and social-emotional support to students (Engle & Tinto, 2008); directly teaching (and coaching the application of) non-academic skills that are critical to college success, yet often operate as unspoken cultural norms that not all students are aware of (Conley, 2005; Conley, 2007), facilitating a sense of belonging and safety on the college campus, including safety from discrimination (Rodgers & Summers, 2008); maintaining an
awareness of and a respect for the ways in which the life experiences of diverse students may affect them in the school setting (Rodgers & Summers, 2008); and ensuring that students form a connection with faculty who know them, and want/expect them to succeed (Engle & Tinto, 2008; Nakajima, Dembo, & Mossler, 2012).

The recommendations for all three elements that lead to degree attainment—readiness, access, and persistence—mirror the foundational principles that undergird early college high school programs. This is no accident; early college high schools operationalize a very deliberate model that is designed to maximize the chance of success in college for all students, and especially those underrepresented in higher education (ECHSI, 2013; Barnett, Maclutsky, & Wagonlander, 2015).

Early college graduates develop a great deal of academic self-efficacy through a cycle of positive-feedback (Nakkula & Foster, 2007). Early college high schools directly teach and coach college readiness skills, enabling students to succeed in college courses. When these students complete high school with a significant amount of college courses on their transcripts, they feel confident that they can succeed in college because they have already done so. While the current study did not specifically test the qualitative design principles that are so central to the early college model, the results pointed to the likelihood that “ECA-ness” is a powerful construct in terms of facilitating successful outcomes for students of color, low-income students, and those who are the first in their families to pursue a Bachelor’s Degree.

Other studies of early college high schools have found that such programs have been able to close academic achievement gaps (Bramucci, 2014; Muñoz, Fischetti, & Prather, 2014); this study found that, at least for this group of Early College Alliance graduates, it is also possible to close Bachelor’s Degree attainment gaps. The next section describes the significance of these
findings for three constituencies: the Early College Alliance itself, its Washtenaw County partner districts, and Eastern Michigan University.

**Early College Alliance.** The results of this study highlight the initial successes experienced by the first few cohorts of Early College Alliance students. As the ECA currently enrolls the students who will make up the ninth incoming cohort this coming fall, the Bachelor’s Degree attainment data for those initial pioneers seem overdue. However, it must be remembered that Bachelor’s Degree attainment is typically measured within six (or even eight) years of beginning as a FTIAC, and these students have only had four or five years, so far, to attain their degrees. While more data are needed, this study is a good start for the ECA program.

At the Early College Alliance, several adjustments that may end up positively affecting students’ college completion rates have been implemented in the years since the graduates of 2010 and 2011 attended the program. Standardized auditing procedures have helped to track and advise students in their college course-taking while in the program. A high school counselor was hired, and immediately implemented a guidance curriculum and related programming to help students with post-ECA planning. Centralizing key processes, such as enrollment, Educational Development Plan creation, academic probation, and program completion procedures have helped to refine and clarify the longer-term goals and needs of students. CORE Advisors, always the champions of their mentees, have become experts in guiding students through the program and, often, beyond.

**K – 12 education and Washtenaw County partner school districts.** While the majority of Washtenaw County’s graduates enroll in college, four-year degree completion remains an elusive goal for many of these, even at the 6-year mark (MI School Data, 2001-2016). As is the case with most other student groups, attainment of college degrees varies markedly on the basis
of race, gender, socioeconomic status, and first-generation status. Washtenaw County school district leaders are increasingly focused on stretching their limited resources to reach across the p – 16 divide and ensure that their students are prepared to complete the college degrees they start. Developing the partnership that created the ECA program is one way that they have done this.

The findings in this study provide bad news, in that the data analyzed largely confirm what was already well-known: Washtenaw County students who attend EMU do not, overall, complete degrees at a higher rate than the larger group of EMU FTIACs. The pattern of unequal degree attainment on the basis of race, gender (males), income level, and familial level of education held just as true for the Washtenaw County group as it did for the larger group of EMU students—despite academic advantages that the majority of Washtenaw County students started college with, in the form of higher GPAs and ACT scores.

There is excellent news in these data, however, in terms of the potential for early college experiences to make a profound difference in post-secondary outcomes. Because ECA students retain membership in their county districts, the degree completion rates of ECA students factor favorably into the ECA district’s graduation rates. This study showed that graduation rates within the districts increased, with the exception of Whitmore Lake. Table 24 shows the impact that the ECA rates have on the Bachelor’s Degree completion rates for those districts who were ECA partners during the time frame examined in this study.

<table>
<thead>
<tr>
<th>Washtenaw County Partner School District</th>
<th>% ECA Students Within the District’s FTIAC Enrollment at EMU</th>
<th>% Degree Completed - ECA</th>
<th>% Degree Completed - District (without ECA)</th>
<th>% Degree Completed - Total (with ECA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lincoln</td>
<td>27%</td>
<td>62%</td>
<td>25%</td>
<td>35%</td>
</tr>
<tr>
<td>Milan</td>
<td>26%</td>
<td>75%</td>
<td>13%</td>
<td>29%</td>
</tr>
<tr>
<td>Whitmore Lake</td>
<td>20%</td>
<td>0</td>
<td>50%</td>
<td>40%</td>
</tr>
<tr>
<td>Ypsilanti</td>
<td>32%</td>
<td>73%</td>
<td>9%</td>
<td>30%</td>
</tr>
</tbody>
</table>
**Higher education and Eastern Michigan University.** The findings in this research project highlight a reality that institutions of higher education must come to grips with. Colleges and universities have certainly been affected by the decrease in college success of first-year college students. The reality is that students are leaving high school unprepared for the demands of college, even when academic indicators meet the levels required for admission—and colleges need to find ways to facilitate their success *anyway*. With an increasing emphasis on the responsibility that post-secondary institutions bear to ensure that students who start college actually finish their degrees, the factors that affect college completion rates for those groups who have demonstrated success, as in this study, warrant close scrutiny.

Eastern Michigan University, with its mission as an “institution of opportunity” has focused particular efforts on improving not only enrollment of, but also graduation outcomes for its diverse student body (EMU, 2013). In particular, programs focusing on Black males and student parents have attempted to positively influence success rates for these at-risk student subgroups. The goals of the Early College Alliance are aligned with EMU’s goals in this respect.

Discussing the challenge of finding ways to improve college success rates for historically underrepresented students, Green (2006) recommended “…investigating the circumstances under which minority, low-income, and first-generation students succeed academically” (p. 26). The results of this study offer exciting evidence of an educational model that can go a long way to mitigating the negative impact of achievement disparities on the basis of race, income, and familial level of education. In particular, the degree attainment rate of Black ECA graduates is noteworthy. Against the odds, and despite lower academic indicators, Black students who completed the ECA program achieved their degrees at rates commensurate with their non-Black
peers. This is an extremely promising finding—and holds true across the demographic subgroups of ECA graduates.

With its history and identity as an “education institution,” EMU has periodically taken action to influence pre-collegiate educational initiatives within Michigan, including its involvement as a charter school authorizer and a partner with the state in the Educational Achievement Authority. Over the past eight years, the Early College Alliance has quietly and independently created a laboratory where the concerns of secondary and post-secondary institutions intersect. This unique program, operating in the space spanning the high school-to-college transition, offers a rich environment in which to study the factors influencing college readiness, college access, and persistence to a degree. Adding to years of incredible college course pass-rate data that hinted at promising outcomes for students who have experienced the program, this study presents the first evidence that ECA model contributes significantly to college graduation rates of its alumni—particularly those who remain at EMU.

Implications for Educational Leaders

Early college leaders. Much of the content of this study will resonate with leaders in the early college movement, particularly in Michigan. Most early college teams (principals/directors, counselors, administrative staff, and faculty) keep a very close eye on their students’ college course-taking success rates while enrolled in the early college high school. Early college leaders should add post-secondary degree-completion to the list of metrics that they use to gauge their own effectiveness. This might entail putting in place mechanisms to track graduates in order to ensure the most complete data.

The work that early college leaders engage in within the gap between high school and college must extend farther down the educational pipeline. Early college faculty cannot take
responsibility for the “during college” experiences of their students; that is the realm of their higher-education counterparts. However, they should prioritize guidance curricula and advising support that will give their graduates the tools they need to overcome the barriers that remain once they leave the early college setting.

**K – 12 leaders.** Early college high school programs are very different from comprehensive high schools, and strict comparisons between the two models are inappropriate. Simply by virtue of the enrollment mechanism at the ECA, for example, the student body is different; students choose the experience, knowing that it is a demanding and rigorous school. They are focused on attending college, and doing so in a unique way and at a much earlier age than their peers. They are willing to give up aspects of a traditional high school experience in order to attend the ECA. There are many things that the ECA and other early college high schools are able to do that are not possible or practical in a traditional public high school.

Nonetheless, this study highlights aspects of students’ pre-collegiate experiences that traditional high school leaders can focus on to increase the likelihood of their graduates’ post-secondary success. The importance of the academic indicators of college readiness—high school GPA and ACT scores—that emerged from these data confirm the need for greater rigor in high schools. A focus on an academically rigorous curriculum is critically important, but students must be supported in attainment of high standards by faculty and staff with the expertise and time to ensure that all students have maximum opportunity to achieve.

There are many ways to think creatively about implementing high standards and high expectations for reaching these standards. It is up to school leaders to facilitate this process—to invite and encourage both creativity and high rigor. At the ECA, teachers developed and continually refine the curricula they teach by consulting with college professors to ensure that the
preparation within ECA high school classes is adequate. Teachers hold office hours to provide individualized help to students, and tutoring is available daily. Students report spending a minimum of 2 hours each day doing homework while in ECA classes; that level of commitment is the stated expectation set forth by the ECA principal and all faculty members. During school and after school, academics must come first if college success is the goal.

This study confirmed what Adleman (2006) found in “The Toolbox, Revisited:” the more college credits students earn while in high school, the better their chances of completing college. Therefore, the second recommendation for leaders in high schools is to expand dual enrollment opportunities. This recommendation is strongly tied to the first; if the academic rigor is not in place within the high school curriculum, students are unlikely to pass their dual-enrollment coursework. School leaders must also maintain a specific goal of ensuring that students of color, low income students, male students, and first-generation students take advantage of purposeful, well-designed dual enrollment opportunities.

High school leaders must accept responsibility for ensuring that the pre-collegiate academic preparation that their students are receiving is aligned with the demands of college. While expanding dual enrollment opportunities to more students is important in terms of establishing momentum toward a degree and reducing financial barriers, high school leaders must not shift the burden of academic preparation for college-level coursework to the post-secondary institutions.

The last recommendation reflects the importance of the as-yet undefined quality of “ECA-ness.” While this study did not specifically address qualitative aspects of the program that influence students beyond high school graduation, it is worth emphasizing the role that adult relationships play in building the foundation for student success at the ECA. The types of
supportive mentoring relationships that ECA students develop with teachers and CORE advisors are designed to help students build the capacity for achievement that leads to strong GPAs, test scores, success in college courses, and eventual degree attainment. High school leaders should create the conditions under which these relationships can develop, including considerable time and an institutional framework to support and focus this mentoring work.

**Higher Education Leaders.** Early college high schools have created successful programs over the past two decades by watching and learning from the post-secondary partners who have had the vision to make space for these young students on their campuses. It is somewhat ironic, therefore, that the educational models built on the expectations and needs of these colleges have often surpassed their mentor-institutions in terms of student outcomes, both short and long term. Leaders on the post-secondary end of the p-16 spectrum should reciprocate the interest that early college leaders have shown; early college high schools have expertise to share with their college partners. Early college high schools have developed programmatic elements that may provide the seed of helpful retention ideas within the post-secondary population.

Developing an institutional stake in studying and replicating early college models would be an exciting way for post-secondary institutions, including EMU, to lead the way in terms of bridging the gap between high school and college. Engaging in further research about the model’s effectiveness is one way leaders in higher education can take on a more significant role. Higher education should also make use of the expertise of the education professionals in the early college high schools. Opportunities for enhanced partnerships exist in departments of teacher education, social work, counseling, educational leadership and the like—such as placing pre-service teachers and other interns in early college high school classrooms and offices.
**Education Policy Leaders.** With increased policy support for the expansion of early college programs across the state, leaders involved in educational policy in Michigan have moved in a direction supported by this research. Increasing the number of college credits that students can earn in high school can be an important variable in degree completion. Additional recommendations for policy leaders include reducing administrative barriers that hamper early college high school programs, while enhancing public oversight of the many new programs to ensure comprehensive early college model components are implemented—particularly the aspects that support the access and success of low-income, minority, and first-generation students.

**Recommendations for Further Research**

While the current study contributes needed descriptive and inferential data to the “early college” corner of the educational world, it also points out the need for many further studies, some of which are being undertaken currently. The most glaring need is to expand the study to include more early and middle college graduates. Michigan serves as a unique proving ground for early colleges that operate under a variety of different models, yet adhere to some common foundational principles. Many of Michigan’s early colleges are connected through the Michigan Early/Middle College Association (MEMCA), the professional organization that serves to provide support and structure to early colleges throughout the state. Currently, MEMCA schools are involved in an ongoing data project led by researchers Jennifer Kim and Elizabeth Barnett of the National Center for Restructuring Education, Schools, and Teaching (NCREST). Now in its 4th year of collecting dual enrollment and student perception data on twelve participating early colleges in Michigan, the NCREST study will soon expand its focus to include degree completion of Michigan’s early college high school graduates.
The researcher’s assumption that early college students are likely to complete a Bachelor’s Degree in less than the now-normal 6-year time frame by virtue of the “head start” they receive in terms of credit accumulation prior to high school graduation led to the decision to truncate the more typical measure of degree completion. While this study found that more early college students have completed 4-year degrees than non-early college students did in this shorter, four- and five-year time frame (68%, as compared with 23% of the general population at EMU), a study that allows for the full six years of undergraduate work would likely demonstrate a higher number of graduates across the board, and would be aligned more closely with the time frame utilized in other studies of college degree attainment.

The need to extend the study beyond the four- and five-year time frame for Bachelor’s Degree completion leads to another critical question that bears further examination: why are ECA students taking so long to complete a “4-year” degree? With an average of 54.8 college credits successfully completed during high school, it would seem that they would be well on their way to finishing the remaining credits within a shorter time frame. As Engle and Tinto (2008) suggested, it is likely that the experiences that students have during college are at play in success rates as much as their pre-collegiate experiences (p. 20). Studies that focus on early college graduates’ experiences once they become independent college students might help to shed light on barriers that remain salient for this group.

A related question involves the reason so many early college graduates have not earned their degrees. While 68% is a much higher rate than 23%, there are obviously considerable barriers facing students even with the support and experience provided by the early college experience. From a practitioner’s standpoint, the question becomes, “What more can be done to improve outcomes for the students graduating from our early college high schools?” The ECA
program has grown and developed in the years since the classes of 2010 and 2011 graduated from high school; continued tracking of post-secondary outcomes of the groups of ECA students who have been exposed to the increasingly sophisticated knowledge-base of this developing program will be important.

Finally, the results from this study beg for an answer to the question: What is ECA-ness? ECA graduates tend to explain their experiences in the program in very similar ways while they are in high school, and as they graduate. Very interesting perception data are collected from Completers via the Washtenaw County’s Senior Exit Survey and the Michigan Early/Middle College Association’s Survey of Student Voices. An analysis of these data, as well as follow-up studies of ECA graduates as they move through college, and beyond, would help to deepen the definition of what it means to have been an ECA student.

**Conclusion**

The theoretical framework underlying this study held that early college high school programs are likely to positively affect college access and college readiness, leading to the increased college persistence that results in degree attainment. Early college programs operate directly in the transitional space between the k-12 and post-secondary segments of the p–16 education system. This position provides a unique opportunity to influence the system at both the high school and college levels. Data from this very initial exploration of this topic support this theoretical model. Even with limited numbers of identifiable Early College Alliance graduates, this study confirms that ECA graduates have, thus far, completed Bachelor’s Degrees at significantly higher rates than their non-early college peers. The most powerful predictor variables of degree completion are also the variables that help to define ECA students at EMU—
higher-than-average high school GPAs and ACT scores, and large numbers of college credits earned while in high school.

Aside from accumulating college credit and facilitating academic achievement, there are many other factors that make an early college unique in the realm of secondary education. Defining principles include “power of the site,” or immersing high school students on a college campus to provide them with authentic college experiences; a focus on strong mentoring or advising relationships with teachers or other significant adults on campus for each student; and a college readiness curriculum that directly teaches students the academic, socioemotional, and study skills necessary to succeed in college coursework. It is impossible to tease out the ways in which these elements directly lead to successful post-secondary degree completion in this study, but it is undeniably true that the Early College Alliance has made it possible for students to earn the significant amounts of college credit that make it much more likely that they will earn a degree.

The results of this study confirm the promise that early college programs hold as models of collaboration across the p–16 education system. Educators in both high schools and colleges face similar challenges, in many respects. Some of these challenges, including problems of readiness for college, access to college, and untenable disparities in outcomes on the basis of race, income, and familial level of education, are much more effectively addressed through partnerships that span the high school–college divide. ECA is truly a feather in the caps of both EMU and Washtenaw County’s public school districts—an exemplar of the relationships that can be forged across the p–16 educational system to improve student outcomes both in high school and in college.
References


Center for Educational Progress and Information (MI). 2012-2013 college remedial coursework enrollment snapshot, statewide, 4-year colleges and universities, by student subgroup (2012-2013 graduating class). Retrieved from https://www.mischooldata.org/DistrictSchoolProfiles/PostsecondaryOutcomes/IheRemedialCoursesByHighSchool2.asp.


Cunningham, C., & Matthews, R.S. (2007). Lessons from the field: A tale of two early college high schools. In N. Hoffman, J. Vargas, A. Venezia, & M.S. Miller (Eds.), Minding the


Long, B.T., & Riley, E. (Spring, 2007). Financial aid: A broken bridge to college access?

*Harvard Educational Review*, 77 (1), 39-63, 127. doi:

http://dx.doi.org/10.17763/haer.77.1.765h8777686r7357


National Center for Higher Education Management System. (2015). *Percent of family income needed to pay for college – by type of institution, 2009* [Graph of Percent of net family
income from lowest quintile (4-year public colleges/universities)]. Retrieved from 

National Student Clearinghouse. (2014, Nov.). StudentTracker for high schools: Aggregate 


analysis and reporting. The Journal of Educational Research, 96(1), 3 – 14. doi:
10.1080/00220670209598786.


Rendón, L.I., Jalomo, R. E., & Nora, A. (2000). Theoretical considerations in the study of 
minority student retention in higher education. In J.M. Braxton (Ed.). Reworking the 

Senate Fiscal Agency. (2013, Sep.). Study of Michigan public university enrollment patterns by 
HiEdEnrollment/PublicUniversityEnrollmentPatterns_MostRecent.pdf.

[Reports for graduating classes of 2008-2009 & 2009-2010, Washtenaw County (all 
schools) and Statewide]. Retrieved from www.mischooldata.org/
DistrictSchoolProfiles/PostsecondaryOutcomes.


RESEARCH @ EMU

UMSIR Determination: EXEMPT

DATE: November 24, 2015

TO: Ellen Fischer, MA
Eastern Michigan University

Re: UMSIR: # 830842-1
Category: Exempt category 4
Approval Date: November 24, 2015

Title: Laying the Foundation: An Investigation of 4-Year Degree Attainment Rates of Early College High School Graduates

Your research project, entitled Laying the Foundation: An Investigation of 4-Year Degree Attainment Rates of Early College High School Graduates, has been determined Exempt in accordance with federal regulation 45 CFR 46.102. UMSIR policy states that you, as the Principal Investigator, are responsible for protecting the rights and welfare of your research subjects and conducting your research as described in your protocol.

Renewals: Exempt protocols do not need to be renewed. When the project is completed, please submit the Human Subjects Study Completion Form (access through IRBNet on the UMSIR website).

Modifications: You may make minor changes (e.g., study staff changes, sample size changes, contact information changes, etc.) without submitting for review. However, if you plan to make changes that alter study design or any study instruments, you must submit a Human Subjects Approval Request Form and obtain approval prior to implementation. The form is available through IRBNet on the UMSIR website.

Problems: All major deviations from the reviewed protocol, unanticipated problems, adverse events, subject complaints, or other problems that may increase the risk to human subjects or change the category of review must be reported to the UMSIR via an Event Report form, available through IRBNet on the UMSIR website.

Follow-up: If your Exempt project is not completed and closed after three years, the UMSIR office will contact you regarding the status of the project.

Please use the UMSIR number listed above on any forms submitted that relate to this project, or on any correspondence with the UMSIR office.

Good luck in your research. If we can be of further assistance, please contact us at 734-487-3090 or via e-mail at human.subjects@emich.edu. Thank you for your cooperation.

Sincerely,

Jennifer Kallmam-Pritz, PhD
Chair
University Human Subjects Review Committee