# THE EFFECTS OF DUAL ENROLLMENT ON STUDENT-LEVEL OUTCOMES AT A RURAL COMMUNITY COLLEGE: A QUANTITATIVE RESEARCH STUDY

by

Richard James Smith

This dissertation is submitted in partial fulfillment of the requirements for the degree of

Doctor of Education

Ferris State University

May 2015

THE EFFECTS OF DUAL ENROLLMENT ON STUDENT-LEVEL OUTCOMES AT A RURAL COMMUNITY COLLEGE: A QUANTITATIVE RESEARCH STUDY

by

Richard James Smith

Has been approved

May 2015

APPROVED:

Christine Vonder Haar, DA
Committee Chair

Jordan Webster, PhD
Committee Member

Jenny Schanker, EdD
Committee Member

Dissertation Committee

ACCEPTED:

Roberta C. Teahen, PhD, Director
Community College Leadership Program

ABSTRACT

Higher education opportunities are prevalent in many different forms throughout the state of Michigan. These opportunities include advanced placement, early college, middle college, technical programming, and traditional dual enrollment. These programs are sometimes referred to as bridge/transition, credit-based transition, or dual enrollment/dual credit. As many community colleges have begun to collaborate with K-12 schools in recent years, these opportunities tend to be an increasingly common way of preparing high school students for postsecondary education. In this study, the researcher used a quasi-experimental research design to determine the effects of different types of dual enrollment on student-level outcomes at a small rural community college in Michigan. Using an overall population sample size of 2,639 students who enrolled during the fall 2010 and winter 2011 semesters, it was discovered that dual enrolled students did not persist or complete at rates that were considered statistically significant. The research did, however, support previous studies demonstrating that high school GPA and ACT reading scores are significant variables associated with college completion, and the research reaffirmed the idea that dual enrollment is associated with increased college GPAs. Further research that focuses on predetermined factors associated with dual enrollment will be important, as well as determining the most efficient instructional methods that impact dual enrollment completion.

DEDICATION

This dissertation is dedicated to my loving family – I love you all.

First, I would like to dedicate this to my beautiful wife, Dr. Ann Smith. She is the best friend that a person could ever have. Her patience with me during this journey has been extraordinary, and I love her so for this. She has been a wonderful mother to our beautiful children, and for this too I am very grateful.

I would also like to dedicate this dissertation to my children, Karly, Cayden, and Cuyler. I am so thankful to have three great kids who have all been so patient with me over the past few years. Each of you are truly a blessing to me and I love you each dearly. All of our accomplishments as a family are a direct result of your unconditional love and support. I have learned so much from each of you, and I will continue to do so in the years to come.

Lastly, I would like to thank my parents and step-parents. My parents, Christina Weber and Richard Smith have supported me through the years and provided me with a loving home and solid upbringing. I would also like to thank my step-mother and step-father, Jana and Dr. Wendell Weber. You have treated me as though I were your own, and I am thankful to each of you every day.

ACKNOWLEDGMENTS

The road taken along this doctoral journey has been paved with sacrifices from numerous individuals. Many individuals have made numerous sacrifices in an effort to allow me to become a better person. Without the encouragement and support from those who assisted me and served on my dissertation committee, this accomplishment would never have been possible.

I would first like to thank Dr. Christine Vonder Haar. Her guidance, mentorship, and feedback were invaluable to me as my dissertation chairperson. The commitment and time that she dedicated to my research and development will always be remembered. Her knowledge and experience has helped me grow tremendously, and for her assistance, I am forever grateful.

I would also like to extend my sincere gratitude to Dr. Jordan Webster. Dr. Webster was an integral part of my research, and I am very thankful for his willingness to share his experience and wealth of knowledge.

A special extension of my gratitude goes to Dr. Jenny Schanker. I appreciate your willingness to serve on my dissertation committee, and I am fortunate to have worked with someone with your expertise.

Lastly, I thank the following individuals for their support and service as role models for me during my growth as an administrator and educator: Mrs. Carol Churchill,

Dr. Michael W. Jankoviak, Mr. Chris Goffnett, Dr. Peter Velguth, Mr. Shawn Troy, and Dr. Maggie Maggoon. Each of you has served as wonderful models of leadership, and I am thankful for the opportunity to work with you.

TABLE OF CONTENTS

Page

# LIST OF TABLES

Page

# LIST OF FIGURES

Page

# CHAPTER ONE: INTRODUCTION

## INTRODUCTION

For many years, postsecondary education has carried a certain prestige and elitism that has targeted the most brilliant minds. For America to compete with other countries throughout the world, the United States would likely benefit from an increase in the number of students who attain a credential or degree in higher education. According to comments made by President Obama, he wants America to have the highest proportion of college graduates in the world, because the country used to have that, and he wants to get that lead back (as cited in Gaston, 2010, p. 199). President Obama suggested that America is in need of innovation, and reclaiming its elite educational status is necessary. This push to develop an increasing number of college graduates means that community colleges will be asked to monitor the number of students who have pressed through college and completed. Does dual enrollment serve as a means for institutions to more effectively transition students and prepare them for higher education in an effort to complete their postsecondary goals?

As the push from President Obama to expand the number of college graduates increases, along with the demand to prepare youth for the educational and employment challenges that lie ahead, community colleges will be asked to take the lead and play a major role. According to Kelly (2010), “More than half of the young adults in the leading

countries (Canada, South Korea, and Japan) have earned college degrees compared to less than 40 percent in the U.S." (p. 2). More college graduates in America could lead to more competitive jobs, which in turn could result in a more stable economy. Kelly (2010) stated the following:

> A driving force behind the President's statement are data published annually by the Organisation for Economic Cooperation and Development (OECD), which reveal that the U.S. recently ranked 10th among developed countries in the percentage of its young adults ages 25 to 34 with college degrees (associate or higher). (p. 2)

Various authors suggested that the United States has a great deal of room for growth when it comes to preparing America's youth for jobs of the future. "Unease about performance is growing among all types of higher education systems and institutions, including community colleges, which are being encouraged to maintain open access while producing many more students who complete and receive a credential" (Bragg & Durham, 2012, p. 106). Such challenges present room for innovative thinking and a willingness for educators to try new techniques to encourage academic growth.

Of the many different types of opportunities that students have to earn college credit, perhaps the most popular and commonly known form is dual enrollment. There are many different variations of dual enrollment throughout America, but the term is defined most generally as an experience where a high school student enrolls in college coursework and receives postsecondary credit upon successful completion of the course (Cassidy, Keating, & Young, 2011; Hughes, 2010; Swanson, 2008). Historically, *dual enrollment* has been a term used to describe the more high-achieving high school

students; however, researchers claim that dual enrollment can also impact underperforming students as well (Edwards, Hughes, & Weisberg, 2011).

Researchers have found a number of benefits and concerns associated with dual enrollment, while a number of studies have found mixed results that appears to question the integrity of such programming. In terms of benefits, students who attain a sizeable number of college credits through some type of accelerated high school program, and enroll in college soon after graduating high school, show increased results in degree attainment (Adelman, 2006; An, 2012; Karp, Calcagno, Hughes, Jeong, & Bailey, 2007; Swanson, 2008). The research connected to dual enrollment also appears to demonstrate concerns as well, however.

Some researchers question whether dual enrollment ultimately leads toward degree completion. According to Karp et al. (2007), "It remains unclear whether dual enrollment participation increases students' likelihood of entering college, preparedness for college-level work, or attainment of a college degree" (p. 14). Despite some of the popularity behind dual enrollment, some studies questioned the efficacy of such programming and believe that more research is necessary related to college level outcomes. Karp et al. (2007) reported that "despite the popularity of dual enrollment programs, little is known about their effectiveness as a strategy for increasing students' postsecondary attainment" (p. 13). Because there is an apparent need for research that focuses on dual enrollment and college completion, the researcher determined that a study focusing on various dual enrollment opportunities in a small, rural community college in central Michigan would provide such support.

## DEFINITION OF TERMS

Several of the terms in this study are defined below for the purposes of clarification. The literature review will also include various terms, and in that occurrence, sources are cited.

*Concurrent Enrollment.* Concurrent enrollment is defined as "college-credit bearing courses taught by college-approved high school teachers" (NACEP, 2014b).

*Dual Career and Technical Education (CTE).* Dual CTE students are defined as those who enrolled in a college-credit bearing welding course at Mid Michigan Community College (MMCC) and were provided with high school math instruction, by a high school instructor, one day per week throughout the semester. These students were not under any college placement or admission restrictions when they enrolled in the dual enrollment welding courses.

*Dual Enrolled.* A student who was dual enrolled participated in some type of general dual enrollment where the instructional modality differed and student admission or selection was dependent upon high school counselor input, high school principal input, dual enrollment qualifying scores, and course placement. These students typically took only a single dual enrollment course or two.

*Dual Middle College.* Dual Middle College students are those who had significant mentoring available to them during the fall 2010 or winter 2011 term at MMCC. The Dual Middle College program was operated through the Clare-Gladwin Regional Educational Service District and the mentor was employed through the same. These students are dual enrolled, and many are classified as socioeconomically disadvantaged.

The majority is also considered first-generation college students. Students are typically intending to complete a certificate or degree in a health field of some type. Dual enrolled courses are primarily taken at a main MMCC campus where courses were taken face-to-face with an instructor. A selective admission process was conducted for these students and enrollment into the program was typically limited to approximately 30 students. Student admission or selection was dependent upon high school counselor input, high school principal input, dual enrollment qualifying scores, and course placement.

*Enrollment Status.* Enrollment status is defined as the category that all students within the total sample were placed in upon enrollment to MMCC, i.e., First Time Freshman, Dual Enrolled, Transfer Student, Dual Middle College, etc.

*FTIAC.* A first-time in any college student who is enrolled in college courses for the first semester and has never been dual enrolled.

*Progression.* Progression is defined as a student's course success rate, or successful completion of a course (Culver, 2011). For the purposes of this study, progression means that students earned at least one college credit in their first college term.

*Persistence.* Persistence is defined as the rate at which students enroll in college from term-to-term (Culver, 2011). For the purposes of this study, persistence means that students earned at least one college credit in the next subsequent term.

*Retention.* Retention is defined as the rate at which students enroll in college courses from fall-to-fall semesters (Culver, 2011). For the purposes of this study,

retention means that students earned at least one college credit one year from their initial enrollment in college.

*Completion.* Completion is defined as the rate at which students complete their certificate, degree, or transfer to another institution of higher education (M. Jankoviak, personal communication, December 20, 2013).

**BACKGROUND OF THE STUDY**

Dual enrollment in Michigan has been in existence for a number of years. In 1996, the Michigan State Legislature passed Public Act 160 of 1996, the Postsecondary Enrollment Options Act and Public Act 258 of 2000, and the Career and Technical Preparation Act, all of which were known as the "Dual Enrollment" bills (Michigan Department of Education, 2013). Due to the larger demand to educate students at a level of higher education, new and innovative ways to transition students seemed to be practical. Cassidy, Keating, and Young (2011) reported that "although research on the effectiveness of dual enrollment is still fairly limited, initial findings suggests dual enrollment can increase high school graduation rates and college enrollment and persistence and decrease the costs of and time to complete a college degree" (p. 20). To some researchers, dual enrollment appears to be one particular way in which students can transition from high school to college more effectively and potentially at higher rates of persistence and completion. According to Edwards, Hughes, and Weisberg (2011), "Dual enrollment—allowing high school students to take college courses and potentially earn college credit—has become increasingly common in the United States"

(p. 5). Mid Michigan Community College is an institution in central Michigan that has been associated with a number of different higher education opportunities for local high school students. The effects of these different programs on progression, persistence, retention, completion (PPRC), and college GPA is important and worth exploring further.

## STATEMENT OF THE PROBLEM

According to the research, there are a number of ways in which high school students can take advantage of dual enrollment opportunities; however, research is limited on which programs have the most effect on student-level outcomes—progression, persistence, retention, completion of postsecondary education, and college GPA. It would be most beneficial to further research the most effective means by which to transition students from high school to college, more specifically focusing on policies that influence Michigan's dual enrolled students.

## PURPOSE OF THE STUDY

The purpose of this study is to determine the effects of Michigan's various dual enrollment opportunities on high school students' progression, persistence, retention, completion rates, and college GPA using data collected from a small, rural community college. According to Pretlow and Wathington (2013), previous studies show very little results in terms of dual enrollment making an impact on middle-achieving students successfully making the transition to higher education, because the evaluation of such programs have been evaluated on preexisting student attributes. It appears that much of the historic dual enrollment research has been tied to high-achieving high school

students, thus providing little evidence that less fortunate students would excel as a result of dual enrollment participation. Therefore, dual enrollment program research that is open to a larger and more diverse group of students is justified.

In other words, dual enrollment programs no longer target only the best high school students anymore. Students with a wide range of high school GPAs and limited college preparatory work are often taking college level classes in Michigan's community colleges. According to An (2012), as a result of socioeconomic status differences in dual enrollment participation and the potential benefits coupled with these initiatives, the equity agenda where dual enrollment reaches a wider range of students has been pushed forth. Mid Michigan Community College (MMCC) is a small, rural community college located in central Michigan that services underrepresented or low socioeconomic status students. It would be beneficial to determine whether dual enrolled students at MMCC experience higher completion rates and college GPAs compared to those students who had never dual enrolled.

**RESEARCH QUESTIONS**

The following questions guided this research study:

1. Did students who participated in dual enrollment at MMCC, progress, persist, retain, and complete at a significantly higher rate than those students who did not dual enroll?

2. Did students who participated in dual enrollment at MMCC have statistically significant higher College GPAs than those who did not dual enroll while in high school?
3. Was there a significant statistical difference in completion rates between the different types of dual enrollment at MMCC and those students who did not dual enroll?

**HYPOTHESES**

Considering the presented questions for this study, the researcher made three discrete hypotheses. The following hypotheses were tested using quantitative research and statistical analyses, and will be discussed later in this document:

1. Those students who participated in dual enrollment at MMCC, progress, persist, retain, and complete at a significantly higher rate than those students who did not dual enroll.
2. Those students who participated in dual enrollment at MMCC will have statistically significant higher College GPAs than those who did not dual enroll.
3. There will be a significant statistical difference in completion rates between the different types of dual enrollment at MMCC and those students who did not dual enroll.

## CONCEPTUAL FRAMEWORK

Research that has encompassed dual enrollment suggested that there are a number of benefits from such programming that better prepares high school students for coursework in college. However, it may be premature to make such claims, because it is unclear whether these programs significantly impact both high-level academic students as well as lower achieving students.

With such a significant push in Michigan for high school students to enroll in college-level courses, the research that supports student achievement still appears to be limited. Social role theory appears to attribute to some of the increase in dual enrollment participation throughout the state and country, but are students merely doing so because of the social and behavioristic influences established by various legislators or political agendas? According to Biddle (1986), "Role theory concerns one of the most important characteristics of social behavior—the fact that human beings behave in ways that are different and predictable depending on their respective social identities and the situation" (p. 68). As more students and parents throughout America become exposed to and aware of dual enrollment opportunities, the social pressures to engage in such programming may become overwhelming.

Biddle and Thomas (1966) argued that individuals in society occupy various positions where their roles can play an integral part in the behaviors or actions of others. Considering dual enrollment, some experts might argue that legislators, parents, and other various influential beings can inspire high school students to enroll in college courses. Educators, students, and families will need to decide if dual enrollment will

help students reach their higher educational goals, or determine whether the influences of low-cost and exposure to college coursework in high school will permit them to be successful.

Karp (2007) noted that the excitement for dual enrollment or higher education opportunities begins from an assumption that students' academic preparedness for college will improve through contact to college-level coursework, and students better understand the normative expectations of the role of a college student through partaking in dual enrollment (p. 1). In theory, and based on the work of previous researchers, it appears that those students who dual enrolled while in high school exhibited signs of improved student-level outcomes, while those who did not dual enroll were subject to lower persistence and completion rates. Karp (2007) emphasized these findings when she stated, "Sociological theories of role change predict that, if this is the case, dual enrollment programs may encourage student matriculation and persistence in college" (p. 1). As a result of exposure to college expectations and rigor, students who dual enrolled appeared to have a greater likelihood of being successful in college. Researchers have found that "dual enrollment was positively related to students' likelihood of earning a high school diploma, to college enrollment, to persistence in college, and to higher postsecondary grade-point averages" (Hughes, 2010, p. 13). Therefore, not only does dual enrollment play a part in college success, but theoretically in high school success and completion as well.

Furthermore, Karp (2007) suggested that theories of role change and socialization provide a framework for arguing that dual enrollment may be an

appropriate strategy for increasing student persistence in postsecondary education. With this being said, there are other theorists who have found different results, and in some cases question whether dual enrollment programs have led to an increase in student-level outcomes. It has been suggested that college-level coursework in high school provides motivation to students, which leads to increased college attendance and persistence; however, according to some researchers, a linear presentation is unlikely, and preexisting motivational factors may instead determine a student's ultimate college success (Pretlow & Wathington, 2013, p. 43). Therefore, an essential question is whether dual enrollment is beneficial to high school students or whether there are other predetermined factors that play a role in college success. According to researchers, it is apparent that there are multiple theories associated with the impact of dual enrollment on student-level outcomes.

Some authors have found that dual enrollment opportunities that are programmatic in nature and provide additional wrap-around support services for high school students engaged in dual enrollment can benefit from those experiences. An (2012) found a "positive relation between dual enrollment participation and degree attainment among first-generation students—those whose parents did not attend college" (p. 64). This particular author found that those students who were identified as first-generation college students were more apt to complete their goals in higher education.

Again, this research would be valuable to additional community colleges, that meet similar demographic characteristics as MMCC, to determine the most significant

and beneficial higher education opportunities for high school students. “Despite the increased popularity of these programs, few rigorous studies assess the impact of dual enrollment on college degree attainment” (An, 2012, p. 68). As community colleges are influenced by K-12 school districts to engage in higher education opportunities for secondary students, it would be beneficial to have a clearer understanding of whether dual enrollment has a significant impact on student-level outcomes, as well as determining specifically which programs make the most positive impact. Hence, exploring these different programs and determining their effects should add to available research studies.

Karp (2007) found an overarching theory seeking to explain the mechanisms by which dual enrollment programs lead to student success in college is lacking; therefore, why should we expect one program to lead to so many different outcomes? Research that can provide a more in-depth analysis of student benefits, besides improving psychosocial and college readiness skills, would be fruitful. Therefore, the objective of this study is to determine whether dual enrollment programs have an effect on the persistence and completion rates of those who attend college.

**DESIGN AND PROCEDURES**

This quasi-experimental research study examined the effects of multiple independent variables—enrollment status, high school GPA, standardized assessment and placement scores, and gender on various dependent variables—progression, persistence, retention, completion, and college GPA. The researcher used a cluster

sampling technique to make certain that a proper proportional representation of population subgroups were studied. Students were grouped according to their enrollment status as Any Dual student and Non Dual student. Dual enrolled students were also categorized according to several different subgroups that included the following: Dual CTE (welding students), Dual Middle College, and Dual Enrolled (general dual enrollment where students took a class or two and instructional modality varied). The control for this study included those students who had not dual enrolled while in high school. Comparisons were then drawn between the various subgroups.

High school student data were collected from each of the school districts that participated in dual enrollment activities with MMCC during the fall 2010 and winter 2011 semesters. The Dual CTE welding students came strictly from schools that participated in what is considered to be MMCC's in-district student population, along with Dual Middle College students. The general Dual Enrolled population consisted of 25 different area school districts, and ranged from students who took a single college class in a given semester to those who had multiple dual enrolled courses.

**SIGNIFICANCE OF THE STUDY**

The data and findings of this study will add to the limited quantitative research data that currently exist, and will help the researcher determine whether students who participated in certain higher education opportunities while in high school progressed, persisted, were retained, and completed at a significantly higher rate than those who did not participate in dual enrollment. The study will also identify whether dual enrolled

students achieved significantly higher college GPAs than those who did not dual enroll, and the research findings will provide information that will help to determine which dual enrollment programs had the greatest impact on college completion rates at MMCC.

As dual enrollment and other various higher education opportunities remain a focus both nationally and locally, the findings in this study may have significance to other community colleges and K-12 school districts that seek to develop dual enrollment partnerships. Moreover, the findings will add relevant information regarding those variables that have the greatest impact on college completion rates.

**SUMMARY OF CHAPTER**

Dual enrollment is becoming much more prevalent throughout the state of Michigan in recent years. These dual enrollment efforts are increasingly popular at MMCC as well, and it is anticipated that these programs will remain attractive in the near and distant future. Chapter One presented the background for this study, identified the statement of the problem, described the significance of the problem, defined key terms that are used in this research, and provided a conceptual framework for the study. Chapter Two includes a historical perspective related to higher education opportunities for high school students, focusing primarily on various forms of dual enrollment. Furthermore, a theoretical viewpoint is included in the second chapter to establish the context for this research study. Chapter Three will include the methodology, delimitations and limitations, and will also provide for a clear relation of

the research and statistical analysis associated with this study. The findings, results, and analysis of this investigation, as presented in the Chapter Three methodology, are offered in Chapter Four. This chapter provides objective results and outcomes of the study, which will provide a foundation for the final analysis. This dissertation will conclude with Chapter Five, which will provide insight about future research opportunities and questions for those who wish to further examine issues related to dual enrolled students.

# CHAPTER TWO: LITERATURE REVIEW

## DUAL ENROLLMENT OPPORTUNITIES

One of the issues in education today involves determining the impact of dual enrollment on community colleges. Some educators might argue that the effects are significant, but where are the data to validate this argument? There are a number of different programs across the country that aim to provide smoother transitions for high school students. Also, these programs provide earlier access to higher education experiences as they prepare for postsecondary opportunities. This review of the associated literature includes various higher education opportunities for high school students in Michigan and includes comparisons to similar programs throughout the country.

## PURPOSE OF THE REVIEW

It is apparent that there are a number of different opportunities for high school students to earn college credit throughout the United States. In this study, the researcher will attempt to define the various types of higher education opportunities, and provide a theoretical framework for these programs. According to Boote and Beile (2005), a substantive, thorough, sophisticated review of scholarly research can be beneficial in advancing our collective understanding of what has been done before, the

strength and weaknesses of existing studies, and what they mean (p. 3). Having a detailed understanding of prior scholarly work can provide advantages for the researcher: “A researcher cannot perform significant research without first understanding the literature in the field” (Boote & Beile, 2005, p. 3). Using thoughtful and comprehensive selection of resources, the researcher will provide a clear connection between the purpose of this study and prior research associated with higher education opportunities for high school students, i.e., dual enrollment, dual credit, middle and early college programs, concurrent enrollment, etc.

## LITERATURE SEARCH PROCEDURES

A number of different methods were used by the researcher to obtain the reviewed literature. First, literature reviewed for this chapter was accessed via online databases, including ProQuest, ERIC, JSTOR, and Sage Journals. Second, published, peer-reviewed books were also used during the research process, and last, the researcher used reports published by the Community College Research Center. In an effort to present relevant information that adds to the literature, the researcher used Boote and Beile’s (2005) 12-item framework for scholarly literature reviews.

## THE PURPOSE AND BENEFITS OF DUAL ENROLLMENT

Some higher education opportunities are relatively new practices that are, described in simplest terms, variations of dual enrollment that include wrap-around support services. Speroni (2011) stated, “Dual enrollment programs have become a prominent feature of the high school education system and their growth is expected to

continue" (p. 33). As dual enrollment programs continue growing, so do the challenges of community colleges and K-12 systems to provide access to an increasing number of college students.

Complementary to this goal was the challenge of producing students that would complete their educational goals and provide some level of contribution to society. Keeling and Hersh (2012) stated, "Too many college graduates are not prepared to think critically and creatively, speak and write cogently and clearly, solve problems, comprehend complex issues, accept responsibility and accountability, take the perspective of others, or meet the expectations of employers" (The Higher Education Learning Crisis section, para. 3). Some authors suggested that enhancing opportunities for students to obtain community college credentials will be a valuable asset for future generations. For example, these authors say that increasing completion rates of students earning community college credentials (certificates and associate degrees) by 50% by 2020 should be a nationwide goal (American Association of Community College, 2012). Not only is it important that high school students attend college, but that they enter higher education programs prepared with the skills that will ensure that they complete their postsecondary goals.

Ensuring that students are prepared for the future movements of the workforce is critical. For some, preparation means completing a vocational program and, for others, their educational pursuits mean a terminal degree. According to Barnett and Stamm (2010), "An increasing number of policymakers, educators and researchers are promoting dual enrollment as an avenue for building a workforce with the knowledge

and skills needed for the emerging globalized economy" (p. 2). The overall purpose of these programs was to enable students to participate in college credit opportunities while still in high school and to provide those students with the necessary supports to be successful and prepared for future employment.

Cassidy et al. (2011) suggested that dual enrollment programs can provide students with more advanced, rigorous coursework in order to improve high school education and prepare students for the academic and behavioral expectations of college (p. 3). Dual enrollment programs can provide an opportunity to high school students that exposes them to the rigor and expectations of college-level work, while under the support of their high school counselors and teachers. According to Community College Research Center (2012), "Participation in dual enrollment can help students succeed in higher education by giving them a realistic idea of what college requires and giving them a head start on college-level work" (p. 1). Students who gain entry to dual enrollment, and have access to academic and social support systems, would presumably experience greater degrees of success.

Although there are many ways that students can attain college credit while still in high school, *dual enrollment* is the most widespread term used. "Dual enrollment permits the community college to help students make the transition from high school to college when they might otherwise drop out or lack the confidence to undertake a college program" (Myran, 2009, p. 10). Hence, community colleges and secondary institutions began to collaborate in an effort to increase high school students' initial success. Additionally, Kazis stated (as cited in Myran, 2009), "Nearly half of all students

who enter 2-year institutions do not return for their second year and the gap of college entry between high- and low-income students has not narrowed in three decades" (p. 127). These statements by the authors illustrated the importance of early intervention aimed at high school students and the value in providing early college support.

For many years, it appeared that only the upper echelon of students would have an opportunity to obtain a college degree. Through dual enrollment and other various higher education opportunities in existence, even the more disadvantaged students appear to have a chance. Community College Research Center (2012) argued that national and state focus has turned to dual enrollment as an opportunity for disadvantaged, first-generation, and middle-achieving students. As a result, not only do the more advanced students have opportunities to experience postsecondary education while in high school, but those who are economically disadvantaged or less prepared academically have opportunities as well.

Additional authors argued that dual enrollment trends tend to be focusing on a more diverse group of high school students. According to Karp and Hughes (2008), dual enrollment programs were at one time tailored for students in college-prep tracks, and the authors indicated that over time, changes have occurred that have opened the doors for a wider group of students who have the opportunity to earn college credit while in high school. Dual enrollment or higher education opportunities for high school students were believed to lead to a broad range of positive outcomes, including an increase in academic rigor, assisting low-achieving students, and enabling them to meet

higher academic standards (Karp & Hughes, 2008; Mokher & McLendon, 2009). The authors suggested that, in some cases, small rural schools have the opportunity to enhance their curricular offerings in a time of state and national budget constraints. Furthermore, Karp and Hughes noted that these opportunities were believed to increase student aspirations and help students acclimate to the college life. Therefore, these dual enrollment opportunities provided high school students with the confidence necessary to pursue an advanced degree or certificate.

In some instances, research studies have found additional positive outcomes for students who dual enroll. According to Community College Research Center (2012), a research study in Florida, New York, and California found a statistically significant difference between students who dual enrolled and persisted to the second term and second year, compared to those who had not dual enrolled. Not only did an increase in persistence rates exist in this study, but a statistically significant increase in First-Year GPAs was found as well.

Researchers have found that various higher education opportunities for high school students are a benefit from a postsecondary standpoint, and these opportunities have led to student's successful completion of high school also. Karp (2013) indicated that dual enrollment participation has led to higher college grades, increased persistence rates, and greater credit accrual, and has benefited especially those students who come from low-income families and those who choose career and technical education fields of study. Not only have dual enrollment programs been found to benefit students academically, but also from a non-academic standpoint. According

to Mokher and McLendon (2009), dual enrollment helps students acclimate to the social demands of college, which in essence enables them to make better choices regarding whether to pursue a postsecondary education (p. 250). Moreover, these higher education opportunities allow high school students to get a jump-start on their college career and, consequently, save both time and money. Those students who are able to take dual enrollment courses, blended with other various college students, tend to experience additional benefits. Hughes, Rodriguez, Edwards, and Belfield (2012) stated, "When dual enrollment students are mixed in classes with regular college students, they are likely to display greater maturity and feel their college experience is authentic" (p. 6). Students who dual enroll appear to experience greater opportunities for social and academic development.

**DUAL ENROLLMENT: WHAT DOES IT LOOK LIKE?**

As mentioned previously, there are different forms of accelerated programs and terms used to identify the many programs throughout the state and country. In 2014, the Michigan Department of Education listed at least seven various opportunities which enabled high school students to earn college credit (Michigan Department of Education, 2014). The degree that students receive support under these various programs, and the upper limits in terms of credit attainment becomes a key component and a determining factor when identifying their differences. As the different opportunities are covered, it should also be noted that the International Baccalaureate (IB) Degree provided the lowest potential for attaining college credits, while the middle/early college programs

offered the greatest opportunity for achieving significant postsecondary credit (C. Wagonlander, personal communication, July 25, 2012).

The first particular program is the (IB) Degree. According to the Michigan Department of Education (2014), the IB is a curriculum that is two years in length and approved only to those schools that include students who are learning a second language. Asking challenging questions, emphasizing critical reflection, working on research skills, and learning how to learn are some of the program's outcomes. In addition, students have an opportunity to focus on community service (p. 1).

Advanced Placement (AP) is the second type of higher education opportunity in Michigan. The 35 nationally recognized AP courses include 19 different subject areas that provide high school students with the opportunity to take college level courses that are taught at their respective high school, taught by an AP-trained high school teacher, and AP courses are also available in an online format for students (Michigan Department of Education, 2014, p. 1). AP and IB programs are similar in nature; however, there are some characteristics that make these different than dual enrollment. According to Cassidy et al. (2011), AP and IB each have a national curriculum, consist of college-level courses that are offered by the high school, and students earn college credit by passing an end-of-course exam.

The third opportunity for Michigan students is the State Approved Career and Technical Education–Tech Prep Articulated Program of Study. The Michigan Department of Education (2014) defines the program in the following way:

> State-approved CTE programs that provide students with a way to start a specific career field and potentially earn college credit or course waivers while in high school. These programs align with specific Tech Prep programs of study at the postsecondary level. (p. 1)

Often students can take CTE courses for high school credit and/or college credit. This gives students more flexibility in terms of completing their high school curricula while working toward their higher education goals.

Direct College Credit/Concurrent Enrollment is the next form of advanced credit or higher education opportunity for Michigan students. According to the Michigan Department of Education (2014), Direct College Credit/Concurrent Enrollment courses are those taught by a qualified high school instructor who has met adjunct qualifications identified by the collaborating institution of higher education. These course offerings can provide high school students with the ability to take college level courses at the high school that they regularly attend. In some cases, a postsecondary faculty member travels to the high school to instruct these courses (p. 1).

Dual enrollment is classified within the Michigan higher education opportunity category in the most general sense. This means that students are enrolling in college courses taught on a college campus, while still enrolled at their high school. It provides high school students with a chance to enroll in a degree-providing postsecondary institution while simultaneously enrolling in at least one high school class (Michigan Department of Education, 2014, p. 1). Dual enrollment has also been defined throughout the United States as a means of officially beginning a student's college career. For example, dual enrollment is defined as high school students simultaneously

enrolled in high school and college courses where they can begin to generate a college transcript (Barnett & Stamm, 2010; Cassidy et al., 2011; Karp, 2013). Although *dual credit* and *dual enrollment* are often used interchangeably, some define dual credit differently: "High school students take a high school course and an aligned or articulated end-of-course exam that may generate credit toward a college degree upon matriculation" (Karp, 2013, p. 2).

In terms of benefits for the high school students, Myran (2009) stated, "Many states now support financially the dual enrollment of students in high school and community college" (p. 10). Because of these financial commitments from different states, students that might not otherwise be able to can take advantage of higher education learning opportunities. Similar to the dual enrollment opportunity is the Enhanced Dual Enrollment System, which is defined as, "a formalized dual enrollment system that provides deliberate support for students to be successful in their college credit earning attempts during the general education high schools (4 year) plan" (Michigan Department of Education, 2014, p. 1).

Not only are there different forms of higher education opportunities, but there are also different terms associated with these forms. According to U.S. Department of Education (as cited by Hofmann and Voloch, 2012), dual enrollment programs are occasionally referred to in a broader sense as college transition programs, while in some cases, educators refer to dual enrollment as dual credit and concurrent enrollment. This terminology is similar to the definitions established recently by the Michigan

Department of Education; however, there still appears to be some confusion when referring to higher education opportunities.

An Early/Middle College Program also exists in Michigan as an opportunity for students to dual enroll and attain college credits while still in high school. According to Michigan Department of Education (2014), "Early/Middle College Program is a five-year high school program designed to allow a pupil to earn a high school diploma and substantial college credit through an additional fifth year of study. A formal agreement with each postsecondary partner is required" (p. 1). One key difference between the Early/Middle College Program and the Early/Middle College School is directly related to the state's reporting procedures that signifies a school as a separate entity. A program allows school districts flexibility in state reporting and provide an opportunity to count Early/Middle College students under their official high school building identity code.

The Early/Middle College School is the last higher education opportunity identified by the state of Michigan. The Michigan Department of Education (2014) defined this opportunity in the following way:

> Early/Middle College School means a stand-alone public high school, a school within a school, a Public School Academy (PSA) or a Shared Educational Entity (SEE) designed to allow a pupil to earn a high school diploma and either an associate's degree, the MEMCA technical certification or up to 60 transferable college credits at the same time. The schools offer a 5th year to their curriculum. Because they are separate schools, they must complete all the reporting required by Michigan High Schools. Early/Middle College may elect to be Shared Educational Entities for the purposes of enrolling students from constituent districts into the school. This requires a formal agreement with each member district and the postsecondary partner(s). (p. 1)

Early and middle college opportunities give students the additional time to earn a substantial number of college credits while simultaneously working on their high school diploma. The early and middle college programs in Michigan appear to be very similar to those identified in other various states throughout the country. In some cases, early and middle college high schools are embedded in small high schools, and are products of partnerships between school districts and postsecondary institutions that often give underrepresented students an opportunity to earn an associate degree in conjunction with their high school diploma (Bailey & Karp, 2003; Barnett & Stamm, 2010; Hoffman & Vargas, 2005). With additional support services, these students are able to accomplish a postsecondary credential, which might not otherwise be possible.

According to Hoffman and Vargas (2005), an underlying principle of early college high schools is that students can progress into and through college courses as soon as they are able to; therefore, students can enter into college courses without needing to meet all high school exit and college admissions requirements (p. 6). Through these early college opportunities, students can apparently enter into college coursework without needing to complete a full high school course of study. According to the research, middle and early college high school programs appeared to be a means for transitioning high school students through a more seamless K-16 educational system.

Furthermore, Hughes (as cited in Williams, 2010) found that *dual enrollment* is the most commonly used term to describe students that are simultaneously enrolled in high school and college courses (p. 27). His definition of dual enrollment was consistent with the terminology recently developed by the Michigan Department of Education;

however, some authors used different terminology to describe higher education opportunities. Robertson, Chapman, and Gaskin, for example, found that various authors also used *concurrent enrollment*, *dual credit*, *postsecondary enrollment,* or *co-enrollment* somewhat interchangeably (as cited in Williams, 2010).

**THE PREVALENCE OF DUAL ENROLLMENT**

A number of states in America have adopted state-level policies that provide high school students with a number of higher education opportunities. According to Kleiner and Lewis (2005), "The U.S. Department of Education reported that as of 2005, 98 percent of community colleges were participating in dual-enrollment programs" (p. 22). National data also indicated that high schools are reporting a substantial number of dual enrollment opportunities for students. Community College Research Center (2012) stated, "The most recent national data (2002-2003) show that 71% of high schools offer dual enrollment opportunities and that 800,000 high school students take at least one college course during the school year." With a very high national number of students who dual enroll, state policies would appear to be important.

According to Education Commission of the States (2013), 46 states have common, statewide dual enrollment policies in place, while four states along with the District of Columbia leave dual enrollment policy up to the local districts and postsecondary education institutions. While dual enrollment appears to be quite prevalent throughout the United States, there are still a few states that could benefit from common statewide policies or practices.

Although dual enrollment appears to have expanded rather quickly, some researchers found that the growth has taken place in a moderately sluggish manner. Mokher and McLendon (2009) stated, “The spread of dual enrollment policies has occurred relatively slowly over a time span of nearly 30 years, with no more than four states adopting a new policy in any given year” (p. 265). With this said, dual enrollment tends to have experienced expansion in student numbers in recent times; however, it has taken a number of years to develop policies and practices that appear to provide program consistency.

Advanced Placement opportunities have increased over a recent 10-year period. According to the College Board (2014), the nationwide Class of 2013 had 1,003,430 total AP examinees, which was a considerable increase from 514,163 total AP examinees in the Class of 2003 (p. 6). In addition to AP, direct credit/concurrent enrollment opportunities continue to experience growth. NACEP (2014a) stated, “Concurrent enrollment programs are now a major component of rigorous high school curricula, coast to coast.” With increases in AP, concurrent enrollment, and dual enrollment, students across America are able to attain higher education credits in ways unavailable to students not long ago.

**LESSENING THE NEED FOR DEVELOPMENTAL EDUCATION**

In the midst of various issues involving institutions of higher education, community colleges are confronted, more frequently, with teaching college-level material to those students who have inadequate skills in at least one subject area that

would allow them to be successful in college-level work (Bueschel & Venezia, 2009, p. 11). As stated by Roueche and Roueche, some educators refer to the practice of providing special courses for students who lack reading, writing, and mathematical skills as remediation. Some educators, however, refer to this training as developmental education, skills courses, or college preparatory courses (as cited in Attewell, Lavin, Domina, & Levey, 2006, p. 886). For those students who are not college ready, it appears that several options should be considered. For example, could some secondary schools use developmental college courses to not only assist students directly with increased "college knowledge," but also increase the likelihood that students would persist and complete their collegiate studies? The benefits of offering developmental education courses for the purposes of dual enrollment could positively impact secondary schools, as well as postsecondary institutions.

According to Rao (2004), "community colleges have accepted the responsibility for educating all their students, including those who are not ready to do college-level work" (Remediation Needs section, para. 1). As community colleges face the developmental education challenge, some institutions have sought innovative strategies that address lessening the need for developmental education for first-time students. Not only do community colleges contend with high numbers of developmental education, but as stated by Levin and Calcagno (2008), "As for institutions, they spend large amounts of resources on remediation and other programs designed to make up for the deficiencies of their diverse entering students" (Headnote section, para. 3). With an abundance of students that require developmental coursework, lessening the need

for developmental education classes becomes a strong desire of some institutions. Adelman's (1998) study found the following:

> Among students who had to take remedial *reading,* 66 percent were in three or more *other* remedial courses, and only 12 percent of this group earned bachelor's degrees. Among students who were in remedial reading for more than one course, nearly 80 percent were in two or more other remedial courses, and less than nine percent earned bachelor's degrees. (An Alternative View of College Remediation section, para. 9)

The author suggested that the more developmental coursework in which the student engages, the less likely it is that the student will complete his or her degree. If community colleges could develop a system or model of dual enrollment course offerings which were appealing academically, and fell within the financial parameters of secondary school systems, perhaps fewer students would be required to take developmental college courses when first entering college. In other words, students would enter college academically prepared to take introductory college-level courses, i.e., freshman English or college math.

In a perception study conducted by Peter D. Hart Research Associates (2005), 56% of students felt unprepared for the work and associated study habits expected of them in college. Even of those students who felt they were adequately prepared for college, 31% took at least one developmental education course in college (p. 4). As a result of a need for such developmental education, some community colleges have pursued collaborative efforts with high schools in an effort to lessen the need for developmental education for first-time college students. According to Barnett et al. (2012), two suggestions were offered that included enhanced partnerships between

high schools and colleges. The first focused on cooperative efforts that reduced the need for developmental education, while the second made a recommendation that collaborative efforts should aim to increase support and transitional experiences that span throughout the high school experience.

Despite the optimism of some, others argued that as developmental education is currently practiced, it is ineffective primarily because many of the students do not finish the developmental sequences in which they are placed (Bueschel & Venezia, 2009). Additional statements by Levin and Calcagno (2008) support the notion that although developmental education is a very common approach to preparing students academically and socially, it is very costly and provides little rigorous research that supports its effectiveness. According to Merisotis and Phipps, "Research about the effectiveness of remedial education programs has typically been sporadic, underfunded, and inconclusive" (as cited in Attewell et al., 2006, p. 887). Again, the authors shared a sense of hesitancy when using developmental education practices. Consequently, a potential need exists for attempting new collaborative measures that include higher education opportunities as a means of addressing the elevated need for skills courses. According to Adelman, "Dual Enrollment also has been shown to mediate the need for developmental education classes, which can facilitate students' completion of a degree and potentially their earning a higher degree" (as cited in Cassidy et al., 2011, p. 4). Again, dual enrollment opportunities could be a means in which students could gain exposure to college level courses, while lessening the need for postsecondary institutions to invest in developmental resources.

## THE IMPACT ON A SUCCESSFUL TRANSITION TO COLLEGE

Historically, researchers have indicated that students have faced many challenges and have attempted to overcome such adversities in their journeys from high school to college. Kiser and Price (2008) stated, “When people enter college, they are faced with challenges for which they may or may not be prepared” (p. 1). For example, in a study completed in California by Prihoda (2011), the author identified several performance problems that the state faced, and a few of the mentioned issues included students’ low preparation levels, lower rates of college completion, and decreasing college affordability. Some researchers believed that a successful transition from high school to college, through higher education opportunities, could impact the mentioned challenges (Prihoda, 2011). State-level agencies experience challenges, but students and secondary schools face them as well. When students aren’t properly prepared for college, numerous stakeholders can be impacted.

Additional authors argued that large percentages of students are not adequately prepared for college when exiting high school. According to American Association of Community Colleges (2012), only 24% of students who intend to go to college meet all four ACT benchmark standards of career readiness in English, mathematics, reading, and science. An apparent need for successfully transitioning students from high school to college exists. As a result, the transition from high school to college is unsuccessful for many students, because many are unsure how to apply or pay for college, and many are not prepared academically for higher education, while some struggle with the task of balancing school and work while searching for a course of study that will put them on a

meaningful career path (Bailey, Hughes, & Karp, 2002). Developing ways to transition high school students to college could lead to improved attendance, persistence, and completion rates, which in essence would benefit not only future students, but also institutions of secondary education as well.

For some postsecondary institutions and high schools, dual enrollment is a viable option to help successfully transition students to higher education; however, this may not always be possible. For example in some instances, high school instructors may need to assist with transition when dual enrollment opportunities aren't available. According to Edwards et al. (2011), "Today, dual enrollment is also emerging as part of a promising college preparation strategy for a broad range of students" (p. 5). When dual enrollment is inaccessible, special postsecondary preview modules could be offered by high school instructors or by visiting college and community college faculty because students should have a taste of what will be expected in higher education (Adelman, 2006). A combination of dual enrollment and faculty collaboration between high school and postsecondary instructors would be an optimal situation to best transition students to college.

Some states have worked collaboratively with institutions of higher education and secondary education to close the curriculum gaps. As of 2007, as many as 30 states were at work on such alignment through a program called Achieve's American Diploma Project Network. In addition to these 30 states, many others were aligning standards themselves (Bueschel & Venezia, 2009).

According to Bueschel and Venezia (2009), “An emerging body of research and practice suggested that providing college-level work in high school was one promising way to better prepare a wide range of young people for college success” (p. 43). In addition to the idea that college-level work in high school had created a positive persona, some researchers stated that early college programs played a significant part due to their high levels of support that were offered. Le and Frankfort (2011) stated, “Early college students participate in an accelerated program of blended high school and college coursework coupled with academic and social supports” (p. 1).

Researchers claimed that if designed well, college-level work done in the high schools could accomplish several objectives. The work could, “Provide realistic information to high school students about the knowledge and skills they will need to succeed in postsecondary education” (Bueschel & Venezia, 2009, p. 44). In some cases researchers have indicated that the use of high school faculty can be helpful in transitioning students from high school to college.

Hoffman, Vargas, and Venezia (2007) stated, “Early college high schools are located on or near a college campus, so that young people experience the academic and social environment of college from an early age” (p. 176). As a result of these experiences at younger ages, high school students had an opportunity to interact with other college students. Both early and middle colleges provided extensive support to ensure that students made a successful transition. For example, Hoffman et al. (2007) argued that “Learning takes place in small, personalized learning environments that demand rigorous, high-quality work and provide extensive support so that students can

meet that demand" (p. 176). Students that received additional support services played a key role in their ability to be successful high school and college students. Barnett and Stamm (2010) stated the following about early/middle colleges:

> These schools are products of partnerships between school districts and postsecondary institutions. They are often located on college campuses and, in the case of early colleges, are designed to allow students to graduate from high school with an associate degree or 1-2 years of college credit. This educational design frequently targets students underrepresented in college, and, therefore, provides varied kinds of supports to help students to succeed in their college classes. (p. 4)

Additional authors identified the importance of a strong transition to college by suggesting that the transition has an impact on degree attainment. Goldrick-Rab (2010) argued that research indicates a strong association between an undisrupted transition to college and the likelihood that high school students will make a successful transition to college, ultimately completing a credential or degree. With this said, there are a number of factors that appear to have an impact on a successful transition. Goldrick-Rab and Han stated, "The ability to make a seamless transition into community college depends not only on academic performance in high school but also on family background, sociodemographic characteristics, and educational expectations" (as cited in Goldrick-Rab, 2010, p. 453).

**INSTRUCTIONAL DELIVERY METHODS AND SUPPORT**

There appears to be a number of ways in which high school students can receive college instruction. One particular method includes students attending college courses taught by high school instructors who have been vetted through a college's hiring or

selection process. If college courses are taught within the high school walls, however, some have criticized the authenticity of the course: “Where and by whom the courses are taught can impact the extent to which a dual enrollment program is perceived as an authentic college experience” (Edwards et al., 2011, p. 7). With this being said, there appears to be a benefit to offering courses at a high school location. For instance, Edwards et al. (2011) argued that “offering dual enrollment courses at the high school also permits greater integration and alignment of these courses with high school courses” (p. 14). Therefore, it appears possible that learning gaps could be narrowed as a result of course offerings in an off-campus setting. Edwards et al. acknowledged the following statement:

> Practitioners often ask if there is a relationship between program delivery and student outcomes—a significant question that is being explored by CCRC. While the Concurrent Courses partnerships all pursued the same goals, the features of the particular programs varied by design. This analysis yields valuable lessons about the advantages and disadvantages of various program features and about which models best supported the initiative’s goals. (p. 9)

There appears to be a direct benefit to instructors when offering college courses that are offered in an off-campus or concurrent enrollment setting. High school teachers and college instructors can more effectively communicate when working together to provide instruction. Edwards et al. (2011) stated the following:

> Similar to the course location, the instructor’s characteristics—his or her institution, experience and pedagogical methods—affect the perceived authenticity of a dual enrollment course. The instructor can strongly influence whether a collegiate environment is created in the classroom—regardless of the location of that classroom. (p. 15)

Edwards et al. (2011) also affirmed that “when dual enrollment is offered on the high school campus and integrated into the regular school day, it generally broadens the

pool of students able to participate" (p. 21). This mode of dual enrollment offering appears to offer greater potential opportunity to students that might not otherwise plan to take college courses, while either in high school or post-high school graduation. Another particular benefit to offering college classes at a high school location includes the elimination of the need to transport students to a college site (Hughes, 2010). College courses become much more accessible to disadvantaged students when courses are offered at the high school site. This appears to eliminate the need to own a vehicle, seek permission from the high school administration to drive to the college campus, and even in some cases avoid policies that prevent high school students from driving at all.

According to Barnett and Stamm (2010), "Dual enrollment may be taught by regular college faculty members or by high school teachers with adjunct status at a college" (p. 3). Moreover, the concept of team-teaching or mentoring appears to be an instructional delivery that can benefit students, but in addition, the benefits to high school instructors teaching a college course appear to be noticeable. Hughes (2010) found that having a faculty member who can work with a high school instructor can provide insight into the college standards and expectations. This dialogue could prove to be invaluable. For example, "dialogue between instructors from the two education sectors may result not only in higher quality college courses for dual enrollment students but also in the development of a more college-like atmosphere and increased rigor throughout the high schools" (Hughes, 2010, p. 13). Research supports the idea that strong collaborative relationships, and greater access to college coursework

through courses offered at a high school location, are beneficial to dual enrolled students.

## Support

Developing ways to support dual enrolled students would be beneficial in a number of ways. Some authors have identified a number of benefits to dual enrolled students. Marken, Gray, and Lewis (2013) stated the following:

> Institutions with dual enrollment programs geared specifically toward high school students at risk of educational failure reported the following extra support services were offered to those students during the 12-month 2010–11 academic year: academic advising (74 percent), tutoring services (68 percent), study skills workshops (65 percent), college application and selection counseling (60 percent), financial aid counseling (49 percent), and other support services (41 percent) (table 15). (p. 4)

According to Barnett and Stamm (2010), dual enrollment can include such supports as academic support, course re-configurations, college preparatory initiatives, career exploration, and mentoring to enhance student success. Through various supplemental instruction and student success courses, some authors have identified variations of dual enrollment that can benefit dual enrolled students. Venezia and Jaeger (2013) stated, “Interventions to improve college readiness offer a variety of services, from academic preparation and information about college and financial aid, to psychosocial and behavioral supports, to the development of habits of mind including organizational skills, anticipation, persistence, and resiliency” (p. 117).

## PROGRESSION, PERSISTENCE, RETENTION, AND COMPLETION (PPRC)

For community colleges that face high dropout or attrition rates, the impact can be great. DeBernard, Spielman, and Julka argued, "When institutions of higher education have a high attrition rate, it costs thousands of dollars in unrealized tuition, fees, and alumni contributions" (as cited in Kiser & Price, 2008, p. 422). Thus, community colleges must do everything they possibly can to ensure that those who begin taking college coursework, indeed, complete their degrees or transfer to another institution of higher education. This can have important implications in terms of the students' potential contribution to society and economic impact on the colleges.

According to McDonogh (as cited in Pitre & Pitre, 2009), the accomplishment of a college education plays a significant role toward the success and future of the United States. Ensuring that students reach these milestones becomes a noteworthy goal. Perhaps data that are linked directly to student persistence, progression, retention, and completion would be significant.

According to Habley, Bloom, and Robbins (2012), IPEDS refers to retention as the percentage of first-time, full-time, degree-seeking students who return from the previous fall. In addition, this includes students who reenrolled or successfully completed their program by the current fall. "Progression is defined as the percentage of first-time, full-time, degree-seeking students who are retained for a second year and have achieved academic standing as second year (sophomore) students" (Habley et al., 2012, p. 386). Furthermore, Habley et al. stated that *completion* and *persistence* are interchangeable terms that indicate the percentage of students who complete a degree

within a specified period of time. Limited research exists related to higher education opportunities for high school students and the impact of these programs on PPRC. Not only are studies limited in Michigan but also throughout the country.

Although the research may be limited, there is documentation that indicates that versions of dual enrollment indeed impact student success in higher education. According to research by Cohen and Brawer (2008), degree completion was greatly advanced for students who attained a minimum of 20 credits or more by the end of their first calendar year of enrollment. The authors attributed the opportunities for high school students to attain these additive credits to the different initiatives created through partnerships between secondary schools and segments of higher education.

Not only in recent years has dual enrollment had an effect on student retention, but historically additional benefits exist. For example, according to Hoyt (1999), "Students who completed concurrent enrollment courses in high school had higher retention rates" (p. 66). Research also suggested that there are additional benefits to dual enrollment. According to Edwards et al. (2011), "Supporting students includes a broad range of services that foster success in college coursework and build capacity for college matriculation and persistence" (p. 24). Not only does dual enrollment impact college retention, but the effects can also be observed on GPAs as well. Karp et al. (2007) found that "dual enrollment participation also had a statistically significant positive relationship to all longer-term outcomes explored in the analyses, including second-year and final grade point averages, persistence to the second year of college, and total postsecondary credits earned" (p. 36). According to some studies, dual

enrollment appears to have some academic benefit to students, albeit the research is somewhat limited.

## DUAL ENROLLMENT CONCLUSIONS

Determining the impacts that higher education opportunities have on Michigan community colleges is a worthwhile issue to research, and drawing conclusions about the effectiveness of these opportunities appears to be questionable due to a lack of supportive data. This deduction was based on the reviewed literature and findings shared by numerous authors. As previous research indicated, addressing the need to lessen the amount of students who require developmental education courses as first-year college students would be crucial from a societal and economic standpoint. Establishing whether higher education opportunities for students in Michigan impact a successful transition from secondary to postsecondary education remains a question. It is apparent that more research into the success of various dual enrollment programs in Michigan would be valuable.

# CHAPTER THREE: METHODOLOGY

Some educators might argue that the effects of dual enrollment on community colleges in Michigan are significant, but where are the data to validate this argument? A number of different programs throughout Michigan aim to provide smoother transitions for high school students with the hopes of improving the number of students that take advantage of higher education (Smith, n.d.a). Also, these programs provide earlier access to higher education experiences as they prepare for postsecondary opportunities. Much of the related research focusing on dual enrollment appears to demonstrate the positive effects on high school students and on K-12 educational institutions throughout Michigan. With this said, what are the effects of these various dual enrollment programs on community colleges? The purpose of this study is to seek out the effects of these higher education opportunities on MMCC.

## RESEARCH PROBLEM

As previously stated in Chapter One, the problem to be addressed in this study is to determine high school student participation in higher education programs and their impact on student-level outcomes. The research problem will focus on the following supporting research question: How do Michigan's higher education opportunities affect subsequent student achievement?

## HYPOTHESES

- Those students who participate in dual enrollment, progress, persist, retain, and complete at a significantly higher rate than those students who did not dual enroll.
- Those students who participate in dual enrollment will have statistically significant higher College GPAs than those who did not dual enroll while in high school.
- There will be a significant statistical difference in completion rates between the different types of dual enrollment at MMCC and those students who did not dual enroll while in high school.

## OVERALL RESEARCH PARADIGM

Through the use of statistics, the researcher decided that a quantitative research method would be the most effective way to answer the identified research questions. By using a quantitative approach, the researcher could draw inferences and comparisons between the identified variables using the data collected in MMCC's Datatel database.

## LIMITATIONS OF THE STUDY

This research study has several limitations. First, the data used in this study were collected from a single, small, rural community college in central Michigan. Due to the fact that numerous higher education institutions in Michigan have varying definitions for each of the higher education opportunities, the researcher chose to limit the data

collected due to the dissimilar definitions. Consequently, the sample size was limited to a single institution. Second, using data that are consistent and reliable can be a challenge when tracking dual enrolled students in Michigan. Because the data are collected according to information requested by MMCC and provided by dual enrolled students and their high school counselors, consistent data entry can be a problem. A great deal of manual labor was necessary to collect and enter the data used in this research study; therefore, the chance of human error was possible. Third, although there are numerous research studies that focus on dual enrollment nationwide, few studies have concentrated on the differences between the various higher education opportunities and their impact on student-level outcomes, i.e., progression, persistence, retention, completion, and college GPA. Last, because MMCC dual enrolled students are allowed to withdraw from their college courses several weeks beyond the time frame that non-dual enrolled students are allowed, the dual student progression results may be skewed as a result.

**DELIMITATIONS OF THE STUDY**

Several delimitations have been identified for the purposes of this research. First, in order to keep the data manageable, the sample size of this study was limited to those dual enrolled students who participated in higher education opportunities during the fall 2010 and winter 2011 semesters. There are numerous variations of higher education opportunities for high school students, but for the purposes of this study, the researcher focused on students who dual enrolled at MMCC in CTE welding, CGRESD

Middle College, and students that fell into a general dual enrollment program, along with those students who did not participate in dual enrollment. These latter students were used for the purposes of a control group. The study was limited to MMCC dual enrolled students because of available data in which students had attended MMCC for at least a 150% time period (three years).

## RESEARCH DESIGN

In an effort to determine the effects of higher education opportunities on college student-level outcomes, the researcher used a quasi-experimental research design. This type of design has been chosen because the intent was to measure the effects of the independent variables on the dependent variables, and use control groups to enhance the study's internal validity.

### Dependent Variables

Five dependent variables were used in this study and each of them is identified in Table 1, along with their respective level of measurement. The first dependent variable was College Grade Point Average (GPA) and was measured on an interval/ratio level. The second dependent variable was whether a dual enrolled student progressed at MMCC (completed the semester course that the student enrolled in). This variable, in addition to the remaining three dependent variables, were an interval/ratio level of measurement. The students who progressed were coded with a 1, while those who did not persist were coded with a 0 (zero). The same coding method was used for the remaining dependent variables: progression, retention, and completion. Because the

researcher used a value of 0 and 1 for progression, persistence, retention, and completion, each of these dependent variables were measured on an interval/ratio scale.

Table 1: *List of Dependent Variables*

| DEPENDENT VARIABLES | DESCRIPTION |
|---|---|
| College GPA | College GPA at the time of completion (interval/ratio) |
| Progression | Student earned at least one college credit in their first college term. (interval/ratio) |
| Persistence | Student earned at least one college credit in the next subsequent term, i.e., fall to winter (interval/ratio) |
| Retention | Student earned at least one college credit one year from initial enrollment in college, i.e., fall to fall (interval/ratio) |
| Completion | Student attained an associate's degree, a certificate, or transferred to another institution of higher education in 150% time (interval/ratio) |

The third dependent variable is whether a dual enrolled student progressed (enrolled in a college course the following semester, fall to winter). The fourth dependent variable is whether a dual enrolled student retained (enrolled in a college course a year from first dual enrolling, fall to fall). The fifth dependent variable is whether a dual enrolled student completed (attained an associate's degree, a certificate, or transferred to another institution of higher education in 150% time).

Independent Variables

Most of the independent variables were directly available through MMCC's database known as Datatel. Table 2 provides a list of the independent variables, and also includes each variable's respective level of measurement. The primary independent

variable in this study included the various types of dual enrollment groups that students were categorized by for the purposes of dual enrollment. Numeric values were assigned to each of the categories. A value of 1 was assigned to those students who were considered traditional Dual Enrolled students, and a value of 2 was assigned to those who fit into the Dual CTE group. Furthermore, a value of 3 was assigned to those who were considered a Middle College student, while a 4 was used to signify a First Time Freshman. A value of 5 was assigned to those students who were Guest students, and a value of 6 was used to identify those students who were International students. Those students who were Previous College – Not Seeking Degree students were given a value of 7, while Returning students and Transfer students were assigned values of 8 and 9, respectively.

The variable Any Dual program was measured at a nominal level with a dummy variable assigned using a value of one for those students who participated in Dual Enrollment, Dual Middle College, or Dual CTE. Those students who did not participate in any of these three former categories were assigned a dummy variable and value of 0 (zero). With respect to gender, a dummy variable with a value of 1 was assigned to those students who were females, and a dummy variable with a value of 0 was assigned to the male students. High School GPA was measured on an interval/ratio level. Accuplacer scores in math and English, in addition to American College Testing (ACT) math and reading scores, were also measured on an interval/ratio level.

Table 2: *List of Independent Variables*

| INDEPENDENT VARIABLES | DESCRIPTION |
|---|---|
| Enrollment Status | Students will be coded 1 for traditional Dual Enrolled student, 2 for Dual CTE, 3 for Middle College, 4 for First Time Freshman, 5 for Guest student, 6 for International student, 7 for Previous College – Not Seeking Degree student, 8 for Returning student, and 9 for a Transfer student (nominal). |
| Any Dual Program | Students will be coded 1 if they participated in any type of dual enrollment and they will be coded 0 if they did not participate in any type of dual enrollment in fall 2010 or winter 2011. |
| High School Grade Point Average (GPA) | High school GPA for all courses taken in high school at the point of entry in college courses (interval/ratio). |
| Accuplacer Algebra | Accuplacer Algebra score (interval/ratio). |
| Accuplacer Reading | Accuplacer Reading score (interval/ratio). |
| ACT Math | ACT Math score (interval/ratio) |
| ACT Reading score | ACT Reading score (interval/ratio) |
| Gender | Students will be coded 1 for females and 0 for males (nominal) |

## Validity and Reliability

The validity and reliability of any study can be very important to a researcher. According to Vogt (2007), both of these components should be considered when determining the design of answering any research question (p. 113). Using a quasi-experimental design may be difficult to ensure external validity; however, according to Hiller (2013), determining statistical significance and random sampling could improve the ability for a researcher to generalize to a larger population. For the purposes of this study, a cluster sampling technique was used to enhance the external validity. Through the use of content validity, the researcher sought the advice of experts in the field of dual enrollment. Addressing face validity, it would be appropriate that a bystander

would consider this study to be reasonable based on the study's methods, measurements, and design.

In terms of reducing the threats of internal reliability, the researcher used a cluster sampling technique to identify the individual samples used in the study, and data were collected by a member of the Internet Technologies (IT) department at MMCC; therefore, the researcher did not actually collect the data from the Datatel database. The researcher also attempted to account for all the independent variables that were directly related to the dependent variables, which, again, should ensure internal validity for the purposes of this study.

To ensure reliability in this study, the researcher appropriately and consistently defined each of the dependent and independent variables. This allowed for consistent results and repeatability, which are important for the purposes of reliability. Moreover, assessing reliability was accomplished through the use of Pearson's *r* which provided the researcher with a correlation coefficient for several of the identified variables. Standardized test scores such as Accuplacer and ACT were also used to ensure reliability for the study.

**SAMPLING**

For the purposes of this study, the researcher intended to generalize to the population of dual enrolled students. Because the researcher is an employee at MMCC, access to each of the applicable dependent variables, along with each of the independent variables was possible.

The unit of analysis that was considered for this study were students at MMCC. Students were categorized into the following sub-groups: traditional (non-programmatic) dual enrollment (Dual Enrolled), CTE dual enrollment (Dual CTE), middle college dual enrollment (Dual Middle College), and all remaining students at MMCC that are not classified as dual enrolled. Because these various sub-groups were used, a cluster sample was constructed for data analysis purposes.

In an effort to reduce external threats to validity, a very large sample size was used in this study. The researcher used data from two different semesters at MMCC. After conducting a cluster sample, the overall sample size included 2,639 students. A sample of this size should be adequate for the purposes of accounting for sampling error and should increase the confidence levels used to determine statistical significance.

**INSTRUMENTATION AND DATA COLLECTION**

To explore the identified research questions, the researcher pulled from data collected through the Datatel database at MMCC. As was previously mentioned, data were collected by the College's IT personnel and stratified for the purposes of comparing between the sub-groups. Duplicate student cases were removed and sorted according to the term that each student enrolled at MMCC, i.e., fall 2010 or winter 2011. At this point, the researcher then transferred the data from an Excel file into a statistical software package known as Statistical Package for the Social Sciences (SPSS). Each of the data associated with the dependent and independent variables was identified according to its appropriate level of measurement.

When considering the reliability of this study's instrumentation and data collection, the data obtained were collected in a report that was constructed by the IT staff at MMCC. If the report were run multiple times, the data output would remain constant each time. The data that were entered into SPSS were compared between the MMCC data report used in this study before final analyses were conducted. Furthermore, to enhance reliability, the researcher obtained the data from the IT staff on June 23, 2014. This was an instance of single data collection, which should have ensured enough time for final grades and data to be entered after the completion of the winter 2014 semester.

In reference to the study's validity, including instrumentation and data collection, the researcher's collection processes and procedures did not change throughout the study. Furthermore, the dependent and independent variables, along with the control groups, did not change. Together, the consistency in these processes would improve the study's validity associated with the instrumentation and data collection.

**DATA ANALYSIS**

The researcher used SPSS to conduct each of the various data analyses in this study. Several analyses were performed that included both descriptive and inferential statistics. Descriptive statistics were used to identify the means for many of the researcher's identified independent variables. For example, the mean GPA of dual enrolled students could be calculated and compared to those who were non-dual

enrolled. In addition, Accuplacer math and English, as well as ACT math and reading scores, could also be averaged and compared to those who were non-dual enrolled. Median and mode scores could be computed and compared between the two groups. In addition to the means, medians, and modes that could be described and illustrated, cross-tabulations could also be generated to help determine relationships, as well as the strength of relationships between variables.

In addition to the descriptive statistics that were included in the study, inferential statistics were important as well and provided information that allowed the researcher to measure differences and association. This also allowed the researcher to measure the strength of the associations and determine the direction of the relationship between variables. A number of inferential statistics were computed for the purposes of this study. For example, chi-square values were generated between the independent variable, enrollment status, and the dependent variable, progression. The researcher could determine if the relationships were statistically significant and could also provide the level of significance.

**DISCUSSION AND CONCLUSION**

To determine differences and associations between independent and dependent variables, which are interval/ratio, linear regression models were created. Ordinary Least Squares (OLS) Regression models were used to measure prediction of multiple independent variables on an interval/ratio level. After determining the *R*-squared values and significance levels of the first model, the remaining models were adjusted to

potentially increase the number of independent variables that account for the variance in the dependent variables, Term GPA, persistence, progression, retention, and completion.

Due to recent legislative changes that took place in Michigan, effective July 1, 2012, it would be important for community college leaders and K-12 administrators to have an understanding of the potential effects of higher education opportunities on small, rural community colleges such as MMCC. In the case of this study, stating the alternative hypothesis, the researcher expected to find that students who participate in higher education opportunities with wrap-around support services while in high school, progressed, persisted, retained, and completed at a significantly higher rate than those students who did not dual enroll. The researcher also hypothesized that those students who participate in dual enrollment would have statistically significant higher college GPAs than those who did not dual enroll while in high school. Finally, it was anticipated that there would be a statistically significant difference in completion rates between the different types of higher education opportunities at MMCC and those students who did not dual enroll while in high school.

It is anticipated that this study will have profound influence on statewide dual enrollment policy, as well as further research at MMCC. It is also possible that other community colleges will refer to this research as they engage in strategic planning or other college initiatives. At MMCC, there has been a great deal of time and resources allocated toward ensuring successful dual enrollment, and with an anticipated dual

enrolled head count of nearly 1,000 students in the fall of 2015, the impact of these dual enrollment programs could have significant implications at the college.

# CHAPTER FOUR: FINDINGS, RESULTS, AND ANALYSIS

## FINDINGS

The purpose of this quasi-experimental study was to answer three general research questions, which were identified as the following:

1. Did students who participated in dual enrollment at MMCC, progress, persist, retain, and complete at a significantly higher rate than those students who did not dual enroll?
2. Did students who participated in dual enrollment at MMCC statistically have significant higher College GPAs than those who did not dual enroll while in high school?
3. Was there a significant statistical difference in completion rates between the different types of dual enrollment at MMCC and those students who did not dual enroll?

According to some authors, there is evidence that indicates that students who dual enroll are more apt to experience retention and achieve a higher college GPA than those who do not dual enroll. Swanson (2008) stated, "Research suggests that dual enrollment courses have the potential to exert positive influences on student persistence by positively affecting students' college grade point averages" (p. 105). The research conducted in this study was intended to determine whether students who participated

in various categories of dual enrollment performed better than their counterparts who did not dual enroll and matriculated to MMCC. Dual enrollment programming continues to gain momentum in Michigan and it will be important to determine what effects dual enrollment has on student-level outcomes such as progression, persistence, retention, completion, and college GPA.

**DESCRIPTIVE STATISTICAL DATA**

Using SPSS, the researcher conducted descriptive statistical analyses including each of the independent and dependent variables. In reference to the overall case size of the study, *N* = 2,639. This population included multiple categories of non-duplicated MMCC students who enrolled in MMCC courses during either the fall 2010 term or the winter 2011 term. Referring to the fall 2010 sample, *n* = 1,748 and in winter 2011, *n* = 891 (see Table 3). There were no missing cases identified for the variable known as Starting Enrollment Term.

Table 3: *Starting Enrollment Term*

| TERM | FREQUENCY | PERCENT |
|---|---|---|
| Fall 2010 | 1,748 | 66.2 |
| Winter 2011 | 891 | 33.8 |
| Total | 2,639 | 100.0 |

MMCC students who were included in the population for this study were categorized according to their enrollment status in an effort to determine the significance of this particular independent variable (see Table 4). The primary enrollment status types used in this chapter include the categories of Dual Enrollment,

Dual CTE, Dual Middle College, and First-Time Freshman. In Table 4, the frequency distribution and percent of the overall population is included. Of the 2,639 students in the study population, 43 missing cases were identified in relation to the students' enrollment status. Those students who were Dual Enrolled (experimental group) accounted for 17.1% of the population and the First Time Freshman (control group) made up 44.3% of the population. Transfer students in this study accounted for 28.7% of the total population sample, which was the next largest sample of students.

Table 4: *MMCC Enrollment Status Breakdown*

| STATUS TYPE | FREQUENCY | PERCENT |
|---|---|---|
| Dual Enrolled | 413 | 15.6 |
| Dual CTE | 24 | .9 |
| Dual Middle College | 17 | .6 |
| First Time Freshman | 1,170 | 44.3 |
| Guest | 192 | 7.3 |
| International | 4 | .2 |
| Previous College - Not Seeking Degree | 1 | .0 |
| Returning Student | 18 | .7 |
| Transfer Student | 757 | 28.7 |
| Total Minus the Missing Cases | 2,596 | 98.4 |
| Missing Cases | 43 | 1.6 |
| Total | 2,639 | 100.0 |

Among those students who participated in dual enrollment, gender was another variable that was used to determine any significant effect in student progression, persistence, retention, completion (PPRC), or college GPA. Table 5 illustrates that of the 2,639 students that were studied, the male gender comprised of 48.4% of the population (*n* = 1,276), while the females accounted for 51.6% of the population (*n* = 1,363). No missing cases were identified for the variable, Gender. High school GPA was also used to

determine its impact on PPRC. The means were calculated in SPSS using the following formula: $x = \frac{x}{n}$. The mean high school GPA was calculated for Any Dual program and compared to Non Dual program students, along with the calculated standard deviation. Standard deviation was calculated in SPSS using the following formula: $s_x = \frac{x^2}{n} - x^2$.

Table 5: *Gender Breakdown for the Study Population*

| GENDER | FREQUENCY | PERCENT |
|---|---|---|
| Male | 1,276 | 48.4 |
| Female | 1,363 | 51.6 |
| Total | 2,639 | 100.0 |

In addition to frequency distributions, mean scores were calculated for High School GPA, College Term GPA, Accuplacer Algebra, Accuplacer Reading, ACT Math, and ACT Reading for each of the enrollment status categories. Mean High School GPAs ranged from a low of 2.56 within the Returning Student category to as high as 3.59 for students who were Dual Enrolled, a difference of 1.03 GPA points as illustrated in Table 6. Of the 2,639 student cases that were used in this study, 738 students had a documented High School GPA; therefore, High School GPA data were available for 28% of the total case population. Table 6 represents only the documented cases used to calculate High School GPA. There were 1,901 missing cases that were identified for the High School GPA variable.

Table 6: *Mean High School GPA According to Enrollment Status*

| Enrollment Status | Mean | *N* | Std. Deviation |
|---|---|---|---|
| Dual CTE | 2.59833 | 9 | .596242 |
| Dual Enrolled | 3.26919 | 132 | .496624 |
| Dual Middle College | 3.58708 | 12 | .330009 |
| FF-First Time Freshman | 2.78213 | 479 | .630297 |
| GU-Guest - in Home College & MMCC | 3.15700 | 5 | .424742 |
| RE-Returning Student | 2.55650 | 2 | .113844 |
| TR-Transfer (first time at MMCC) | 2.86125 | 92 | .491825 |
| Total | 2.89123 | 738 | .622921 |

Considering the sample of the population with documented high school GPAs, the researcher found that the average high school GPA was 2.89 and the median was 2.98. Of a total sample size of 738 students, the researcher concluded that the data distribution was reportedly very close to a normal distribution, or bell curve, as illustrated in Figure 1. It was also determined that approximately 60 students achieved a mean score of 2.89. The Skewness value for the variable, High School GPA, was –.430, while the Kurtosis value was –.332.

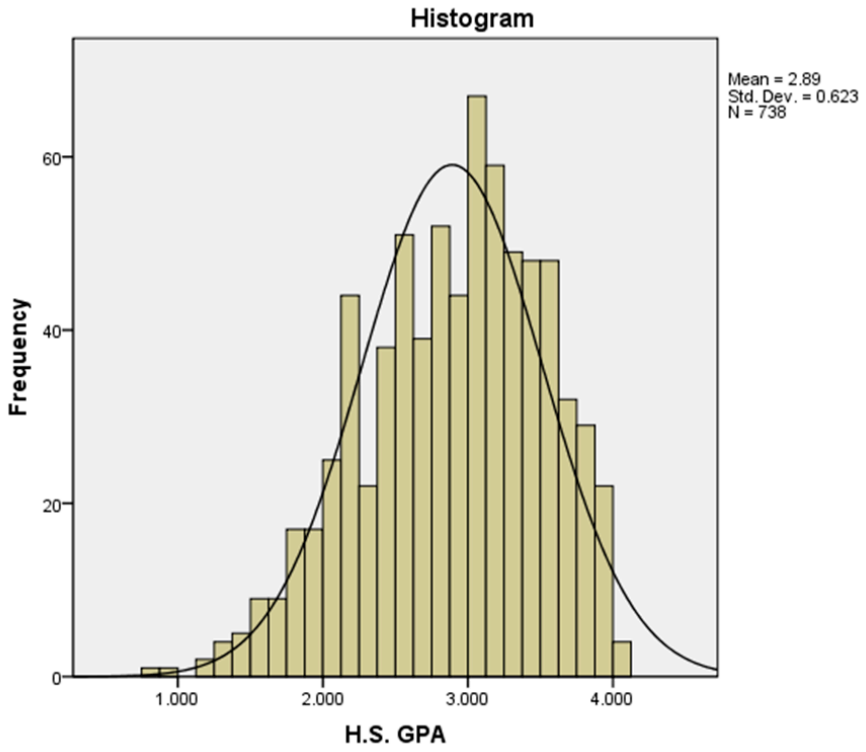


*Figure 1. High school GPA.* This figure illustrates the central tendencies for high school GPA.

Central tendencies were also identified for the independent variable, Accuplacer Algebra score. Considering this variable, the researcher found that the average Accuplacer Algebra score was 46.60 and the median was 40.0. The mode for this sample size of 1,167 was 21.00. It was also determined that approximately 20 students scored the mean score of 46.60. The Skewness value for the Accuplacer Algebra score was 1.045, while the Kurtosis value was .471. As illustrated in Figure 2, the data distribution is skewed to the right.

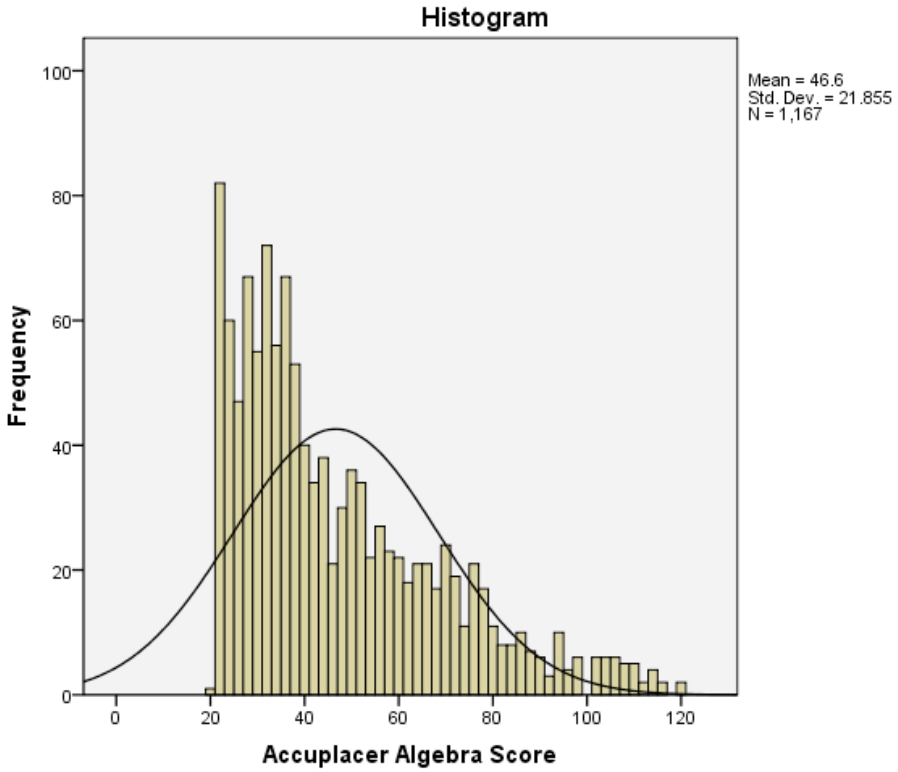


*Figure 2. Accuplacer Algebra score.* This figure illustrates the central tendencies for the Accuplacer Algebra scores.

Accuplacer Reading score was an additional independent variable that was identified in this research study. Related to this variable, the researcher discovered that the mean value was 73.78 and the median value was 75.00. For this particular sample size of 1,281, the mode value was 70.00. A Skewness value of –.310 was determined, along with a Kurtosis value of –.332. Figure 3 shows that the data distribution for this sample was close to normal.

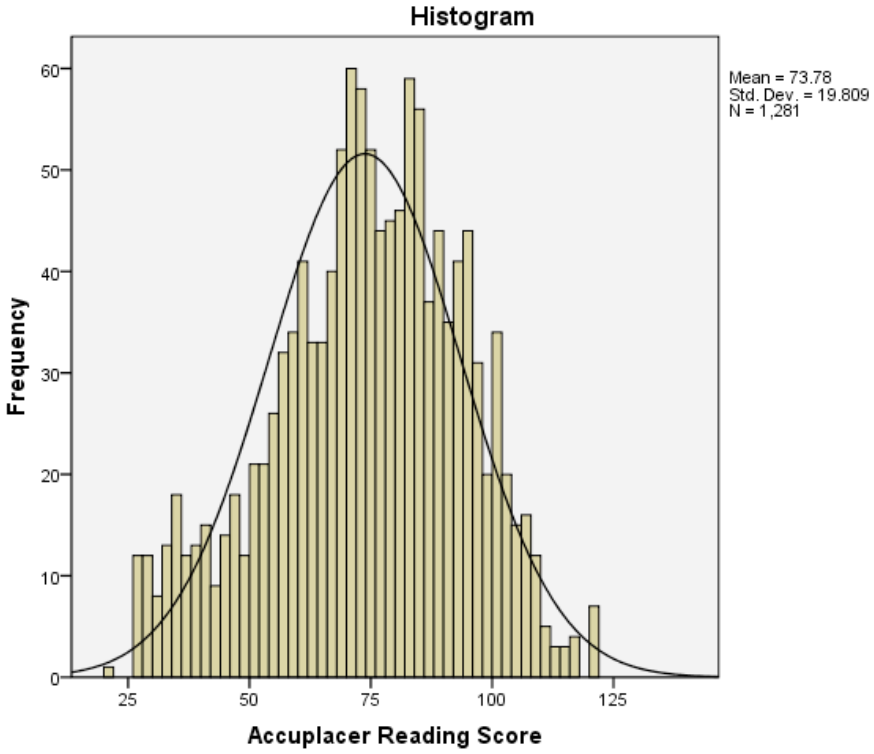


*Figure 3. Accuplacer reading score.* This figure illustrates the central tendencies for the accuplacer reading scores.

Additional central tendencies were identified for the independent variables ACT Math scores and ACT Reading scores. Concerning each of these variables, the researcher discovered that the average ACT Math score was 18.51, while the average ACT Reading score was 18.76. The median value was 18.00 for both ACT Math and ACT Reading, and the mode for each sample was 16 and 15, respectively, out of a total sample size of 689 for ACT Math and 685 for ACT Reading. Related to ACT Math, approximately 75 students attained a mean score of 18.51, while approximately 50 students produced a mean score of 18.76 in ACT Reading. The Skewness value for the variable ACT Math was .861, while the Kurtosis value was .529. The Skewness value for the variable ACT Reading was

.240, and the Skewness value was .162. Figure 4 illustrates a data distribution that was skewed slightly to the right, while the data distribution for the ACT Reading would be considered very close to a normal distribution as illustrated in Figure 5.

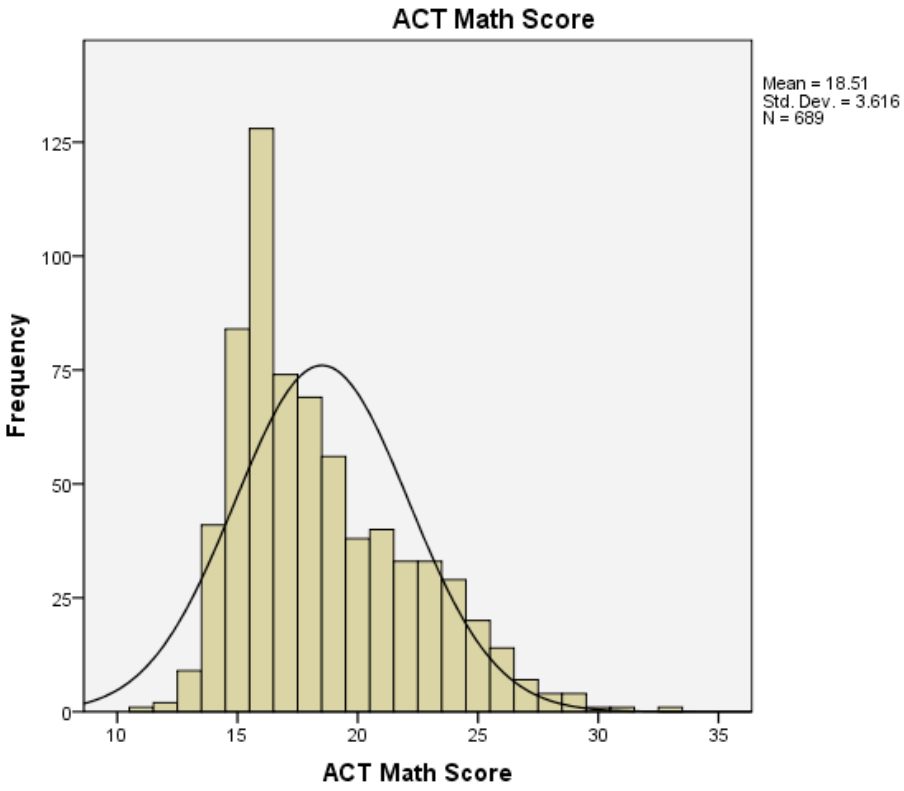


*Figure 4. ACT math score.* The figure illustrates the central tendencies associated with dual enrollment ACT math scores.

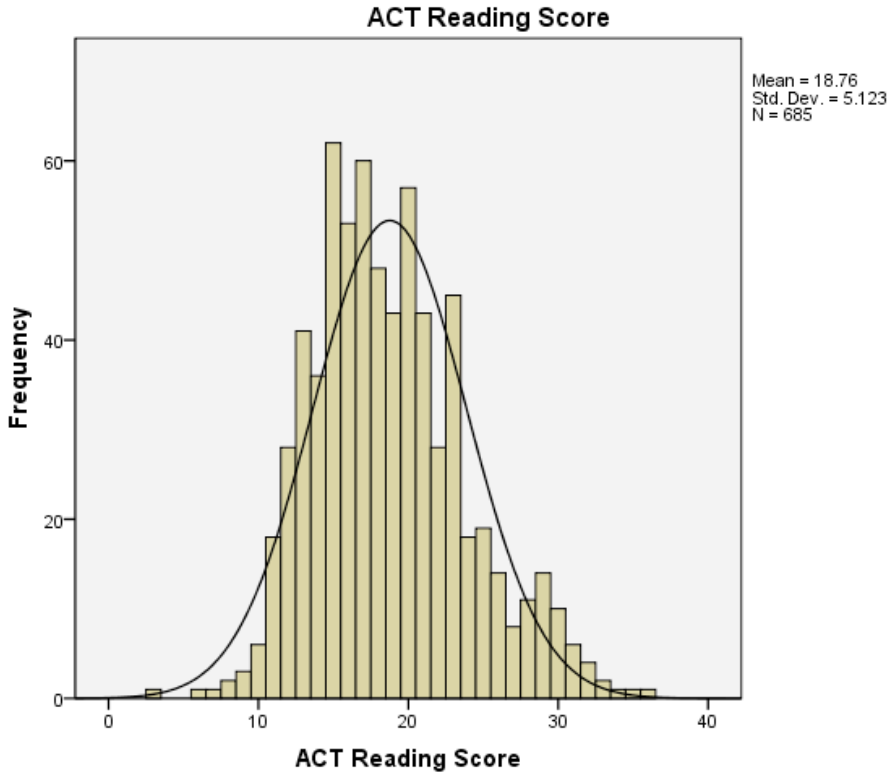


*Figure 5. ACT reading score.* This figure illustrates the central tendencies according to ACT reading scores.

Some of the various statistical analyses in this study compared students who participated in some type of dual enrollment (experimental group) against those who did not participate in dual enrollment (control group). Table 7 illustrates the frequency distribution of students who were in Any Dual program, along with those students who were categorized into a Non Dual program. The percentage of student cases in this study who were never dual enrolled was found to be 81.2%, while 17.2% of the population was involved in some type of dual enrollment or higher education opportunity in fall 2010 or winter 2011. Again, there were 43 missing cases identified, but this accounted for only 1.6% of the total case population.

Table 7: *Any Dual Program and Non Dual Program Student Frequencies*

| Program Status | Frequency | Percent |
|---|---|---|
| Non Dual Program | 2,142 | 81.2 |
| Any Dual Program | 454 | 17.2 |
| Missing Cases | 43 | 1.6 |
| Total | 2,639 | 100.0 |

Table 8 shows that students who were in Any Dual program had a mean high school GPA 0.45 points higher than those students who were categorized into the Non Dual program. The standard deviation from the mean for both categories was within an approximated one-half standard deviation; therefore, each of the case samples was relatively close to the mean GPA within each category.

Table 8: *Mean High School GPAs – Non Dual Program vs. Any Dual Program*

| Program Status | *N* | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|
| Non Dual Program | 578 | 2.79719 | .608850 | .025325 |
| Any Dual Program | 153 | 3.25466 | .523035 | .042285 |
| Missing Cases | 1,908 | | | |

The placement testing and college readiness testing mean scores were also presented according to program status, Non Dual program and Any Dual program. The number of missing cases for the Accuplacer Algebra score was 1,483. Accuplacer Reading score had 1,372 missing cases and ACT Math score contained 1,956 missing cases. The number of missing cases for the test type ACT Reading score was 1,960.

Students who participated in dual enrollment had mean Accuplacer Algebra scores that were 13.22 points higher than those who did not dual enroll, while students

who did not dual enroll exhibited slightly higher Accuplacer Reading scores. When comparing ACT scores, students who dual enrolled scored 1.24 points higher on the ACT Math than those who did not dual enroll. Furthermore, students who dual enrolled scored 1.91 points higher on average than those who did not dual enroll. Standard Error Means signified a large sample size and therefore were reported close to the means. Standard deviations for Accuplacer Algebra scores were slightly higher in value than the Accuplacer Algebra scores, while the ACT Reading scores were slightly higher than the ACT Math scores. These assessment results can be found in Table 9.

Table 9: *Placement and College Readiness Assessments*

| Test Type | Program Status | *N* | Mean | Std. Deviation | Std. Error Mean |
|---|---|---|---|---|---|
| Accuplacer Algebra Score | Non Dual Program | 1,045 | 45.35 | 21.470 | .664 |
| | Any Dual Program | 111 | 58.57 | 21.999 | 2.088 |
| Accuplacer Reading Score | Non Dual Program | 1,152 | 73.94 | 19.960 | .588 |
| | Any Dual Program | 115 | 72.27 | 18.536 | 1.728 |
| ACT Math Score | Non Dual Program | 513 | 18.20 | 3.517 | .155 |
| | Any Dual Program | 170 | 19.44 | 3.692 | .283 |
| ACT Reading Score | Non Dual Program | 511 | 18.26 | 5.017 | .222 |
| | Any Dual Program | 168 | 20.17 | 5.105 | .394 |

**RESEARCH QUESTION #1 FINDINGS AND RESULTS**

Research question #1 stated the following: Did students who participated in dual enrollment at MMCC while in high school, progress, persist, retain, and complete at a significantly higher rate than those students who did not dual enroll?

Identifying student progression, persistence, retention, and completion rates can be important factors that help identify whether students are making progress toward their academic goals (M. Jankoviak, personal communication, February 5, 2012). According to Culver (2011), progression is defined as a student's course success rate, or successful completion of a course. The Any Dual program versus the Non Dual program population sample used to determine student progression in this study included 2,596 students, which also included 43 missing cases.

## Progression

Table 10 illustrates the progression rates of Any Dual program students and Non Dual program students who were enrolled in college coursework at MMCC during the fall 2010 or winter 2011 semesters.

Table 10: *Progression Rates: Non-Dual vs. Any Dual Program*

| | PROGRESSED | | DID NOT PROGRESS | | TOTAL |
|---|---|---|---|---|---|
| | # | % | # | % | |
| Non-Dual Program | 1,735 | 81.0 | 407 | 19.0 | 2,142 |
| Any Dual Program | 427 | 94.1 | 27 | 5.9 | 454 |
| Total | 2,162 | 83.3 | 434 | 16.7 | 2,596 |

Again, the first research question focused on determining whether students who participated in dual enrollment progressed at a significantly higher rate than students who did not dual enroll. Students who were categorized into Any Dual program progressed 13.1 percentage points higher than those who fell into the Non Dual program category as illustrated in Table 10. According to a chi-square analysis in

Appendix B, results indicated that there is a statistically significant relationship between progression and involvement in Any Dual Enrollment program. Chi-square results exhibited a *p* value that was < .05. Overall, those students that participated in Any Dual program were more likely to progress than those students who were categorized under Non Dual program. With this said, although a statistically significant relationship was determined between these two groups, a phi value of .133 was identified in Appendix B, which indicated a rather weak association between those students who participated in Any Dual program and those who ultimately progressed during the given terms.

Persistence

The first research question also focused on determining whether students who participated in dual enrollment while in high school persisted at a significantly higher rate than students who did not dual enroll. Students categorized under Any Dual program persisted 20.1 percentage points higher than those who were categorized under the Non Dual program as illustrated in Table 11. Similar to evaluating the progression of students, chi-square results again indicated that there is a statistically significant relationship between persistence and involvement in Any Dual Enrollment program. Chi-square results, found in Appendix C, confirmed a *p* value that was < .05. Once again, those students who participated in Any Dual program were more likely to persist than those students who fell into the Non Dual program category. According to Appendix C results, a phi value of .153 was revealed, which again signified a weak

association between those students who participated in Any Dual program and those who persisted.

Table 11: *Persistence Rates: Non-Dual vs. Any Dual Program*

| | Persisted | | did not persist | | Total |
|---|---|---|---|---|---|
| | # | % | # | % | |
| Non-Dual Program | 1,045 | 48.8 | 1,097 | 51.2 | 2,142 |
| Any Dual Program | 313 | 68.9 | 141 | 31.1 | 454 |
| Total | 1,358 | 52.3 | 1,238 | 47.7 | 2,596 |

Retention

Retention is another component associated with the first research question. For example, the question addresses the idea that students who participated in dual enrollment while in high school were retained at a significantly higher rate than those who did not dual enroll. The researcher found that students who fell into the category of Any Dual program were retained only 3.5 percentage points higher than those who were in the category of Non Dual program. The Any Dual program versus Non Dual program results are illustrated in Table 12.

Table 12: *Retention Rates: Non-Dual vs. Any Dual Program*

| | Retained | | did not retain | | Total |
|---|---|---|---|---|---|
| | # | % | # | % | |
| Non-Dual Program | 686 | 32.0 | 1,456 | 68.0 | 2,142 |
| Any Dual Program | 161 | 35.5 | 293 | 64.5 | 454 |
| Total | 847 | 32.6 | 1,749 | 67.4 | 2,596 |

Chi-square results were calculated comparing those students who were categorized under Non Dual program or Any Dual program and those students who

were retained or did not retain. These results were different than those that were calculated for progression and persistence. For example, the chi-square value, found in Appendix D, was > .05, thus concluding that there was no statistically significant relationship between retention and student involvement in Any Dual program.

## Completion

Completion was the last dependent variable associated with the first research question. The question addressed the idea that students who participated in dual enrollment would complete at a significantly higher rate than those who did not dual enroll. Students who fell into the category of Any Dual program completed at a rate of .4 percentage points lower than those who were categorized in a Non Dual program. The Any Dual program versus Non Dual program completion results are illustrated in Table 13.

Table 13: *Completion Rates: Non-Dual vs. Any Dual Program*

| | Completed | | Did Not Complete | | Total |
|---|---|---|---|---|---|
| | # | % | # | % | |
| Non-Dual Program | 726 | 33.9 | 1,416 | 66.1 | 2,142 |
| Any Dual Program | 152 | 33.5 | 302 | 66.5 | 454 |
| Total | 878 | 33.8 | 1,718 | 66.2 | 2,596 |

Once again, chi-square results were calculated comparing those students who were categorized under Non Dual program or Any Dual program, and those students who had completed or did not complete within a three-year time frame. These results

also determined that there was no statistically significant relationship between completion and those students who were involved in Any Dual program because a chi-square value was found to be >.05. The chi-square value can be found in Appendix E.

Another interesting note to keep in mind is that students who dual enroll in college courses could be at a slight disadvantage in terms of completing within a three-year time period if students do not take a number of college credits that is comparable to other FTIACs. With this said, it is possible that this is why there was no statistical significance between students who dual enrolled and student completion.

**RESEARCH QUESTION #2 FINDINGS AND RESULTS**

Research question #2 stated the following: Did students who participated in dual enrollment at MMCC statistically have significant higher College GPAs than those who did not dual enroll while in high school?

This particular question is important because some researchers would suggest that college GPA is one factor that helps to measure success in college. For instance, researchers have found that in addition to college graduation and higher-order thinking skills, college GPA can also be a potential measure used to determine college success (Zahner, Ramsaran, & Steedle, 2014). Therefore, in addition to not only completing college coursework, students may benefit from higher college GPAs, which in turn may lead to better employment opportunities.

In this study, the researcher found that there was a significant statistical difference in mean GPAs between the students who were dual enrolled (Any Dual

program) in fall 2010 or winter 2011 and those who were not dual enrolled (Non Dual program). For those 413 students who dual enrolled during either of these two terms, the mean Term GPA was 2.90. Students who did not dual enroll during the fall 2010 or winter 2011 term had a mean Term GPA of 2.15. These statistics were determined using a sample size of 2,183 students. Those students who dual enrolled had a Term GPA that was .75 points higher than those who did not dual enroll. The standard deviation for those students who dual enrolled was 1.114 and the median GPA was 3.08. The enrollment status, including students who did not dual enroll, had a standard deviation of 1.40 and median GPA of 2.48. The term GPA for the entire sample population, $N$ = 2,596, was 2.27, the standard deviation was 2.67, and the median GPA was 2.66.

The Term GPA, calculated according to enrollment status, was also determined by the researcher and the breakdown is illustrated in Table 14. The Dual Middle College students exhibited the highest GPA with a mean score of 3.76, while the First Time Freshman (non-dual enrolled students) displayed a mean GPA of 1.98. Using SPSS, the researcher ran an ANOVA *F*-test to determine the global significance of the independent variable, enrollment status, and the dependent variable, Term GPA. Given the results of the ANOVA analysis (located in Appendix F), the researcher could conclude that there is a significant relationship between the student enrollment status and the Term GPA, because the *p* value was equal to .000, which is less than .05. Although it could be said that there is a significant relationship between enrollment status and Term GPA, the Eta-squared value (effect size) was determined to be .070, which illustrated a medium relationship between the independent and dependent variables.

Table 14: *Mean Term GPA According to Enrollment Status*

| Enrollment Status | Mean | *N* | Std. Deviation |
|---|---|---|---|
| Dual Enrolled | 2.90157 | 413 | 1.114941 |
| Dual CTE | 2.10417 | 24 | 1.281127 |
| Dual Middle College | 3.76471 | 17 | .377394 |
| First Time Freshman | 1.98017 | 1,170 | 1.415299 |
| Guest | 2.69192 | 192 | 1.243882 |
| International | 2.63175 | 4 | 1.634543 |
| Previous College – Not Seeking Degree | .00000 | 1 | .000000 |
| Returning Student | 2.85172 | 18 | 1.466312 |
| Transfer Student | 2.20996 | 757 | 1.353283 |

**RESEARCH QUESTION #3 FINDINGS AND RESULTS**

Research question #3 stated the following: Was there a significant statistical difference in completion rates between the different types of dual enrollment at MMCC and those students who did not dual enroll?

Although the third research question primarily focused on comparing the completion rates of the different types of dual enrollment compared to those who did not dual enroll, the researcher also determined the progression, persistence, and retention rates according to students' enrollment status. The key findings associated with completion rates among the different types of dual enrolled students prompted the researcher to report the findings of the various student-level outcomes that, in theory, led to student completion.

Progression by Enrollment Status

According to Table 15, of the 2,596 students who were categorized according to enrollment status, and of the 1,170 total First Time Freshman students, 911 of them progressed, meaning that 77.9% of these students successfully progressed through their first semester at MMCC. The Transfer Student category included 634 students who progressed at a rate of 83.8%, while the Dual Enrolled status included 386 students who progressed at a rate of 93.4%. One-hundred percent of the Dual CTE students (totaling 24), successfully progressed through their first semester of college at MMCC, in addition to all 17 of the Dual Middle College students.

Table 15: *Progression Rates According to Enrollment Status*

| | Progressed | | Did Not Progress | | Total |
|---|---|---|---|---|---|
| Enrollment Status | # | % | # | % | |
| Dual Enrolled | 386 | 93.5 | 27 | 6.5 | 413 |
| Dual Cte | 24 | 100.0 | 0 | 0.0 | 24 |
| Dual Middle College | 17 | 100.0 | 0 | 0.0 | 17 |
| First Time Freshman | 911 | 77.9 | 259 | 22.1 | 1,170 |
| Guest | 170 | 88.5 | 22 | 11.5 | 192 |
| International | 4 | 100.0 | 0 | 0.0 | 4 |
| Previous College – Not Seeking Degree | 0 | 0.0 | 1 | 100.0 | 1 |
| Returning Student | 16 | 88.9 | 2 | 11.1 | 18 |
| Transfer Student | 634 | 83.8 | 123 | 16.2 | 757 |
| Total | 2,162 | 83.3 | 434 | 16.7 | 2,596 |

Persistence by Enrollment Status

Student persistence according to enrollment status was also calculated. Again, there were 2,596 total students whose data were analyzed. Six-hundred-one First Time

Freshman students out of 1,170 persisted, which equated to a persistence rate of 51.4%. The Transfer Student category included 391 out of the 757 total student count, which equaled a persistence rate of 51.7%. Of the Dual Enrolled students, 257 persisted out of 413 total, which equated to a persistence rate of 62.2%. The Dual CTE category included 23 out of 24 total students who persisted, which equated to a 95.8% rate of success, and the Dual Middle College category had 15 out of 17 total students who persisted, equaling a success rate of 88.2%. The data for student persistence according to their enrollment type can be found in Table 16.

Table 16: *Persistence Rates According to Enrollment Status*

| | Persisted | | Did Not Persist | | Total |
|---|---|---|---|---|---|
| Enrollment Status | # | % | # | % | |
| Dual Enrolled | 257 | 66.6 | 138 | 33.4 | 413 |
| Dual CTE | 23 | 95.8 | 1 | 4.2 | 24 |
| Dual Middle College | 15 | 88.2 | 2 | 11.8 | 17 |
| First Time Freshmen | 601 | 51.4 | 569 | 48.6 | 1,170 |
| Guest | 42 | 21.9 | 150 | 78.1 | 192 |
| International | 2 | 50.0 | 2 | 50.0 | 4 |
| Previous College – Not Seeking Degree | 0 | 0.0 | 1 | 100.0 | 1 |
| Returning Student | 9 | 50.0 | 9 | 50.0 | 18 |
| Transfer Student | 391 | 51.7 | 366 | 48.3 | 757 |
| Total | 1,358 | 52.3 | 1,238 | 47.7 | 2,596 |

Retention by Enrollment Status

Student retention rates were also calculated and categorized according to their enrollment status. As in student progression and persistence, again 2,596 total students were identified in this total sample. As illustrated in Table 17, the First Time Freshman

category had the highest number of total students at 1,170, and also had the highest number of students who were retained during the fall 2010 or winter 2011 semesters at MMCC. Of the 1,170 total First Time Freshman, 412 of these students were retained, which equated to a 35.2% rate of retention. Out of a total of 757 Transfer Students, 247 were retained, equaling a rate of 32.6%. A total of 413 Dual Enrolled students included 132 of whom were retained, which equated to a 32.0% retention rate. Although the First Time Freshman, Transfer Students, and Dual Enrolled categories had the highest number of students who were retained, these categories did not represent the highest retention rates overall. Interestingly, 14 of the 24 Dual CTE students and 15 of the 17 Dual Middle College students were retained equaling retention rates of 58.3% and 88.2%, respectively. The Dual CTE retention rates were determined to be 23.1 percentage points higher than those of First Time Freshman, and the Dual Middle College retention rates were found to be 53 percentage points higher than their First Time Freshman counterparts.

Table 17: *Retention Rates According to Enrollment Status*

| | Retained | | Did Not Retain | | Total |
|---|---|---|---|---|---|
| Enrollment Status | # | % | # | % | |
| Dual Enrolled | 132 | 32.0 | 281 | 68.0 | 413 |
| Dual CTE | 14 | 58.3 | 10 | 41.7 | 24 |
| Dual Middle College | 15 | 88.2 | 2 | 11.8 | 17 |
| First Time Freshman | 412 | 35.2 | 758 | 64.8 | 1,170 |
| Guest | 18 | 9.4 | 174 | 90.6 | 192 |
| International | 1 | 25.0 | 3 | 75.0 | 4 |
| Previous College – Not Seeking Degree | 0 | 0.0 | 1 | 100.0 | 1 |
| Returning Student | 8 | 44.4 | 10 | 55.6 | 18 |

| Enrollment Status | Retained | | Did Not Retain | | Total |
|---|---|---|---|---|---|
| | # | % | # | % | |
| Transfer Student | 247 | 32.6 | 510 | 67.4 | 757 |
| Total | 847 | 32.6 | 1,749 | 67.4 | 2,596 |

Completion by Enrollment Status

Just as progression, persistence, and retention rates were calculated, the completion rates were also determined according to enrollment status. Lastly, out of a total of 2,596 total students sampled, 229 out of 1,170 First Time Freshman were found to have completed either a certificate, a degree, or had transferred to another higher education institution. This completion rate for First Time Freshman equaled 19.6%. Out of the 757 Transfer Students, 361 of them completed, which equated to a 47.7% completion rate. The Dual Enrolled category included 145 students out of 413 who completed, equaling a 35.1% completion rate. Two of the 24 Dual CTE students completed, while five of the 17 Dual Middle College students finished either their certificate, degree, or transferred to a different institution of higher education. These completion rates equaled .08% and 29.4%, respectively.

Interestingly, overall, the completion rate of Transfer Students was highest, while the Dual Enrolled category of students illustrated the second highest rate. Considering the dual enrollment status type only, the Dual Enrolled category successfully completed at a rate that was almost six percentage points higher than the Dual Middle College category and approximately 35 percentage points higher than the Dual CTE category. Table 18 provides a breakdown of each enrollment status, along with the overall completion rate percentages of the total sample population, *N* = 2,596. For

each of the PPRC categories that were compared to enrollment status, there were 43 missing cases.

Table 18: *Completion Rates According to Enrollment Status*

| | Completed | | Did Not Complete | | Total |
|---|---|---|---|---|---|
| Enrollment Status | # | % | # | % | |
| Dual Enrolled | 145 | 35.1 | 268 | 64.9 | 413 |
| Dual CTE | 2 | 8.3 | 22 | 91.7 | 24 |
| Dual Middle College | 5 | 29.4 | 12 | 70.6 | 17 |
| First Time Freshman | 229 | 19.6 | 941 | 80.4 | 1,170 |
| Guest | 128 | 66.7 | 64 | 33.3 | 192 |
| International | 1 | 25.0 | 3 | 75.0 | 4 |
| Previous College – Not Seeking Degree | 0 | 0.0 | 1 | 100.0 | 1 |
| Returning Student | 7 | 38.9 | 11 | 61.1 | 18 |
| Transfer Student | 361 | 47.7 | 396 | 52.3 | 757 |
| Total | 878 | 33.8 | 1,718 | 66.2 | 2,596 |

Individual Enrollment Status and Relationship to Student Completion

The researcher used an ANOVA *F*-test to determine the significance or relationship between each of the enrollment status categories and the dependent variable, completion. The ANOVA results, case summaries, measures of association, and central tendencies associated with enrollment status and student completion, can be found in Appendix G. As illustrated in Table 19, the researcher found that there was a statistically significant relationship between First Time Freshman, Transfer Students, Dual CTE students and the successful completion of a certificate, degree, or transfer to another institution of higher education. Each of the *p* values for First Time Freshman,

Transfer Students, and Dual CTE were <.05. The Eta-squared values for each of these categories were, respectively, .073, .034, and .003.

Table 19: *Enrollment Status and the Relationship Between Student Completion Rates*

| Enrollment Status | *n* | Sig. | Eta-squared |
|---|---|---|---|
| First Time Freshman | 1,170 | .000* | .073 |
| Transfer Student | 757 | .000* | .034 |
| Dual Enrolled | 413 | .547 | .000 |
| Dual CTE | 24 | .008* | .003 |
| Dual Middle College | 17 | .694 | .000 |

*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

The Eta-squared value of .073 for First Time Freshman demonstrated a medium effect on student completion. According to Nandy (2012), 0.01 is considered a small effect size, 0.06 is considered a medium effect size, and a large effect size is deemed 0.14 using Eta-squared. The Eta-squared values for Transfer and Dual CTE students would be considered to have a small effect on completion rates. Consequently, it is suggested that there is a weak to medium relationship between each of the statistically significant categories—First Time Freshman, Transfer Students, and Dual CTE—and overall student completion.

In the third model, the collinearity results for Tolerance associated with High School GPA and ACT Reading was .837. Also, the collinearity results for Variance Inflation Factor (VIF) associated with the High School GPA and ACT Reading was 1.195. If a Tolerance value is ≤ 0.2 and the VIF is ≥ 5.0 then there is a potential problem with the regression analysis model specifications (D. Hiller, personal communication, June 25,

2013). Consequently, because the Tolerance and VIF values under this model fall within an acceptable range, there is no multicollinearity associated with the independent variables. With a *p* value of .000, it was also determined that the third model indicated that global significance existed using the variables, High School GPA and ACT Reading (see Table 20). The Eta-squared value for the third model was .042, which could be considered a small to medium effect size.

Table 20: *Ordinary Least Squares Regression Analysis of Independent Variables and Student Completion*

| INDEPENDENT VARIABLES | MODEL 1 | MODEL 2 | MODEL 3 |
|---|---|---|---|
| High School Grade Point Average (GPA) | .184 | .111 | .05* |
| ACT Reading | .274 | .004** | .001*** |
| ACT Math | .659 | .404 | |
| Gender | .530 | .766 | |
| Accuplacer Algebra | .964 | | |
| Accuplacer Reading | .900 | | |
| Adjusted $R^2$ | .000 | .040 | .042 |

*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

Group Enrollment Status and Student Completion

The researcher also sought to determine whether there was a statistically significant relationship between the entire enrollment status group and student completion. Once again, the researcher used an ANOVA *F*-test to determine the global significance of the independent variable, enrollment status, and the dependent variable, completion. The results of this analysis allowed the researcher to conclude that there was a significant relationship between enrollment status and student completion. The *p* value equaled .000, which again was less than .05. Considering the strength of the

relationship, the Eta-squared value was .105, which can be classified as a large effect size, ultimately suggesting that there is a fairly strong relationship between enrollment status and student completion. The results of this analysis can be found in Appendix H.

## ANALYSIS OF FINDINGS AND RESULTS

Overall, the research findings in this study were quite interesting. Although the hypotheses associated with each of the research questions anticipated that there would be significant statistical results associated with a dual enrolled student and their ability to progress, persist, retain, complete, and attain a higher college GPA, the researcher found that in some cases, the null hypothesis could be rejected, while in others it could not. The following information provides a detailed analysis of the research findings and results connected to this study.

### Analysis of Research Question #1

Hypothesis 1: Those students who participated in dual enrollment while in high school, progressed, persisted, retained, and completed at a significantly higher rate than those students who did not dual enroll.

Bearing in mind those students who participated in Any Dual program, and comparing them to students who were categorized into a Non Dual program, the researcher was able to reject the null hypothesis which acknowledged there is no statistically significant difference between the two groups and a student's ability to progress through a college course. Students who were in Any Dual program were found to be more likely to finish a college course than those students who fell under a Non

Dual program category. In other words, there is a relationship between students who participated in Any Dual program, ultimately progressing toward completion of a degree, a certificate, or transfer to another institution.

The researcher could also reject the null hypothesis, which affirmed that there is no statistically significant difference between the two groups and a student's ability to persist or complete at least one college-credit the subsequent semester. Again, students classified under Any Dual program were found to be more likely to persist to the next semester. With this said, although somewhat weak, a relationship was found between students who participated in Any Dual program, ultimately persisting toward completion.

Taking into account the retention rates between Any Dual program students and Non Dual program students, the researcher was unable to reject the null hypothesis which acknowledged that there was no statistically significant difference between a student's involvement in Any Dual program and a student's ability to be retained in subsequent years. Therefore, students who were in Any Dual program weren't retained any more so than those students who were classified under a Non Dual program. With these results related to retention, the researcher was unable to conclude that students who participated in Any Dual program were more likely to be retained than those students who did not participate in dual enrollment.

Furthermore, the researcher found that students who were enrolled in Any Dual program didn't finish their certificate, degree, or transfer to another institution of higher education at a rate that was statistically, significantly higher than students who

were categorized under a Non Dual program. As a matter of fact, again, the researcher was unable to reject the null hypothesis, which stated that there was no statistically significant difference between a student's involvement in Any Dual program and a student's ability to complete within a three-year time frame.

Students who participated in Any Dual program type at MMCC tended to progress and persist at higher rates than those students who did not dual enroll. Interestingly enough, however, these rates did not demonstrate the same results when evaluating student retention and completion rates. Even though it would seem that dual enrolled students would have been retained and completed at rates comparable to Non Dual program students, the researcher did not find this to be the case. According to Swanson (2008), "Along with academic rigor found in individual courses, high school grade point average and standardized test outcomes provide additional indicators of future college persistence" (p. 98). This means that high school grade point average, individual course rigor, and standardized test scores are variables that institutions should strongly consider if students are expected to persist and eventually complete in college.

In this current study, the researcher hypothesized that students who participated in Any Dual program would have completion rates that would be statistically and significantly higher due to the higher mean High School GPA rates which can be associated with college persistence. However, the researcher actually found that despite the Dual Middle College students exhibiting a mean High School GPA of 3.59 and the Dual Enrolled students displaying a mean High School GPA of 3.27, these factors

were non-significant in the retention and completion outcomes for these students. Moreover, the researcher found that, overall, students who were categorized under a Non Dual program exhibited a mean high school GPA of 2.80 compared to students who were identified as Any Dual program students who displayed a mean high school GPA of 3.25. Despite some of the research conducted by other various researchers, the high school GPA comparisons between Any Dual categorized student and Non Dual students appeared to have little effect, if any, on student retention and completion.

Accuplacer and ACT standardized test scores also exhibited interesting results. For example, Accuplacer Algebra, ACT Math, and ACT Reading scores for the Any Dual category demonstrated mean scores that were higher than their Non Dual counterparts; however, the mean Accuplacer Reading scores for the Any Dual category had a lower mean score than the Non Dual group. Overall, the mean standardized test scores were higher in three of the four different test categories, with the largest predictors of completion between Non Dual enrolled students and Any Dual students potentially being ACT Reading and ACT Math.

Finally, and most importantly, the researcher was able to conclude that when comparing Any Dual program students to Non Dual program students, those who participated in dual enrollment in the fall 2010 or winter 2011 were more likely to progress and persist through their college coursework than their non-dual enrolled counterparts. This measure of differences and association was concluded using the ANOVA *F*-test and *p* values (found in Appendix A), which were statistically significant for student progression and persistence. On the other hand, the researcher could not

conclude any association between student retention and completion and student participation in dual enrollment programming.

Analysis of Research Question #2

Hypothesis 2: Those students who participate in dual enrollment while in high school will have statistically significant higher College GPAs than those who did not dual enroll while in high school.

In reference to the second research question, students who participated in Any Dual program and their Term GPAs were compared to students who were categorized into a Non Dual program. As a result of the researcher's analysis pertaining to this specific research question, it was determined that the null hypothesis could be rejected, meaning that there was indeed a statistical significant difference in Term GPAs between students were participated in Any Dual program and those who did not in fall 2010 or winter 2011.

The researcher found that students who participated in some type of dual enrollment program were more apt to achieve a higher college GPA during their first term of enrollment. It is important to note that those students who participated in the Dual Middle College program or Dual Enrolled program achieved much higher Term GPAs than those students who were grouped into First Time Freshman. Bailey and Karp (2003) stated the following:

> The authors found that students who had participated in transition programs experienced lower drops in their grade point averages during their freshman year than the other students, and suggested that this difference indicated a

> positive impact on college success stemming from participation in AP or dual enrollment. (p. 16)

It is important to keep in mind that Dual Middle College students who attended MMCC in the fall 2010 or winter 2011 were privy to a program mentor who spent a significant amount of time with students when they did not attend class. In most cases, these students were in the presence of a program mentor for approximately two and a half hours per day working on soft skills, tutoring, and course preparation or review. Students who participated in dual enrolled courses while attending high school experienced a positive effect on their first-semester GPA (Karp et al., 2007). Karp and her fellow colleagues were not the only researchers to discover that dual enrollment participation could lead to higher college GPAs. For example, according to Cohn, Cohn, Balch, and Bradley (2004), high school GPAs and ACT scores together provide valid predictions of college GPA in a student's freshman year of college, while individually there is very little predictive value.

In this study, the researcher discovered that there was statistical significance between students who dual enrolled and their first-term GPA based on college coursework. It is difficult to ascertain, however, whether dual enrollment actually had an effect on the first term GPA because, compared to their non-dual enrolled counterparts, students who participated in dual enrollment tended to have higher accumulative high school GPAs before they began dual enrollment. In other words, the results of this study found an association between students who dual enrolled and first-term college GPA, but there may have been some predetermined factors that lead to

these findings as opposed to the dual enrollment program itself having an impact on the college GPA. Regardless, students who participated in dual enrollment at MMCC were more likely to attain a higher college GPA during their first term in college. Furthermore, the researcher found that there was also a relationship between student ACT Reading scores, high school GPA, and the probability of completing a college certificate, degree, or transferring to another institution. According to the researcher's statistical results, it was found that ACT Reading scores and high school GPAs are significantly related to college completion. Consequently, these statistics demonstrated very similar results to previous research studies, which were conducted by other various authors.

Analysis of Research Question #3

Hypothesis 3: There will be a significant statistical difference in completion rates between the different types of dual enrollment at MMCC and those students who did not dual enroll while in high school.

In view of the third research question, the researcher was able to reject the null hypothesis which acknowledged that there would be no significant statistical difference in completion rates between the different types of dual enrollment at MMCC compared to those who did not dual enroll. The researcher in this case found that students who participated in the Dual CTE (welding) program displayed statistically significant results, meaning that there was an association between this type of program and the overall completion of these students.

According to the researcher's results, Dual CTE welding students completed their certificate or transferred to another institution less frequently than other types of MMCC students. Only two of the 24 students who were enrolled in the Dual CTE welding program completed their welding certificate or transferred to another institution within a three-year period. These results might be considered alarming, but it is possible that there were other variables that may have impacted these very low completion rates. For example, in the fall 2010 or winter 2011 terms, the welding program at MMCC had no minimum standards for admission or placement into the college's introductory welding courses. In addition, Dual CTE welding students sometimes enrolled in a general education course or two at MMCC; however, these students seemingly enrolled in these welding courses to gain hands-on experience and develop skills in a specific trade. With this said, it is possible that students who enrolled in this particular welding program had no intent of completing a certificate or transferring to another institution because their minimally attained skill sets were able to land them a job without completing.

First Time Freshman students (control group) and Transfer Students both displayed *p* values of .000, which meant that there was a statistically significant relationship between each of these groups and a student's tendency to complete. Ultimately, the researcher concluded that just because students participated as Dual Enrolled or Dual Middle College students, this did not necessarily mean that they would complete a certificate, degree, or transfer to another institution of higher education within a three-year time period. As a matter of speaking, students who did not dual

enroll in some way were less apt to complete than First Time Freshman who never participated in dual enrollment.

These particular findings are noteworthy, because the results tend to dispute the assumptions or findings of other various authors. For example, An (2012) suggested that dual enrollment addresses higher education problems which include poor academic preparation and low graduation rates. Depending upon the college curricula taught, and according to the findings of this particular research study, just because students participated in dual enrollment doesn't mean that they are more likely to graduate from college within a three-year period.

**FINDINGS AND ANALYSIS CONCLUSION**

Despite the results in this study that led the researcher to infer that dual enrollment participation did not lead to statistically significant rates of completion, the study did, however, provide results that demonstrated a positive impact of dual enrollment on student progression, persistence, and college GPA. Interestingly, students who participated in some type of dual enrollment were more likely to progress or persist at MMCC, but they were not as likely to be retained or complete as their non-dual enrolled counterparts.

Karp, Hughes, and Cormier (2012) stated, "Dual enrollment participants who have higher college grade point averages than their nonparticipating peers, are more likely to persist in college, and make good progress toward graduation" (p. 6). Although the definitions of persistence may be slightly different between this research study and

that which was conducted by Karp and her colleagues, the general theory that dual enrollment can have a positive influence on a student's progress in college appears to be consistent. What is apparent as a result of this study is that more research is needed to determine why students who participated in dual enrollment didn't persist or complete at rates comparable or better than the non-dual enrolled students. Regardless of a student's ability to progress, persist, and attain higher college GPAs, it will be important that students graduate and complete their educational goals.

According to an article in *National Center for Higher Education Management Systems* in 2010, the United States has committed to 60% of its adults aged 25 to 34 attaining a college degree by the year 2020 (Kelly, 2010). If other various academics who research dual enrollment suggest that these programs will have a positive influence on the transition of students from high school to college, further research on a much broader scale is needed to determine whether dual enrollment actually plays a statistically significant role in the attainment of a college certificate, degree, or transfer to another institution of higher education.

# CHAPTER FIVE: SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

## THE FUTURE OF DUAL ENROLLMENT

Those who have worked at Michigan's community colleges in recent years have experienced a change in the world of academia, particularly as it pertains to dual enrollment programs. According to Smith (n.d.b), dual enrollment numbers continue to increase at a staggering rate at MMCC and data throughout America has demonstrated a similar trend in recent years. According to High School Leadership Summit (2004), the number of colleges in New York City offering dual enrollment increased from 6 to 17 between 2000 and 2001, and in Virginia dual enrollment rose from 2,000 students in 1991 to 6,700 total students in 1997.

There is additional research that suggested that dual enrollment continues to increase in popularity. According to a research study conducted in academic year 2010-2011, of all the two-year and four-year institutions surveyed, 1,227,100 students were reported to have participated in some type of dual enrollment program where students could earn college credit, while 873,600 of these students attended two-year institutions (Marken et al., 2013). As dual enrollment trends continue to increase throughout America and Michigan, community colleges will likely experience the greatest demand for such programming. Consequently, faculty, staff, and administrators

will need to possess quality leadership skills to ensure that dual enrolled students are successful.

According to the results of this study, the researcher found that students were not as likely to be retained or complete as well as their non-dual enrolled counterparts. These findings appear to contradict those results of other various authors, so it will be important that future researchers replicate this study at additional community colleges, and on a larger scale, to determine whether these findings should be of concern. In other words, if dual enrollment isn't necessarily leading to significant completion rates, should the state of Michigan be pursuing this initiative so aggressively? It may be difficult to generalize this researcher's findings to other community colleges in Michigan, but because these findings could have potentially significant institutional and public policy implications, further research in this area of study would be very valuable.

**DISSERTATION OVERVIEW**

The purpose of this particular research study was to determine the effects of Michigan's various dual enrollment opportunities on student's progression, persistence, retention, completion rates, and college GPA using data collected from a small, rural community college in Michigan. The research associated with dual enrollment students successfully completing their postsecondary goals could still be considered somewhat limited. For instance, researchers argued that previous studies on dual enrollment depict little results that such programs help underrepresented and middle-achieving students successfully transition to higher education (Karp et al., 2008; Pretlow &

Wathington, 2013). If this is the case, research on dual enrollment programs that are open to a larger and more diverse group of students is justified. As a result of these more diversified dual enrollment programs, in addition to the lack of formal studies, the researcher in this case sought to identify the benefits of dual enrollment in a rural setting by focusing on the following research questions specific to MMCC:

1. Did students who participated in dual enrollment at MMCC, progress, persist, retain, and complete at a significantly higher rate than those students who did not dual enroll?
2. Did students who participated in dual enrollment at MMCC statistically have significant higher College GPAs than those who did not dual enroll while in high school?
3. Was there a significant statistical difference in completion rates between the different types of dual enrollment at MMCC and those students who did not dual enroll?

In the case of this study, student-level outcomes included (a) progression, which is defined as a student's course success rate, or successful completion of a course; (b) persistence, which is defined as the rate at which students enroll in college from term-to-term; and (c) retention, which is defined as the rate at which students enroll in college courses from fall-to-fall semesters (Culver, 2011). Lastly, completion is defined as the rate at which students complete their certificate, degree, or transfer to another institution of higher education (M. Jankoviak, personal communication, December 20,

2013). Each of these outcomes was used to determine whether students were making progress toward achievement of their academic goals.

## DUAL ENROLLMENT AND FUTURE RECOMMENDATIONS

As has been stated previously, over the years, dual enrollment has become a very popular method for secondary students to get a jump-start on their college education, and it has been a means in which students can gain a more accurate depiction of college expectations. According to Marken et al. (2013), "Dual enrollment refers to high school students earning college credits for courses taken through a postsecondary institution" (p. 1). Dual enrollment studies that have been conducted over time suggested that dual enrollment can increase student persistence in postsecondary education. In a recent study, researchers found that dual enrollees exhibited higher rates of persistence which were statistically significant, as well as accumulating more college credits than their non-dual enrolled counterparts (Rodriguez, Hughes, & Belfield, 2012). If there is validity to the claims that dual enrollment can serve as a means of persisting and completing college coursework, then what are the variables that lead to greater success among dual enrolled students versus non-dual enrolled students? It is this question about certain variables that could serve future researchers well, and it also provides the basis for recommendations associated with further research.

## A Need for Consistent Dual Enrollment Terminology

As researchers study the effects of dual enrollment on student-level outcomes, it will be imperative that future studies focus on developing common terminology associated with the subject of dual enrollment. Information and further research studies may tend to be confusing until there is consistency in dual enrollment terminology throughout the state of Michigan and the rest of the country (Smith, n.d.b).

During this research project alone, it was evident that there is a need for consistent language and specific definitions associated with dual enrollment in Michigan. Although it appears that progress has been made in recent years, research connected to dual enrollment and student progression, persistence, retention, and completion verbiage will need to be more uniform when associated with data collection and research

## A Strategy for Addressing the Increasing Need for Developmental Education

Research has suggested that many first-time freshmen are entering college underprepared. A larger percentage of students are required to take developmental math and English classes before enrolling in introductory college-level coursework. "These courses are costly to students, because they usually do not confer college credit; thus, students must pay fees and tuition and support themselves without earning credit for a degree" (Levin & Calcagno, 2008, p. 182). If more research were conducted to determine whether dual enrollment could have a positive impact on lessening the need for developmental education courses for first-time college freshmen, both institutions

of higher education and secondary schools alike may benefit. For instance, what if developmental math and English courses were offered to seniors in high school in place of their high school curriculum? If these students took these classes on main campuses or through such deliveries as concurrent enrollment, it would appear that more students might enter college more academically prepared for introductory college courses in math and English. Again, further research may be beneficial in determining whether dual enrollment programming has a positive effect on what appears to be an increased need for developmental education in community colleges.

## The Role of Humanism vs. Behaviorism in Dual Enrollment

Teaching dual enrolled students can be a challenge. High school students can quite often be prepared academically for higher education; however, most can seemingly lack the social and maturity levels that are necessary for successful degree completion (Smith, n.d.b). As students progress through their primary and secondary school education, their behaviors are shaped according to their teachers' values, school policies and procedures, including the parental influence that exists as well. Skinner (1971) suggested that whether students are influenced behaviorally through the use of positive reinforcement or adverse conditions, researchers could benefit from focusing on potential variables that could positively impact student achievement or increase the likelihood of student completion and higher college GPAs. These external factors can influence success through the developmental years of a student; however, at some point, students who seek a deeper knowledge or understanding of life, and concentrate

on self-reflection and learning from within, tend to complete their postsecondary studies (Smith, n.d.b).

The philosophy of humanism, used in the context of dual enrolled students, could also be considered as great research value. In other words, as researchers seek to determine why dual enrollment programming may benefit students, it may be worthwhile to determine if dual enrolled students (who can range in Michigan from 9$^{th}$ grade to 12$^{th}$ grade) are ready in terms of maturation (Smith, n.d.b). According to Rogers (1983), humanism is an experience of responsible choice that is one of the deepest aspects of psychotherapy and one of the elements which most influences personality and change in individuals. This philosophy tends to raise questions such as, are dual enrolled students developmentally prepared to undergo the academic challenges that exist in higher education? Similarly stated, are dual enrolled students ready to commit to education that provides a deeper meaning and one that is built on life's experiences? Rogers (1983) argued that commitment is more than a decision, and it is something that involves the functioning of an individual who is searching for the directions that emerge from within himself. It is apparent that many dual enrolled students are interested in taking advantage of free tuition and getting a jump-start on their college education, but are these factors alone enough to motivate students to complete their postsecondary education? Aside from looking at specific types of dual enrollment programs, additional research that seeks to find reasons for dual enrollment success would be beneficial (Smith, n.d.b).

## 21st-Century Learning Skills

The skill sets that students need to attain employment beyond completion of a college certificate or degree appears to be debatable. Some researchers argue that the competencies that student's should be able to demonstrate when they complete their college coursework is different in today's age, while others contend that students of the 21st century must still be able to problem solve and think critically, work together collaboratively with others, and demonstrate solid communication skills (Senechal, 2010). With this said, and given the strong emphasis or push for dual enrollment, further research is needed to determine whether dual enrolled students are receiving the appropriate skills necessary to not only complete their college education, but also determine whether they are successful in gaining and maintaining employment (Smith, n.d.b). Senechal (2010) suggested that educators should avoid trying to adopt whatever is modern and instead concentrate on pursuing and attaining perfection in curriculum and pedagogy. It is in both of these areas where research efforts should be focused the most. Determining whether there are curriculum or pedagogical differences between students who dual enrolled while in high school, and those who did not, would be important as well (Smith, n.d.b).

## Innovative Teaching and Learning Practices

Dual enrollment in Michigan has taken shape rapidly in recent years and some professionals in education question whether high school students are truly ready for the challenges of higher education. As transformative teaching and learning becomes a

major focal point in higher education in the 21st century, community college leaders should determine which practices lead to the greatest impact on student completion and success. Some educational practices have become rather innovative, and it is these such exercises that may be connected to student success. For example, in some cases, medical professors use palliative care and reflective writing to enhance student learning in health related fields (Smith, n.d.b). Health instructors facilitate learning by requiring students to use personal reflection and comments to assess student learning in settings that include the home, hospice, and hospital (Mezirow, 2009). It is possible that this concept of self-reflective writing and assessment may benefit dual enrolled students and possibly increase the likelihood of student learning and completion of higher education goals. Again, further research into whether transformative practices, similar to those used in palliative care, impact dual enrolled students should be considered necessary.

There are additional transformative learning strategies that exist and many of these principles appear to primarily pertain to learning associated with adults, those who have whom likely had more experience with larger projects or solving problems in a working environment. For instance, Action Learning Conversations (ALCs) and Action Learning (AL) are ways in which students can utilize real-life experiences, critically reflect, and learn from such experience to enhance student learning (Mezirow, 2009). If dual enrolled students have had little experience, or have not been provided with instruction on reflection in a critical manner, a transformative learning experience is unlikely. Again, there appears to be little evidence that suggested that ALC or AL occurs

in a more general academic setting at postsecondary institutions; therefore, how do these strategies impact dual enrolled students? Transformative teaching and learning is more than simply covering an academic curriculum. Instead, cognitive learning and transformation occurs when students are able to experience, learn from their mistakes, and develop solutions to problems through a cycle of personal reflection (Smith, n.d.b).

In Chapter Two, the researcher found dual enrollment to be a benefit to more efficiently transition students from high school to college. While it could be implied that students who successfully completed their higher educational goal did indeed make the transition from high school to college, it is possible that some may still lack certain soft-skills. Future research that focuses specifically on the background of dual enrollment families in Michigan, as well as considering various socio-demographic characteristics and increased higher education expectations from family would be valuable. Moreover, pertaining to those who participated in Michigan's dual enrollment programs, it would be important to determine whether there is any correlation between these variables and student completion.

## Dual Enrollment Using a "Learning College" Approach

For many years, higher education has presented an educational experience that placed a great deal of emphasis on teaching. American higher education has transformed from initiatives outlined in the 1983 report, *A Nation at Risk*, into aspirations of learning colleges of the 21st century (O'Banion, 1997). More recent research studies placed an emphasis on measuring the learning of individual students as

opposed to teachers presenting information with the hopes that students will retain such material. Under the learning college model, students are classified as integral components to college success, teacher's behaviors communicate powerful messages about expectations, and all staff members work together to respond to changes in their environments in an effort to survive (O'Banion & Wilson, 2011).

During times when overall enrollment appears to be declining in community colleges, dual enrollment appears to be a way to increase revenue. Moreover, dual enrollment has become a means to which students can earn college credits and limit their personal expense. At MMCC, dual enrolled students account for approximately 20% of the overall student population (B. Mishler, personal communication, December 1, 2014). As community colleges experience such increases in dual enrollment, these institutions will be faced with reevaluating their mission and goals. Dual enrollment will likely be considered in institutional strategic plans and conversations related to budget development, curriculum assessment, and student learning will be imperative. O'Banion and Wilson (2011) stated, "Under the learning paradigm, faculty—and everybody else in the institution—are unambiguously committed to each student's success" (p. 35). Collaboration that involves an entire institution and its stakeholders will be necessary, and dual enrollment programming may benefit from the use of a learning college model.

The learning college approach places a significant amount of importance on pedagogical practice and it is this emphasis that transforms into a culture of true learning (O'Banion, 1997). In other words, organizations must identify how students learn and determine which pedagogical practices most profoundly influence success for

dual enrolled students. Based on O'Banion's (1997) learning college philosophy, future researchers would benefit from dual enrollment studies that placed focus on the following principles:

- Good practice encourages student and faculty contact.
- Good practice encourages cooperation and interaction among students.
- Good practice gives prompt feedback and time on task.
- Good practice includes the communication of high expectations.
- Good practice respects diverse talents and different ways in which students learn.

In other words, researchers must seek to determine which transformative teaching or learning college principles impact dual enrolled student performance most.

As was addressed in the literature review, the researcher also discovered that various instructional deliveries can play a role in students' success in postsecondary education, more notably concurrent enrollment. For instance, future research is needed to determine whether the location of a given course, the type of instructor, or the delivery that is used to deliver the course has any association with student performance and completion in college.

As these initiatives gain momentum, further research concerning which dual enrollment programs (early/middle college, general dual enrollment, concurrent enrollment, or career and technical education dual enrollment) are most beneficial and lead to student completion (Smith, n.d.b). In addition, it will be important to determine which transformative teaching and learning principles present the greatest impact on successful completion of programs and the attainment of future employment. The

research will need to focus on more than just the different types of programs, but rather it will need to include specific research variables that are tied specifically to student learning.

## Transformative Learning and Concurrent Enrollment

As a result of numerous secondary and postsecondary institutions collaborating in an effort to provide a number of opportunities for high school students, new and innovative ways to provide this college instruction has emerged. Concurrent enrollment is a type of dual enrollment that provides high school students with an opportunity to earn college credit from college-approved high school teachers (NACEP, 2014b). The relationship between transformational learning and concurrent enrollment would be worthy of investigation. Although there are a number of key principles associated with transformative teaching, determining whether concurrent enrollment students are learning in a transformational sense could be challenging. For example, it is unlikely that many postsecondary instructors are exposed to transformational teaching strategies; therefore, it could be assumed that many high school instructors are unable to deliver academic instruction that includes such tactics. According to McGonigal (2005), a key concept of transformational learning occurs when students are encouraged through critical discourse, which is the most social aspect of the learning process. How do we know if this critical discourse occurs within the walls of our postsecondary campuses currently, let alone through delivery methods known as concurrent enrollment? Further research in this area would provide insightful data and information that might not only

drive the efforts surrounding concurrent enrollment, but also on-campus instruction and distance education as well.

## IMPLICATIONS OF DUAL ENROLLMENT RESEARCH ON TRANSFORMATIVE LEARNING

At no other time in the history of education is transformative learning and dual enrollment programming more important than now in America. Lumina Foundation (2011) stated the following:

> Higher learning has taken on new importance in today's knowledge society. To succeed in the contemporary workplace, today's students must prepare for jobs that are rapidly changing, use technologies that are still emerging and work with colleagues from (and often in) all parts of the globe. The challenges that graduates face as citizens during their lives are similarly complex and also are affected by developments around the world. (p. 1)

With relation to transformative learning, teaching skills of the 21st century require students to develop the ability to self-reflect, analyze, and synthesize information, and transformative learning requires higher order communication skills. This doesn't just include the traditional or non-traditional college students anymore, however. Instead, these transformative teaching and learning skill sets must direct specific attention toward a rapidly growing population of dual enrolled students. Not only are the number of dual enrolled students showing tremendous increases, but the different types of dual enrollment programs are expanding and the number of programs overall continues to increase.

This particular dual enrollment study is rather limited in terms of the implications on transformative learning; however, there are a few ways in which the study could influence future dual enrollment research and transform the ways in which

instructors currently teach. For example, in classrooms that include dual enrolled students, an emphasis on reflective writing can be a component of transformative learning. In turn, this should produce students who are better prepared for 21st-century employment in a global society (Smith, n.d.b).

Exhibiting an awareness of the type of learner and understanding the maturity levels of the various learners within the classroom will also be important. As our younger generation of students experience dual enrollment in its various forms, the transition from high school to college should include a developmental process that moves from less to more complex levels of thinking. Just because students are dual enrolled, and are secondary-aged in nature, shouldn't mean that the curriculum which is taught should be different. With this said, however, instructors will need to use transformational teaching strategies to ensure that dual enrolled students are equally as prepared as those who had never experienced dual enrollment.

**CONCLUSIONS**

Opportunities for students in high school to take dual enrollment courses is on the rise in Michigan, as well as many other states throughout the country. Research studies exist that suggested students who dual enroll are more apt to achieve their postsecondary goals, while other research suggested that various predetermined factors are more influential in predicting student completion in college. This particular research study found that students who dual enrolled at MMCC were no more likely to complete a certificate, degree, or transfer to another institution than students who had never

dual enrolled. This raises the question whether there may indeed be predetermined factors that lead to student completion rather than participation in dual enrollment itself.

Consistent with previous research studies, ACT reading scores and high school GPAs were identified as good predictors of college success at MMCC. These results will hopefully lead to positive changes in local college policy and also encourage other researchers to determine whether these variables should be considered for placing students in community college coursework. Furthermore, as the state of Michigan refines its various definitions associated with dual enrollment, along with its data collection processes, educators and administrators in postsecondary institutions will be interested to find out which programs have the greatest impact on college completion, i.e., middle college/early college, enhanced dual enrollment, etc. President Obama suggested a need for America to develop more college graduates than any other country, and state initiatives in Michigan seemingly propose dual enrollment as a means of attaining more college graduates. Studies that comprehensively examine Michigan dual enrollment in future years will be of profound importance.

# REFERENCES


Adelman, C. (1998). The kiss of death? An alternative view of college remediation. *National Crosstalk*, *6*(3). Retrieved from http://www.highereducation.org/crosstalk/ct0798/voices0798-adelman.shtml

Adelman, C. (2006). *The toolbox revisited: Paths to degree completion from high school through college.* Retrieved from http://www2.ed.gov/rschstat/rsearch/pubs/toolboxrevisit/toolbox.pdf

American Association of Community Colleges. (2012*). Reclaiming the American dream: Community colleges and the nation's future.* American Association of Community Colleges. Retrieved from http://www.aacc.nche.edu/AboutCC/21stcenturyreport/21stCenturyReport.pdf

An, B. P. (2012). The impact of dual enrollment on college degree attainment: Do low-SES students benefit? *Educational Evaluation and Policy Analysis*, *35*(1), 57–75. doi:10.3102/0162373712461933

Attewell, P. A., Lavin, D. E., Domina, T., & Levey, T. (2006). New evidence on college remediation. *Journal of Higher Education*, *77*(5), 886–924.

Bailey, T. R., Hughes, K. L., & Karp, M. M. (2002). *What role can dual enrollment programs play in easing the transition between high school and postsecondary education?* Community College Research Center and Institute on Education and the Economy. Retrieved from http://ccrc.tc.columbia.edu/media/k2/attachments/dual-enrollment-easing-transitions.pdf

Bailey, T. R., & Karp, M .M. (2003). *Promoting college access and success: A Review of credit-based transition programs*. Retrieved from http://ccrc.tc.columbia.edu/media/k2/attachments/promoting-college-access-success.pdf

Barnett, E., & Stamm, L. (2010). *Dual enrollment: A strategy for educational advancement of all students.* Retrieved from http://www.blackboardinstitute.com/pdf/Bbinstitute_DualEnrollment.pdf

Barnett, E. A., Bork, R. H., Mayer, A. K., Pretlow, J., Wathington, H., & Weiss, M. J. (2012). *Bridging the gap: An impact study of eight developmental summer bridge*

*programs in Texas* (Research). Retrieved from http://www.mdrc.org/project_37_94.html

Biddle, B. J. (1986). Recent development in role theory. *Annual Review of Sociology*, *12*, 67–92. Retrieved from http://www.jstor.org/stable/2083195

Biddle, B. J., & Thomas, E. J. (1966). *Role theory: Concepts and research*. New York: John Wiley & Sons.

Boote, D. N., & Beile, P. (2005). Scholars before researchers: On the centrality of the dissertation literature review in research preparation. *Educational Researcher*, *34*(6), 3–15. doi:10.3102/0013189X034006003

Bragg, D. D., & Durham, B. (2012). Perspectives on access and equity in the era of (community) college completion. *Community College Review*, *40*(2), 106–125. doi:10.1177/0091552112444724

Bueschel, A. C., & Venezia, A. (2009). *Policies and practices to improve student preparation and success*. San Francisco: Jossey-Bass.

Cassidy, L., Keating, K., & Young, V. (2011). Dual enrollment: Lessons learned on school-level implementation. Retrieved from http://www2.ed.gov/programs/slcp/finaldual.pdf

Cohen, A. M., & Brawer, F. B. (2008). *The American community college*. San Francisco: Jossey-Bass.

Cohn, E., Cohn, S., Balch, D. C., & Bradley, J. (2004). Determinants of undergraduate GPAs: SAT scores, high school GPA and high-school rank. *Economics of Education Review, 23*(6), 577–586.

College Board. (2014). *The 10th annual AP report to the nation*. Retrieved from http://media.collegeboard.com/digitalServices/pdf/ap/rtn/10th-annual/10th-annual-ap-report-to-the-nation-single-page.pdf

Community College Research Center. (2012). *What we know about dual enrollment.* New York: Community College Research Center, Teachers College, Columbia University.

Culver, T. (2011, May 12). Six strategies for collecting and using data in retention planning [Web log comment]. Retrieved from http://blog.noellevitz.com/page/19/

Education Commission of the States. (2013). *Dual enrollment: Statewide policy in place*. Retrieved from http://ecs.force.com/mbdata/MBQuestSNR?Rep=DE01

Edwards, L., Hughes, K. L., & Weisberg, A. (2011). *Different approaches to dual enrollment: Understanding program features and their implications*. Community College Research Center. Retrieved from http://ccrc.tc.columbia.edu/media/k2/attachments/dual-enrollment-program-features-implications.pdf

Gaston, P. L. (2010). *The challenge of Bologna: What United States higher education has to learn from Europe, and why it matters that we learn it*. Sterling, Va: Stylus.

Goldrick-Rab, S. (2010). Challenges and Opportunities for Improving Community College Student Success. *Review of Educational Research*, *80*(3), 437–469. doi:10.3102/0034654310370163

Habley, W. R., Bloom, J. L., & Robbins, S. (2012). *Increasing persistence: Research-based strategies for college student success*. San Francisco, CA: Jossey-Bass. Retrieved from http://books.google.com/books?id=KpGvFqNcHOIC&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q=%20completion%20defined%20as&f=false

High School Leadership Summit. (2004). *Dual enrollment: Accelerating the transition to College.* Retrieved from http://www.ed.gov/about/offices/list/ovae/pi/hsinit/papers/dual.doc

Hiller, D. (2013). *Module 5b: Validity.* Retrieved from https://fsulearn.ferris.edu/bbcswebdav/pid-265775-dt-content-rid-1608739_1/xid-1608739_1

Hoffman, E., & Voloch, D. (2012). *Dual enrollment strategies, outcomes, and lessons for school-college partnerships*. Jossey-Bass Inc Pub.

Hoffman, N., & Vargas J. (2005). *Integrating grades 9 through 14: State policies to support and sustain early college high schools*. Retrieved from http://www.earlycolleges.org/Downloads/Integrating9to14.pdf

Hoffman, N., Vargas, J., & Venezia, A. (2007). *Minding the gap: Why integrating high school with college makes sense and how to do it*. Cambridge, MA: Harvard Education Press.

Hoyt, J. E. (1999). Remedial Education and Student Attrition. *Community College Review*, *27*(2), 51–72. doi:10.1177/009155219902700203

Hughes, K. L. (2010*). Dual enrollment: Postsecondary/secondary partnerships to prepare students*. National Science Teachers Association. Retrieved from http://ccrc.tc.columbia.edu/media/k2/attachments/dual-enrollment-postsecondary-secondary-partnerships.pdf

Hughes, K. L., Rodriguez, O., Edwards, L., & Belfield, C. (2012). *Broadening the benefits of dual enrollment: Researching underachieving and underrepresented students with career-focused programs.* New York: Community College Research Center, Teachers College, Columbia University.

Karp, M. M. (2007). *Learning about the role of college student through dual enrollment participation*. Retrieved from http://ccrc.tc.columbia.edu/media/k2/attachments/learning-role-college-student.pdf

Karp, M. M. (2013). *Dual enrollment for college completion: Policy recommendations for Tennessee.* Retrieved from http://ccrc.tc.columbia.edu/media/k2/attachments/Dual-Enrollment-recommendations-Tennessee_1.pdf

Karp, M. M., Calcagno, J. C., Hughes, K. L., Jeong, D. W., & Bailey, T. (2007). *The postsecondary achievement of participants in dual enrollment: An analysis of student outcomes in two states*. Retrieved http://ccrc.tc.columbia.edu/media/k2/attachments/dual-enrollment-student-outcomes.pdf

Karp, M. M., Calcagno, J. C., Hughes, K. L., Jeong, D. W., & Bailey, T. (2008). *Dual enrollment students in Florida and New York City: Postsecondary outcomes.* Retrieved from http://files.eric.ed.gov/fulltext/ED500537.pdf

Karp, M. M., & Hughes, K. L. (2008). Study: Dual enrollment can benefit a broad range of students. *Techniques, 83*(7), 14–17. Retrieved from http://ccrc.tc.columbia.edu/media/k2/attachments/dual-enrollment-student-outcomes.pdfhttp://search.proquest.com/docview/216141052?accountid=35715

Karp, M. M., Hughes, K. L., & Cormier, M. (2012). *Dual enrollment for college completion: Findings from Tennessee and peer states*. Retrieved from http://ccrc.tc.columbia.edu/media/k2/attachments/dual-enrollment-college-completion-TN-peer-states.pdf

Keeling, R. P., & Hersh, R. H. (2012). *The higher education learning crisis.* Retrieved from Academic360.com website: http://www.academic360.com/articles/articleDisplay.cFm/ID=327

Kelly, P. J. (2010). *Closing the college attainment gap between the U.S. and most educated countries, and the contributions to be made by the States*. Retrieved from http://www.nchems.org/pubs/docs/Closing%20the%20U%20S%20%20Degree%20Gap%20NCHEMS%20Final.pdf

Kiser, A. & Price, L. (2008). The persistence of college students from their freshman to sophomore year. *Journal of College Student Retention, 9*(4), 421–436. Retrieved from http://search.proquest.com/docview/196726060?accountid=35715

Kleiner, B., & Lewis, L. (2005). *Dual enrollment of high school students at postsecondary institutions: 2002–03*. Retrieved from http://nces.ed.gov/pubs2005/2005008.pdf

Le, C., & Frankfort, J. (2011). *Accelerating college readiness: Lessons from North Carolina's innovator early colleges*. Jobs for the Future. Retrieved from http://www.jff.org/sites/default/files/Accelerating_College_032011.pdf

Levin, H. M., & Calcagno, J. C. (2008). Remediation in the community college: An evaluator's perspective. *Community College Review*, *35*(3), 181–207.

Lumina Foundation. (2011*). The degree qualifications profile*. Retrieved from http://www.luminafoundation.org/publications/The_Degree_Qualifications_Profile.pdf

Marken, S., Gray, L., & Lewis, L. (2013). *Dual enrollment programs and courses for high school students at postsecondary institutions: 2010-11.* Retrieved from http://nces.ed.gov/pubs2013/2013002.pdf

McGonigal, K. (2005). *Teaching for transformation: From learning theory to teaching strategies*. Retrieved from http://web.stanford.edu/dept/CTL/cgi-bin/docs/newsletter/transformation.pdf

Mezirow, J. (2009). *Transformative learning in practice: Insights from community, workplace, and higher education* (1st ed.). San Francisco, CA: Jossey-Bass.

Michigan Department of Education. (2013). Dual entrollment. Retrieved from http://www.michigan.gov/mde/0,4615,7-140-28753_65799_40085---,00.html

Michigan Department of Education. (2014). *Earning college credit in high school: A synopsis of opportunities.* Retrieved from http://www.michigan.gov/documents/mde/Earning_College_Credit_in_High_School_3-5-14_450865_7.docm

Mokher, C. G., & McLendon, M. K. (2009). Uniting secondary and postsecondary education: An event history analysis of state adoption of dual enrollment policies. *American Journal of Education*, *115*(2), 249–277. doi:10.1086/595668

Myran, G. A. (2009). *Reinventing the open door: Transformational strategies for community colleges*. Washington, DC: Community College Press.

NACEP. (2014a). *Research studies*. Retrieved from http://www.nacep.org/research-policy/research-studies/

NACEP. (2014b). *What is concurrent enrollment?* Retrieved from http://www.nacep.org/about-nacep/what-is-concurrent-enrollment/

Nandy, K. (2012). *Understanding and quantifying effect sizes*. Retrieved from http://nursing.ucla.edu/workfiles/research/Effect%20Size%204-9-2012.pdf

O'Banion, T. (1997). *A learning college for the 21st century*. Phoenix, AZ: Oryx Press.

O'Banion, T., & Wilson, C. (2011). *Focus on learning: A learning college reader*. Phoenix, AZ: League for Innovation in the Community College.

Peter D. Hart Research Associates. (2005). *Rising to the challenge: Are high school graduates prepared for college and work?* Retrieved from http://www.achieve.org/files/pollreport_0.pdf

Pitre, C. C., & Pitre, P. (2009). Increasing underrepresented high school students' college transitions and achievements: TRIO educational opportunity programs. *National Association of Secondary School Principals. NASSP Bulletin, 93*(2), 96–110. Retrieved from http://search.proquest.com/docview/216036080 ?accountid=35715

Pretlow, J., & Wathington, H. D. (2013). Expanding dual enrollment: Increasing postsecondary access for all? *Community College Review*, *42*(1), 41–54. doi:10.1177/0091552113509664

Prihoda, J. J. (2011). *Presidents and analysts discuss contemporary challenges: New directions for community colleges.* Hoboken, NJ: John Wiley & Sons. Retrieved from http://public.eblib.com/EBLPublic/PublicView.do?ptiID=832504

Rao, D. (2004). The open door policy: Hidden barriers to postsecondary education for nontraditional adult learners. *Focus on Basics*, *6*(D), n.p.

Rodriguez, O., Hughes, K. L., & Belfield, C. (2012). *Bridging college and careers: Using dual enrollment to enhance career and technical education pathways*. Retrieved from http://www.postsecondaryresearch.org/i/a/document/NCPRBrief _RodriguezHughesBelfield_DualEnrollment.pdf

Rogers, C. R. (1983). *Freedom to learn for the 80's*. Columbus, OH: C.E. Merrill.

Senechal, D. (2010). The most daring education reform of all. *American Educator*. Retrieved from http://www.aft.org/sites/default/files/periodicals/ Senechal_3.pdf

Skinner, B. F. (1971). *Beyond freedom and dignity* (1st ed.). New York: Knopf.

Smith, R. J. (n.d.a). *Higher education opportunities for high schools: The impact on Michigan's community colleges.* Unpublished manuscript.

Smith, R. J. (n.d.b). *Transformative teaching and learning: Applying the concepts to dual enrollment.* Unpublished manuscript.

Speroni, C. (2011). *Determinants of students' success: The role of advanced placement and dual enrollment programs* (Research). National Center for Postsecondary Research. Retrieved from http://www.eric.ed.gov/PDFS/ED527528.pdf

Swanson, J. L. (2008). *An analysis of the impact of high school dual enrollment course participation on post-secondary academic success, persistence and degree completion.* Retrieved from http://nacep.org/wp-content/uploads/2010/02/Dissertation-2008-Joni-L.-Swanson.pdf

Venezia, A., & Jaeger, L. (2013). Transitions from high school to college. *The Future of Children*, *23*(1), 117–136. Retrieved from http://www.jstor.org/stable/23409491

Vogt, W. P. (2007). *Quantitative research methods for professionals*. Boston, MA: Pearson/Allyn and Bacon.

Williams, J. F. (2010). *Early college academic performance: Studying the effects of earning college credits from advanced placement and dual enrollment*. Retrieved from http://www.proquest.com/en-US/products/dissertations/individuals.shtml

Zahner, D., Ramsaran, L. M., & Steedle, J. T. (2014). Comparing alternatives in the prediction of college success. Retrieved from http://cae.org/images/uploads/pdf/Comparing_Alternatives_in_the_Prediction_of_College_Success.pdf

# APPENDIX A: PPRC – ANY DUAL PROGRAM VS. NON DUAL PROGRAM ANOVA RESULTS

PPRC - Any Dual Program vs. Non Dual Program ANOVA Results

| Student Outcome | | Sum of Squares | *df* | Mean Square | *F* | Sig. |
|---|---|---|---|---|---|---|
| Progression | Between Groups | 6.383 | 1 | 6.383 | 46.635 | .000 |
| | Within Groups | 355.060 | 2594 | .137 | | |
| | Total | 361.444 | 2595 | | | |
| Persistence | Between Groups | 15.220 | 1 | 15.220 | 62.429 | .000 |
| | Within Groups | 632.394 | 2594 | .244 | | |
| | Total | 647.613 | 2595 | | | |
| Retention | Between Groups | .442 | 1 | .442 | 2.012 | .156 |
| | Within Groups | 570.206 | 2594 | .220 | | |
| | Total | 570.648 | 2595 | | | |
| Completion | Between Groups | .006 | 1 | .006 | .029 | .866 |
| | Within Groups | 581.043 | 2594 | .224 | | |
| | Total | 581.049 | 2595 | | | |

# APPENDIX B: PROGRESSION CHI SQUARE AND PHI RESULTS

Progression Chi Square and Phi Results

| | Value | *df* | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|---|---|---|---|---|---|
| Pearson Chi-Square | 45.847[a] | 1 | .000 | | |
| Continuity Correction[b] | 44.914 | 1 | .000 | | |
| Likelihood Ratio | 55.800 | 1 | .000 | | |
| Fisher's Exact Test | | | | .000 | .000 |
| Linear-by-Linear Association | 45.829 | 1 | .000 | | |
| N of Valid Cases | 2596 | | | | |

Symmetric Measures

| | | Value | Approx. Sig. |
|---|---|---|---|
| Nominal by Nominal | Phi | .133 | .000 |
| | Cramer's V | .133 | .000 |
| N of Valid Cases | | 2596 | |

# APPENDIX C: PERSISTENCE CHI SQUARE AND PHI RESULTS

Persistence Chi Square and Phi Results

| | Value | *df* | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|---|---|---|---|---|---|
| Pearson Chi-Square | 61.009[a] | 1 | .000 | | |
| Continuity Correction[b] | 60.203 | 1 | .000 | | |
| Likelihood Ratio | 62.532 | 1 | .000 | | |
| Fisher's Exact Test | | | | .000 | .000 |
| Linear-by-Linear Association | 60.985 | 1 | .000 | | |
| N of Valid Cases | 2596 | | | | |

Symmetric Measures

| | | Value | Approx. Sig. |
|---|---|---|---|
| Nominal by Nominal | Phi | .153 | .000 |
| | Cramer's V | .153 | .000 |
| N of Valid Cases | | 2596 | |

# APPENDIX D: RETENTION CHI SQUARE AND PHI RESULTS

## Retention Chi Square and Phi Results

Chi square

| | Value | *df* | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|---|---|---|---|---|---|
| Pearson Chi-Square | 2.012[a] | 1 | .156 | | |
| Continuity Correction[b] | 1.859 | 1 | .173 | | |
| Likelihood Ratio | 1.990 | 1 | .158 | | |
| Fisher's Exact Test | | | | .168 | .087 |
| Linear-by-Linear Association | 2.012 | 1 | .156 | | |
| N of Valid Cases | 2596 | | | | |

Symmetric Measures

| | | Value | Approx. Sig. |
|---|---|---|---|
| Nominal by Nominal | Phi | .028 | .156 |
| | Cramer's V | .028 | .156 |
| N of Valid Cases | | 2596 | |

# APPENDIX E: COMPLETION CHI SQUARE AND PHI RESULTS

## Completion Chi square and Phi Results

Chi square

| | Value | *df* | Asymp. Sig. (2-sided) | Exact Sig. (2-sided) | Exact Sig. (1-sided) |
|---|---|---|---|---|---|
| Pearson Chi-Square | .029[a] | 1 | .866 | | |
| Continuity Correction[b] | .013 | 1 | .909 | | |
| Likelihood Ratio | .029 | 1 | .866 | | |
| Fisher's Exact Test | | | | .913 | .456 |
| Linear-by-Linear Association | .029 | 1 | .866 | | |
| N of Valid Cases | 2596 | | | | |

Symmetric Measures

| | | Value | Approx. Sig. |
|---|---|---|---|
| Nominal by Nominal | Phi | -.003 | .866 |
| | Cramer's V | .003 | .866 |
| N of Valid Cases | | 2596 | |

# APPENDIX F: TERM GPA BY ENROLLMENT STATUS – ANOVA AND ETA RESULTS

## Term GPA by Enrollment Status – ANOVA and Eta Results

ANOVA Table

| | | | Sum of Squares | *df* | Mean Square | *F* | Sig. |
|---|---|---|---|---|---|---|---|
| Term GPA (2010FA) * Recode Status for Final Analysis | Between Groups | (Combined) | 350.284 | 8 | 43.785 | 24.527 | .000 |
| | Within Groups | | 4618.382 | 2587 | 1.785 | | |
| | Total | | 4968.665 | 2595 | | | |

Measures of Association

| | Eta | Eta Squared |
|---|---|---|
| Term GPA (2010FA) * Recode Status for Final Analysis | .266 | .070 |

# APPENDIX G: ANOVA STATISTICS ACCORDING TO INDIVIDUAL ENROLLMENT STATUS

## ANOVA Statistics According to Individual Enrollment Status

DUAL ENROLLED

Case Processing Summary

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Included | | Excluded | | Total | |
| | N | Percent | N | Percent | N | Percent |
| Recode Completion Transferred to another college or Graduated within 3yr * Recode Dual Enrollment | 2596 | 98.4% | 43 | 1.6% | 2639 | 100.0% |

Report

Recode_Completion Transferred to another college or Graduated within 3yr

| Recode_Dual Enrollment | | Mean | N | Std. Deviation |
|---|---|---|---|---|
| dimension 1 | Did Not Dual Enroll | .34 | 2183 | .472 |
| | Dual Enrolled Status | .35 | 413 | .478 |
| | Total | .34 | 2596 | .473 |

ANOVA Table

| | | | Sum of Squares | *df* | Mean Square | *F* | Sig. |
|---|---|---|---|---|---|---|---|
| Recode_Completion Transferred to another college or Graduated within 3 yr * Recode_Dual Enrollment | Between Groups | (Combined) | .081 | 1 | .081 | .364 | .547 |
| | Within Groups | | 580.968 | 2594 | .224 | | |
| | Total | | 581.049 | 2595 | | | |

Measures of Association

| | Eta | Eta Squared |
|---|---|---|
| Recode_Completion Transferredtoanother collegeorGraduatedwithin 3yr * Recode_DualEnrollment | .012 | .000 |

## DUAL CTE

Case Processing Summary

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Included | | Excluded | | Total | |
| | N | Percent | N | Percent | N | Percent |
| Recode_Completion Transferred to another college or Graduated within 3yr * Recode_DualCTE | 2639 | 100.0% | 0 | .0% | 2639 | 100.0% |

Report

Recode_Completion Transferred to another college or Graduated within 3 yr

| Recode_DualCTE | | Mean | N | Std. Deviation |
|---|---|---|---|---|
| dimension 1 | Non Dual CTE | .34 | 2615 | .474 |
| | Dual CTE | .08 | 24 | .282 |
| | Total | .34 | 2639 | .474 |

ANOVA Table

| | | | Sum of Squares | *df* | Mean Square | *F* | Sig. |
|---|---|---|---|---|---|---|---|
| Recode_Completion Transferred to another college or Graduated within 3yr * Recode_DualCTE | Between Groups | (Combined) | 1.585 | 1 | 1.585 | 7.085 | .008 |
| | Within Groups | | 589.882 | 2637 | .224 | | |
| | Total | | 591.466 | 2638 | | | |

Measures of Association

| | Eta | Eta Squared |
|---|---|---|
| Recode_Completion Transferred to another college or Graduated within 3yr * Recode_DualCTE | .052 | .003 |

## DUAL MIDDLE COLLEGE

Case Processing Summary

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Included | | Excluded | | Total | |
| | N | Percent | N | Percent | N | Percent |
| Recode_Completion Transferred to another college or Graduated within 3yr * Recode_Middle College | 2639 | 100.0% | 0 | .0% | 2639 | 100.0% |

Report

Recode_CompletionTransferredtoanothercollegeorGraduatedwithin3yr

| Recode_Middle College | | Mean | N | Std. Deviation |
|---|---|---|---|---|
| dimension 1 | Non Middle College | .34 | 2622 | .474 |
| | Middle College | .29 | 17 | .470 |
| | Total | .34 | 2639 | .474 |

ANOVA Table

| | | | Sum of Squares | *df* | Mean Square | *F* | Sig. |
|---|---|---|---|---|---|---|---|
| Recode_Completion Transferred to another college or Graduated within 3 yr * Recode_Middle College | Between Groups | (Combined) | .035 | 1 | .035 | .155 | .694 |
| | Within Groups | | 591.432 | 2637 | .224 | | |
| | Total | | 591.466 | 2638 | | | |

Measures of Association

| | Eta | Eta Squared |
|---|---|---|

Measures of Association

| | Eta | Eta Squared |
|---|---|---|
| Recode_Completion Transferred to another college or Graduated within 3yr * Recode_Middle College | .008 | .000 |

FIRST TIME FRESHMAN

Case Processing Summary

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Included | | Excluded | | Total | |
| | N | Percent | N | Percent | N | Percent |
| Recode_Completion Transferred to another college or Graduated within 3yr * Recode_First Time Freshman | 2639 | 100.0% | 0 | .0% | 2639 | 100.0% |

Report

Recode_CompletionTransferredtoanothercollegeorGraduatedwithin 3yr

| Recode_FirstTimeFreshman | Mean | N | Std. Deviation |
|---|---|---|---|
| Non First Time Freshman | .45 | 1469 | .498 |
| First Time Freshman | .20 | 1170 | .397 |
| Total | .34 | 2639 | .474 |

ANOVA Table

| | | | Sum of Squares | *df* | Mean Square | *F* | Sig. |
|---|---|---|---|---|---|---|---|
| Recode_Completion Transferredtoanother collegeorGraduated within3yr * Recode_FirstTime Freshman | Between Groups | (Combined) | 43.232 | 1 | 43.232 | 207.945 | .000 |
| | Within Groups | | 548.234 | 2637 | .208 | | |
| | Total | | 591.466 | 2638 | | | |

Measures of Association

| | Eta | Eta Squared |
|---|---|---|

Measures of Association

| | Eta | Eta Squared |
|---|---|---|
| Recode_Completion Transferredtoanother collegeorGraduatedwithin 3yr * Recode_FirstTimeFreshman | .270 | .073 |

## TRANSFER STUDENT

Case Processing Summary

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Included | | Excluded | | Total | |
| | N | Percent | N | Percent | N | Percent |
| Recode_CompletionTransferredtoanothercollegeorGraduatedwithin3yr * Recode_TransferStudent | 2639 | 100.0% | 0 | .0% | 2639 | 100.0% |

**Report**

Recode_CompletionTransferredtoanothercollegeorGraduatedwithin3yr

| Recode_TransferStudent | | Mean | N | Std. Deviation |
|---|---|---|---|---|
| dimension 1 | Non Transfer Student | .28 | 1882 | .451 |
| | Transfer Student | .48 | 757 | .500 |
| | Total | .34 | 2639 | .474 |

ANOVA Table

| | | | Sum of Squares | *df* | Mean Square | *F* | Sig. |
|---|---|---|---|---|---|---|---|
| Recode_CompletionTransferredtoanothercollegeorGraduatedwithin3yr * Recode_TransferStudent | Between Groups | (Combined) | 20.139 | 1 | 20.139 | 92.951 | .000 |
| | Within Groups | | 571.328 | 2637 | .217 | | |
| | Total | | 591.466 | 2638 | | | |

Measures of Association

| | Eta | Eta Squared |
|---|---|---|
| Recode_CompletionTransferredtoanothercollegeorGraduatedwithin3yr * Recode_TransferStudent | .185 | .034 |

# APPENDIX H: ANOVA STATISTICS ACCORDING TO GROUP ENROLLMENT STATUS

## ANOVA Statistics According to Group Enrollment Status

Case Processing Summary

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Included | | Excluded | | Total | |
| | N | Percent | N | Percent | N | Percent |
| Recode_CompletionTransferred toanothercollegeorGraduated within3yr * Recode_StatusforFinalAnalysis | 2596 | 98.4% | 43 | 1.6% | 2639 | 100.0% |

Report

Recode_CompletionTransferredtoanothercollegeorGraduatedwithin3yr

| Recode_StatusforFinalAnalysis | Mean | N | Std. Deviation |
|---|---|---|---|
| Dual Enrolled | .35 | 413 | .478 |
| Dual CTE | .08 | 24 | .282 |
| Dual Middle College | .29 | 17 | .470 |
| First Time Freshman | .20 | 1170 | .397 |
| Guest | .67 | 192 | .473 |
| International | .25 | 4 | .500 |
| Previous College - Not Seeking Degree | .00 | 1 | . |
| Returning Student | .39 | 18 | .502 |
| Transfer Student | .48 | 757 | .500 |
| Total | .34 | 2596 | .473 |

ANOVA Table

| | | | Sum of Squares | *df* | Mean Square | *F* | Sig. |
|---|---|---|---|---|---|---|---|
| Recode_CompletionTransferred toanothercollegeorGraduated within3yr * Recode_StatusforFinalAnalysis | Between Groups | (Combined) | 60.876 | 8 | 7.610 | 37.845 | .000 |
| | Within Groups | | 520.173 | 2587 | .201 | | |
| | Total | | 581.049 | 2595 | | | |

Measures of Association

| | Eta | Eta Squared |
|---|---|---|
| Recode_CompletionTransferred toanothercollegeorGraduated within3yr * Recode_StatusforFinalAnalysis | .324 | .105 |