ACADEMIC ACHIEVEMENT OF DUAL ENROLLED STUDENTS: DO INSTRUCTORS AND VENUES MATTER?

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ACADEMIC ACHIEVEMENT OF DUAL ENROLLED STUDENTS: DO INSTRUCTORS AND VENUES MATTER?

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ABSTRACT

ACADEMIC ACHIEVEMENT OF DUAL ENROLLED STUDENTS: DO INSTRUCTORS AND VENUES MATTER?

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This study investigated the impact that instructor type (high school teacher or college faculty) and educational venue (high school or college campus) had on the academic achievement of dual enrollment students as measured by overall course grades in First-Year Composition and College Algebra courses. A pre-existing data set from a large Midwestern urban community college, spanning two academic years was used in the analysis. The researcher analyzed the data using descriptive methods, as well as two separate statistical analysis methods: an independent samples t-test and a one-way between groups ANOVA. The results revealed that, in general, dual enrollment students in First-Year Composition taking courses from a high school teacher scored higher and performed better in terms of overall course grades compared to dual enrollment students in First-Year Composition who were taking courses from a high school teacher faired similarly to dual enrollment students in College Algebra taking courses from a high school teacher faired similarly to dual enrollment students in College Algebra taking courses from a college

faculty member. The results also revealed that the Delivery Model (i.e., high school teacher on a high school campus, college faculty on a high school campus, or college faculty on a college campus) did impact the overall course grade of dually-enrolled students in First-Year Composition but not in College Algebra. The findings are discussed in terms of further research and practice.

Dedicated to Grace and Hope, may you always complete your educational goals no matter how long your journey.

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CHAPTER I INTRODUCTION

Through the collaboration of Clark Kerr, former President of the University of California, Berkley, and Alan Pifer, President of the Carnegie Corporation and the Carnegie Foundation for the Advancement of Teaching, an expansive study of American higher education was launched to investigate its needs and contributions to the nation's social and economic future (Douglass, 2005). Discussions between Kerr and Pifer surrounding what the focus of the research should be resulted in the initial designation of the project as, *The Carnegie Commission to Study the Future Structure, Functions, and Financing of Higher Education*, which was ultimately shortened to the Carnegie Commission (Pifer, 1972). Kerr and Pifer, along with their colleagues, compiled a research agenda incorporating six general policy areas: Social justice; Provision of high skills and new knowledge; Effectiveness, quality, and integrity of academic programs; Adequacy of governance; Human and financial resources available to higher education; and, Purposes and performance of higher education institutions (Douglass, 2005).

The Carnegie Commission's (1968) first published report focused on the issues of quality and equality, noting the importance of removing the financial barriers to higher

education for needy individuals (Douglass, 2005). Subsequent reports from the Carnegie Commission suggested potential changes in the structure of the nation's educational system, which included the reduction of years students spent in high school or college, the possible creation of a three-year bachelor's degree, and the granting of college credit for high school seniors capable of producing college-level work (Pifer, 1972). The Carnegie Commission continued to release additional information addressing the six general policy areas in the form of 21 special reports and 80 sponsored studies over the next several years (Douglass).

Background

Independent scholarly research concerning the duplication of curricula in secondary and post-secondary institutions began when Blanchard (1971) conducted a national survey on curriculum articulation between colleges and secondary schools and found nearly one-third of the content of the first two years of college was a reiteration of content found in secondary education curricula. Blanchard's research further highlighted the need for stronger partnerships between high schools and colleges to help reduce the repetition of curricula content and aid in creating smoother transitions for students as they moved from secondary to post-secondary institutions. As the focus on improving higher education in terms of reducing the amount of time to degree, overall cost, and overlap of curricula continued, several partnerships emerged between secondary and post-secondary institutions in an effort to address these challenges.

According to Boswell (2001), state policymakers have been encouraging concurrent enrollment options to increase access to college-level courses for students while still in high school for decades. Boswell found there were two different approaches

to concurrent enrollment courses: one allowed high schools and colleges to offer courses at the high school; the other enabled high school students to attend college courses on college campuses. As high school and college leaders collaborated on developing concurrent enrollment partnerships, a number of different models emerged.

Advanced Placement (AP) programs were created in the 1950s by the College Board (Boswell, 2001). AP courses were initially designed for highly-qualified high school students who were capable of taking college-level courses taught by their high school teachers (Nugent and Karnes, 2002). Upon completing the course work, high school students would take a standardized subject test on which they were scored on a scale of 1-5, with 5 being the highest possible score, and 1 being the lowest (Nugent and Karnes). High scores resulted in students being given college credit depending upon the institution into which they matriculated. In some states (e.g., Ohio) a predetermined score on an AP exam (i.e., 3) resulted in the automatic awarding of college credit at a public two or four-year institution.

The International Baccalaureate (IB) program was another high school to college partnership that emerged in the 1970s designed to assist geographically-mobile students in meeting their educational needs (Poelzer & Feldhusen, 1997). The IB program was developed as a rigorous curriculum that included the study of a foreign language, literature, science, math and social studies (Zanville, 1999). Students who traveled abroad during their high school years found the IB programs helpful as many universities across the states recognized and accepted their earned credits (Poelzer & Feldhusen).

In the 1980s, Parnell (1985) put forth the concept of Tech Prep programs as a partnership between high schools and community colleges whereby students had planned

pathways that linked high school curricula to more advanced subsequent courses at community colleges (Bailey, Hughes & Karp, 2002). These partnerships were generally federally funded through grants and offered a specialized curriculum in professional and technical fields that were designed to reduce duplication of course content (Boswell, 2001). Ideally, students began their Tech Prep program during their junior year in high school and finished their degree program after their second year in college (Bailey et al., 2002).

Another dual enrollment program for high school students enacted in the 1980s was the Post-Secondary Enrollment Option, also known as PSEO. According to Boswell (2001), the state of Minnesota was the first state to institute policies on dual enrollment options. By 1989, the state of Ohio passed the Omnibus Education Reform Act, which legislated the state's PSEO offerings (Smith et al. 2007). Ultimately, PSEO programs were designed to provide high school juniors and seniors a variety of more rigorous academic offerings by taking college-level courses at the state's expense (Boswell).

The current trend in high school-to-college partnerships is known as Dual Credit or Dual Enrollment (Hughes, 2010). Dual credit courses allow students to earn credit for both their high school diplomas and college degrees at the same time by taking the same course(s). Mokher and McLendon (2009) noted that dual enrollment programs have grown considerably since California established its program in 1976. By the end of the 1980s, 13 more states had developed dual enrollment programs, and by the end of the 1990s, 17 states had joined the list of states offering dual enrollment programs, bringing the total to 31 states by the early 2000s. Today, according to the Education Commission of the States, all 50 states have developed some type of secondary to post-secondary

partnership involving dual enrollment; however, not all states have structured these partnerships in the same way (Zinth, 2016). Taylor, Borden, and Park (2015) assert many dual enrollment programs have proceeded without clear policy guidelines or regulations at the state level, leading to much variation between and among the states.

Statement of the Problem

While most researchers concluded high school students who were enrolled in dual enrollment courses had a distinct advantage in terms of cost savings, college readiness, and completion rates (Andrews, 2001; Andrews & Barnett, 2002; Medvide & Blusten, 2010), other scholars indicated challenges in the quality of course content and academic rigor (Ferguson, Baker, & Burnett, 2015; Whissemore, 2012; Hughes & Edwards; 2012). Taylor et al. (2015) argued that despite the expansion of dual enrollment partnerships, little empirical research had been conducted concerning state policy regulation and enforcement of quality. Additional researchers found that the few studies that had been conducted at the national level identified wide variations in the state policies guiding dual enrollment programs (Bragg, Kim, & Barnett, 2006; Karp, Bailey, Hughes, & Fermin, 2004).

Zinth (2016) collected information concerning which states allowed high school students to attend dual enrollment courses and what parameters existed surrounding those venues. Her research revealed that 24 states allowed high school students to attend dual enrollment courses at either their high schools or on a college campus. Zinth (2016) further noted that 35 states offered online courses in multiple dual enrollment programs, that 13 states allowed dual enrollment courses to be held at physical locations other than

on a high school or college campus, and that three states and the District of Columbia only allowed dual enrollment courses to be held on college or university campuses.

In addition to the location at which students could attend dual enrollment classes, Zinth (2016) also examined information concerning policies ensuring the quality of the dual enrollment instructor. She found 41 states have adopted policies setting the expectations for dual enrollment instructor quality. However, Zinth (2015) argued that these state policies span a broad spectrum ranging from granting the postsecondary institution complete authority over the quality of the instructor and content of dual enrollment courses, to setting specific state-mandated quality control measures on faculty credentials, professional development, and syllabi.

Hughes (2010) reported that questions had surfaced surrounding the quality of classes taught at high schools by high school teachers and whether such courses could truly be considered college level courses. Gewertz, Harwin, Sparks, and Lewandowski (2016) found that a growing number of high school counselors were encountering reluctance from institutions of higher education concerning the acceptance of dual credit. Their findings suggest colleges and universities were often skeptical about courses taught at high schools by high school teachers, questioning whether the quality of instruction met college-level rigor. Zinth (2015) contended that the majority of dual enrollment courses were taught on high school campuses by high school teachers. She further asserted that it was imperative that mechanisms be implemented to ensure the quality of the curriculum and ancillary materials, as well as the qualification of the high school teachers (Zinth).

Giani, Alexander, and Reyes (2014) explored dual credit coursework and its impact on post-secondary outcomes. The researchers looked at how dual enrollment courses contributed to the dual enrolled students' access to, persistence through, and attainment of a college or university degree. While their research reaffirmed what most studies found that dual enrollment programs helped students matriculate into and persist through to degree completion they also noted that further research was needed to determine the impact of where the courses were taught (i.e., on the high school or college campus) and who was responsible for teaching the dual enrollment courses (i.e., high school teacher or college faculty member).

To date, little research has been directed specifically at college-level instruction performed by high school teachers in the high school classroom. With the current skepticism concerning the academic rigor of college-level courses taught by high school teachers, and the growing trend in dual enrollment programs to have dual enrollment courses taught by high school teachers, an investigation into the academic achievement of dual-enrolled students instructed by high school teachers compared to the academic achievement of dual-enrolled students instructed by college faculty would inform both state-level policies and institutional practices.

Purpose of the Study

This study investigated the level of academic achievement in high school students enrolled in dual enrollment courses. More specifically, this study focused on the impact that the instructor (i.e., high school teacher or college faculty member) had on the overall academic achievement of the dual-enrolled high school student. In addition, the

researcher focused on the impact the venue had (i.e., the high school or college campus) on the overall academic achievement of the dual-enrolled high school student.

Research Questions

The following research questions guided this study in terms of the level of academic achievement in high school students enrolled in dual-enrolled courses:

Research question 1: What is the difference in overall course grades for dual enrollment students taught by high school teachers and overall course grades for dual enrollment students taught by college faculty, taking the same dual enrollment course?

Research question 2: What is the difference in overall course grades of high school students who take dual enrollment courses taught by high school teachers on their high school campus compared to high school students who take the same dual enrollment courses taught by college faculty on their high school campus?

Research question 3: What is the difference in overall course grades for high school students who take dual enrollment courses taught by college faculty on their high school campus compared to high school students who take the same dual enrollment courses taught by college faculty on a college campus?

Null and Research Hypotheses

The following were the null and research hypotheses associated with the research questions on the level of academic achievement in high school students enrolled in dualenrolled courses:

Ho 1: There will be no statistically significant difference in overall course grades for dual enrollment students taught by high school teachers and overall course grades for

dual enrollment students taught by college faculty, taking the same dual enrollment course.

Ha 1: There will be a significant difference (p < .05) in overall course grades for dual enrollment students taught by high school teachers and overall course grades for dual enrollment students taught by college faculty, taking the same dual enrollment course.

Ho 2: There will be no statistically significant difference in overall course grades for high school students who take dual enrollment courses taught by high school teachers on their high school campus compared to overall course grades for high school students who take the same dual enrollment courses taught by college faculty on their high school campus.

Ha 2: There will be a significant difference (p < .05) in overall course grades for high school students who took dual enrollment courses taught by high school teachers on their high school campus compared to overall course grades for high school students who took the same dual enrollment course taught by college faculty on their high school campus.

Ho 3: There will be no statistically significant difference in overall course grades for high school students who take dual enrollment courses taught by college faculty on their high school campus compared to overall course grades for high school students who take the same dual enrollment courses taught by college faculty on a college campus.

Ha 3: There will be a significant difference (p < .05) in overall course grades for high school students who took dual enrollment courses taught by college faculty on their

high school campus compared to high school students who took the same dual enrollment courses taught by college faculty on a college campus.

Study Implications

This study contributes to the dual enrollment literature in a number of ways. First, colleges and universities that have established dual enrollment partnerships with local high schools can use these findings to help inform decisions surrounding course staffing and appropriate venues for instruction. Because many options exist (i.e., high school versus college faculty, and high school campus versus college campus), this study provides evidence of which course delivery structure works best for dually-enrolled high school students in terms of their overall academic success.

Second, department chairpersons and college faculty may have better insights into how course curricula can be designed to meet the specific needs of the dually-enrolled high school students, especially when high school teachers are primarily responsible for the actual instruction of the course content. Because department chairpersons and college faculty own the curriculum of the courses they teach, this research may inform their pedagogical decisions when designing course curriculum for their programs that include dually-enrolled students.

Third, state legislatures may be provided additional insights into what policies may be needed (or may need to be revised) in order to provide more consistency in how dual enrollment programs are managed and administrated throughout their respective states. Because in some states dual enrollment programs vary greatly in terms of their structure, this research may provide insights into best practices of dual enrollment partnerships between secondary and post-secondary institutions.

Finally, parents of high school students who are involved in decisions concerning their child's academic progress and ultimate success may find the results of this research useful when planning for both secondary and post-secondary coursework. As the cost of education continues to rise, parents may be provided additional insights as to how their children can best navigate secondary and post-secondary educational options that streamline their timeline toward degree completion.

Justification for Study

As dual enrollment partnerships between high schools and colleges continue to grow across the United States, and as questions concerning instructor quality and academic rigor surface, this study provided insights into what differences, if any, existed between dual enrollment courses taught by high school teachers versus dual enrollment courses taught by college faculty. Hebert (2001) recommended that high school teachers instructing dual enrollment courses be considered a special set of adjunct faculty, and that research concerning their effectiveness in the classroom was needed. This study provides insights into which instructional delivery approach may be the best option in terms of facilitating academic success as assessed through final course grades of high school students enrolled in dual credit courses and taught through different instructor models (i.e., employing high school teachers to teach college-level content or continuing to allow college-level content to be delivered by college faculty).

Other researchers, Taylor et al. (2015) noted that there was little empirical research concerning state regulation of quality in dual enrollment course content, even though large variations of policies existed among the states. And, Karp (2015) suggested that legislators and other dual enrollment stakeholders should be engaged in discussions

concerning how to best structure, incentivize and administer dual enrollment programs. Additional research was also needed into what type of secondary to post-secondary partnerships were most effective in eliminating the inter-institutional gaps that prohibit students from obtaining their collegiate completion goals (Karp).

Finally, Kinnick (2012) investigated the impact that dual enrollment programs had on the post-secondary institution. She found that both administrators and faculty alike were concerned with an institution's ability to maintain high-quality course content in dual enrollment courses taught by a high school teacher on a high school campus. Kinnick also suggested that simple program assessments and the sharing of pedagogical best practices were critical in helping to ensure and maintain dual enrollment program quality.

Limitations

There were several limiting factors of this research. First, the researcher used an ex post facto design, which limited the internal validity of the study. According to Ary, Jacobs and Sorensen (2010) ex post facto research designs are used when the researcher cannot randomly assign subjects to experimental groups or manipulate the independent variable. The researcher used groups of students who had already received grades for dual enrollment courses that they had completed through classes that either a high school teacher or college faculty member taught. Those classes were comprised of students who had not been randomly assigned.

Second, because this study used groups that were preexisting, selection bias represented a threat to internal validity. According to Ary et al. (2010), selection bias occurs when the researcher cannot randomly assign subjects to groups and must use

groups that were previously intact. For this study, students chose between taking the dual enrollment course on the high school campus or on the college campus and were not randomly assigned. In order to help mitigate this issue of selection bias, the researcher limited the subjects to a more homogenous group by including only students who were juniors and seniors in high school and only those taking courses in College Algebra and/or First-Year Composition.

A third limitation of this study was the inability to manipulate the independent variable, or Delivery Model. High school teachers and college faculty were scheduled to teach sections of the dual enrollment courses based on the needs of the department and at the chairperson's discretion. In addition, students self-select the manner in which they wanted to receive their course instruction (i.e. with a high school teacher on a high school campus, with a college faculty member on a high school campus, or with a college faculty member on a college campus); thus, manipulation of the independent variable was not plausible.

Finally, because the data for this study were limited to one geographical area, southwest Ohio, and were coming from students who were matriculating into a participating community college, the results may not be generalizable to a broader population of students matriculating at a 4-year university.

Assumptions

There were several assumptions the researcher was making concerning this study. First, the researcher assumed that data in this study were coming from dual enrollment students who had been deemed to be college ready either through an appropriate standardized testing instrument (i.e., ACT, SAT, Accuplacer for students in math courses,

and WritePlacer for students in English courses) or through other college approved standards for assessing college readiness (i.e., High School GPA).

A second assumption was that all high school teachers and college faculty in this study were properly credentialed to teach the college level content through dual enrollment. For high school teachers, the minimum qualification was 18 hours of graduate level credit in the content area of the discipline in which they were teaching. For college faculty, the minimum qualification was a MA in any area, usually education, plus 18 hours of graduate-level credit in the content area of the discipline in which they were teaching.

A third assumption was that there was some difference between high school teachers and college faculty in terms their pedagogical knowledge vis-à-vis teaching high school students. The researcher assumed that high school teachers would have more experience and appropriate credentialing at the K-12 level than would the college faculty. However, the researcher assumed that this difference in pedagogical knowledge would not influence the grades that students earned from either a high school teacher or college faculty member who were teaching the same dual enrollment courses.

Operational Definitions

Dual Credit: Indicates credit earned by high school students meeting both high school diploma and college degree requirements. Dual credit students earn both high school and college credit for the same course (Hughes, 2010).

Dual Enrollment: Indicates matriculation of high school students in courses whereby college-level credits were earned. Students complete assessments that were

normally part of the college course and were given final grades on a college transcript (Hughes, 2010).

Dually-Enrolled Student: Indicates high school students in their Junior or Senior year whom were taking dual credit courses through their high schools' dual enrollment partnerships.

High School Teacher: Instructor who was employed by a school district and credentialed by the state to teach high school level courses. For this study, high school teachers were qualified by state standards to teach as college-level adjunct faculty.

College Faculty: Instructor who was employed by an institution of higher education. Faculty may have earned the rank of Assistant Professor, Associate Professor or Full Professor. Faculty may also have been Instructors in non-tenured positions or adjunct faculty with appropriate state mandated and institutionally approved credentials.

Overall Course Grades: Indicates the final calculated course grade including all assessments in the dual enrolled course that contribute to the final course grade as it appeared on the college transcript.

Delivery Model: Delivery Model was defined as the combination of who (high school teacher or college faculty) and where (high school campus or college campus) the dual enrollment student received the college level instruction. Three mutually exclusive manners were used for this study.

1.) High school teacher on a high school campus. High school teacher was defined as the instructor who was employed by a school district and credentialed by the state to teach high school level courses. For this study high school teachers were also qualified by state standards to teach as college level adjunct faculty. High school

campuses were defined as any location where secondary instruction was being conducted exclusively involving high school aged students.

2.) College faculty on a high school campus. College faculty were employed by an institution of higher education. Faculty may have earned rank of Assistant Professor, Associate Professor, or Full Professor. Faculty may also have been Instructors in nontenured positions or adjunct faculty with appropriate state mandated and institutionally approved credentials.

3.) College faculty on a college campus. College campus was defined as any location where post-secondary instruction was being conducted involving students who were matriculating as post-secondary students. For this study, college location included the main campus of the educational institution, or any one of the institution's defined satellite branch campuses, which were formally approved by the institution's governing body.

CHAPTER II LITERATURE REVIEW

Numerous studies have been conducted in higher education focusing on the efficacy of dual enrollment and/or dual credit programs in increasing student preparedness for (Speroni, 2011; Allen & Dadgar, 2012; An & Taylor, 2015; and Taylor, 2015), access to (Karp, Bailey, Hughers, & Fermin, 2004; Bragg, Kim & Barnett, 2006; Karp, Calcagno, Hughes, Jeong, & Bailey, 2007; and Giani, Alexander, & Reyes, 2014), and successful completion of (Karp, Calcagno, Hughes, Jeong, & Bailey, 2007; Speroni, 2011; An, 2013; Giani, Alexander, & Reyes, 2014; and Taylor 2015) post-secondary education.

In addition, many researchers have studied reasons why dual enrollment programs were created (Greenberg, 1988; Andrews, 2001; Boswell, 2001; and Bailey, Hughes, & Karp, 2002) compared dual enrollment to other high school courses with college credit bearing opportunities (Greenberg, 1988; Cubberley, 2009; Allen & Dadgar, 2012; Edmunds, 2012; and Ferguson, Baker, & Burnett, 2015) and examined state policies that contribute to the structure and function of dual enrollment programs (McCarthy, 1999; Boswell, 2001; Karp, Bailey, Hughes, & Fermin, 2004; Krueger, 2006; Mokher & McLendon, 2009; Ward & Vargas, 2012; Khazem & Khazem, 2014; Pretlow & Patteson, 2015; and Taylor, Borden, & Park, 2015). However, two areas of dual enrollment research that were relatively unexplored include academic rigor of course content and quality of instruction.

The following literature review provides a brief historical background of the commencement, and subsequent expansion of, dual enrollment programs across the United States. The review follows with an overview of selected states in an effort to show the variation among the states' dual enrollment programs. And, finally the review concludes with relevant research in dual enrollment in three specific areas: Student access and success, College readiness and Academic rigor and Instructor quality.

Historical Background of Dual Enrollment

Although high school dual enrollment options have existed for decades, there was no definitive start date for the inclusion of college courses within the high school curriculum. The state of California was the first state to pass legislation for dual enrollment in 1976 as dual credit options became more popular among high school students (Mokher & McLendon, 2009). By the 1980s the state of Illinois established dual credit options in an effort to allow high school students to earn college credit simultaneously with their high school coursework (Andrews & Barnett, 2002). These researchers also found that dual enrollment programs were appealing because of the potential they had for reducing costs, accelerating students' progress towards college degree completion, increasing academic rigor for gifted students, offering more overall course options and allowing high school students to get a glimpse of the requirements of college-level study.

By the late 1980s, the state of Virginia began offering dual enrollment programs with the formal signing of the Virginia Plan for Dual Enrollment (VPDE) (Catron, 2001). The VPDE did not serve as an official policy for dual enrollment in the state; however, it did provide an outline for the parameters for community colleges to structure their programs to meet the needs of their constituents in both rural and urban areas (Catron).

Dual enrollment programs were expanding rapidly despite some of the early reported problems (Mohker & McLendon, 2009). In the state of Florida, Windham (1997) conducted research investigating reports from the University of Florida indicating that dual enrollment students who had taken courses at the community colleges in the early 1990s were required to retake those courses when they matriculated into the state's university system. Windham's research revealed that dual enrollment, although not perfect, did provide a viable acceleration mechanism for some high school students who were qualified to engage in college level coursework.

By the end of the 1990s, twelve states, including Colorado, Florida, Georgia, Maine, Massachusetts, Michigan, New Jersey, Ohio, Utah, Washington and Wisconsin, had comprehensive dual enrollment programs that included little to no tuition costs for students, few course restrictions and students earning dual credits (McCarthy, 1999). According to Bailey, Hughes and Karp (2002), by 2001 the rapid expansion of dual enrollment programs resulted in all but three states having secondary to post-secondary transitional partnerships. The researchers found all dual enrollment programs allowed high school students to earn college credit through simultaneous matriculation in high school and college courses, but the funding, course prerequisites, and program structures for dual enrollment participation varied from state to state.

At the turn of the century, as more states were experiencing the expansion of dual enrollment partnerships between high schools and postsecondary institutions, additional benefits of these partnerships were being realized. Krueger (2006) reported dual enrollment programs across the nation were having positive results by increasing academic performance and degree attainment and reducing the average time-to-degree and the number of students in need of remediation. He also reported, however, that dual enrollment programs were not reaching low-income or minority students, and also found that the highest minority enrollment schools were the least likely to offer dual enrollment courses. Krueger further noted that removing financial barriers to dual enrollment courses did have a positive impact on the participation and success rates among underrepresented high school students.

The Education Commission of the States reported all fifty states evidenced numerous dual enrollment partnerships between secondary and post-secondary schools (Zinth, 2016). Zinth evaluated current dual enrollment program policies and found thirteen components that have the potential to increase diverse student populations engaging and succeeding in high quality dual enrollment options. These policy components dealt with issues surrounding access, financing, course content, instructor quality and transferability of course credits.

The following is a sampling of selected states and the parameters within which dual enrollment options were offered in those states to secondary school students. Each state's analysis includes information concerning the dual enrollment program's beginning, transformation, unique qualities (if any), student eligibility, instructor credentialing policies or guidelines, and parameters for course offerings (i.e., course

content requirements, acceptable locations for instruction, assessment methods, etc.). The states are presented in chronological order based on the year the dual enrollment program became available.

Overview of Selected State Dual Enrollment Programs

California

The state of California, in 1976, was the first state to adopt legislation concerning the practice and offerings of secondary to post-secondary partnerships (Hamilton, 2017; Mohker & McLendon, 2009). Since that time the state focused primarily on funding and student eligibility and less on developing a specific model for dual enrollment offerings and program content, leaving those decisions to institutional partnerships (Edwards, Hughes & Weisberg, 2011; Hamilton, 2017). In California, dual enrollment is referred to as College and Career Access Pathways partnerships (CCAP). California state law allows for the governing board of the community college in a school district to determine student fees, enrollment numbers, and what restrictions can be placed on students based on age, grade level, or standardized assessments (Edwards et al., 2011; Hamilton, 2017). High school students wanting to take dual enrollment courses must seek a written recommendation from their high school principal and meet the entrance requirements of the post-secondary institution through which the course is offered (Zinth, 2015).

In terms of instructor credentialing, California does not have any state policies regulating or ensuring that high school and college faculty maintain a minimum standard of higher education in order to teach the dual enrolled student. However, the CCAP requires community colleges and high school districts to comply with the collective bargaining agreements concerning teacher qualifications (Zinth, 2016). In addition to this

mandate, community college instructors teaching on a high school campus must not have been convicted of any sex or substance offenses (Zinth, 2016). Finally, as in many states, California allows for a dual enrollment course to be taught at either the high school or on the college campus.

Florida

Similar to California, another state that began offering dual enrollment opportunities in the 1970s was Florida. Established in 1979 (Mohker & McLendon, 2009; Stewart, 2017) Florida's dual enrollment program was credited with establishing the first P-16 organizational structure, which facilitates a seamless transition from secondary to post-secondary education through collaboration between both agencies and a state mandate requiring all community colleges and selected 4-year institutions to offer dual enrollment options for high school students (Krueger, 2006; McCarthy, 1999; Mokher & McLendon, 2009). These dual enrollment options guaranteed that dual credits transfer as either electives or general education college level credits, and parents and their duallyenrolled students were given addition information concerning these transfer guarantees, privileges and responsibilities (Zinth, 2014b). In addition, dual enrolled high school students in Florida were exempted from paying for registration, tuition and lab fees, while instructional materials for these courses were provided to each student free of charge (Hoffman, Vargas, & Santos, 2009; Khazem & Khazem, 2014; Stewart, 2017).

According to the Education Commission of the States, Florida also required faculty who teach dual enrollment courses, regardless of the location (i.e., high school or college campus), meet the qualifications as established by the Southern Association of Colleges and Schools Commission on Colleges' Principles of Accreditation (SACS)

(Zinth, 2016). These dual enrollment courses may not be combined with non-college level courses and all instructors, regardless of academic level, must teach the course competencies as designated and required by the post-secondary institution offering the course (Hoffman et al., 2009).

New York

The state of New York is home to one of the largest high school-to-college partnership efforts, which was established in 1984 as College Now (Allen & Dadgar, 2012; Bailey, Hughes, Karp, 2002; College Now, 2017; Hoffman, et al., 2009; Krueger, 2006). College Now was developed as a partnership between the City University of New York (CUNY) and the New York Department of Education (College Now, 2017; Krueger, 2006). Initially, College Now allowed for high school seniors from selected New York City high schools to take college level courses at their respective high schools (Greenberg, 1988).

Since its commencing, College Now experienced tremendous growth (Bailey et al., 2002; College Now, 2017). In the academic year of 2000-2001, the College Now program on the Kingsborough Community College (KCC) campus in Brooklyn, enrolled nearly 5000 students (Bailey et al., 2002; Hoffman et al., 2009). By 2007 over 14,000 students were taking advantage of the CUNY program state wide (Hoffman et al., 2009). One of the major benefits of the College Now program was that it was free to students (Bailey et al., 2002; Hoffman et al., 2009).

Students were deemed eligible for the College Now program based upon college entrance examination scores, high school grades and personal academic advising (Allen & Dadgar, 2012; College Now, 2017; Hoffman et al. 2009). The screening provided

students a realistic view into what it took to be college ready, and pointed out where, in terms of academic development, students needed additional tutoring (Bailey et al., 2002). However, the state did not stipulate a grade level requirement for student participation in the College Now program (Zinth, 2015). The College Now program holds the majority of the dual enrolled courses on high school campuses (Hoffman et al, 2009; College Now, 2017). Finally, the state of New York had no state policies regulating the quality of the course content or the credentialing of instructors who taught dual enrollment courses (Zinth, 2016).

Illinois

Approximately a decade after California passed legislation supporting dual enrollment partnerships between secondary and post-secondary educational institutions, the state of Illinois launched its first dual credit program in 1984 (Andrews & Barnett, 2002; Zamani-Gallaher, 2017). Illinois dual credit school partnerships experienced slow growth in the first few years; however, two changes in the state served as catalysts for more rapid growth: the Illinois Community College Board's (ICCB) rule of allowing both high schools and colleges to claim the dually-enrolled student for funding purposes, and the availability of Accelerated College Enrollment (ACE) grants used to cover students' tuition and fees (Andrews & Barnett, 2002; Barnett, Gardner, & Bragg, 2004; Zamani-Gallaher, 2017).

The ICCB served as the monitor of all dual credit programs in the state of Illinois (Barnett et al., 2004; Zamani-Gallaher, 2017; Zinth, 2016). The ICCB provided guidance in terms of grant funding and data collection of student participation in dual credit programs (Barnett et al., 2004; Zamani-Gallaher, 2017; Zinth, 2016). High school

students met the post-secondary institution's entrance requirements in order to be eligible to take dual credit courses (Zinth, 2015). Additional decisions concerning scope and size of dual credit programs resided at the local levels, which resulted in a variety of approaches used across the state (Barnett et al., 2004). In 2009, the Illinois legislature passed the Dual Credit Quality Act (DCQA) in an effort to define criteria for institutional adherence to quality standards, faculty credentialing and course rigor (Taylor, 2015).

Dual credit high school teachers in Illinois were required to meet the same credentialing standards as college faculty teaching the same credit bearing courses (Zamani-Gallaher, 2017; Zinth, 2016). In addition, course content and learning outcomes for courses taught at the high school location had to be the same as the course content and learning outcomes for the same courses taught at the college or university campus (Zinth, 2016). Finally, all state laws and ICCB policies regulating instructional procedures and academic standards applied to all dual credit courses regardless of location (i.e., university, college, off-campus sites, or secondary schools) (Zinth, 2016).

Minnesota

In 1985, the state of Minnesota was the first state to establish and mandate the dual enrollment opportunity known as Postsecondary Enrollment Options Program (PSEO) as a secondary to post-secondary partnership (Boswell, 2001; Krueger, 2006; Mohker & McLendon, 2009). The PSEO program was designed to allow high school juniors and seniors to take college level courses on college campuses at the state's expense with the goal of adding academic rigor and providing students a wider variety of academic options (Austin-King, Lee, Little, & Nathan, 2012; Boswell, 2001; Krueger, 2006).

According to the Minnesota Department of Education (2016), concurrent enrollment, or dual enrollment, whereby high school students take college level courses on the high school campus, is known within the state as College in the Schools (CIS). Today, CIS serves high school juniors and seniors who are enrolled at post-secondary institutions and take courses taught during the regular school day, by either a postsecondary professor or instructor, or an accredited high school teacher (Barrie, 2016). If the CIS course did not have enough juniors and seniors to fill the class, first year high school students and sophomores were allowed to apply for permission to attend the course (Zinth, 2015). There were no costs to the high school students participating in the CIS programs and the state provided reimbursement to the school districts to help defray the cost of offering these dual enrollment courses at the high schools (Barrie, 2016). High school teachers had to be approved by the partnering college or university and meet the institution's academic credentialing requirements in order to be eligible to teach in the CIS programs. Finally, high school students were held to the same academic standards, in terms of course rigor and learning outcomes, as college students (Barrie, 2016).

North Carolina

In the same decade that Illinois and Minnesota launched their first dual credit programs, North Carolina's General Assembly established the Huskins program in 1986, allowing high school students to enroll in community college courses during the school day (Sandhills Community College, 2011). The Huskins program provided opportunities for qualified high school students in their junior and senior years to dually enroll in college courses, known as Huskins classes, on the high school or college campus during the regular school day and earn both high school and college credit for the same course
(Andrews, 2001; Sandhills Community College, 2011). By 2002 a new more comprehensive dual enrollment program was introduced in the state using an Early College Model (Eads, 2017; Edmunds, 2012; Le & Frankfort, 2011). Early College High Schools (ECHS) were developed throughout the nation from seed money provided by the Bill and Melinda Gates Foundation (Edmunds, 2012; Le & Frankfort, 2011). ECHSs were designed to merge aspects of high school and college experiences and to provide new environments in which more diverse and low income high school students could earn college credits simultaneously with their high school diplomas (Edmunds, 2012; Le & Frankfort, 2011).

Since 2004, North Carolina opened 42 ECHS while the name of the programs gradually changed to Learn and Earn Schools (Hoffman et al., 2009). During 2007-2008, the state invested over \$15 million into the Learn and Earn schools, making college level courses available through online learning at no cost to the student (Hoffman et al., 2009). Learn and Earn schools have helped improve dual enrollment pathways by avoiding uncoordinated secondary and post-secondary state policies that had inhibited positive school partnerships in the past (Hoffman, et al., 2009).

In 2011 North Carolina's Former Governor, Bev Perdue, suggested that the state's General Assembly combine all dual credit options (i.e., Huskins Classes, Learn to Earn, etc.) into one overarching program known today as Career and College Promise (CCP) (Eads, 2017; Sandhills Community College, 2011; Ward & Vargas, 2012). According to Zinth (2016) CCP courses were taught by community college faculty on the college campus and/or at the high school. High school teachers were allowed to teach CCP courses only if they meet the Southern Association of Colleges and Schools (SACS)

required qualifications for faculty. CCP provides three pathways for students: Career Technical Education Certificate (CTEC), College Transfer Certificate (CTC), and Cooperative Innovative High School Programs, (CIHS) (Eads, 2017; Sandhills Community College, 2011; Ward & Vargas, 2012). All three pathways required high school students to maintain a minimum 3.0 GPA, demonstrate career and college readiness through standardized placement assessments, and agree to complete their second year of higher education at a community college (Eads, 2017; Sandhills Community College, 2011). The CTEC and CTC programs were open only to high school juniors and seniors, while the CIHS program was open to students in grades 9-12 (Eads, 2017; Sandhills Community College, 2011; Ward & Vargas, 2012). Finally, these dual enrollment partnerships between secondary and post-secondary institutions were offered in nearly every county in North Carolina (Eads, 2017; Ward & Vargas, 2012). **Virginia**

In the state of Virginia, dual enrollment programs were offered since 1988 (Catron, 2001; Pretlow & Wathington, 2004; Virginia's Community Colleges, 2017). Dual enrollment programs operate under the Virginia Plan for Dual Enrollment (VPDE), which was a centralized structure updated and redesigned as needed by the Chancellor of the Virginia Community College System (VCCS), Secretary of Education, and the Superintendent of Public Instruction (Catron, 2001; Pretlow & Patteson, 2015; Pretlow & Wathington, 2014). Just as the P-16 structure was unique to Florida, Virginia had a "distinct service area" philosophy identifying which specific higher educational institutions were responsible for offering dual enrollment courses to which specific high schools (Pretlow & Patteson, 2015; Virginia's Community Colleges, 2017). In terms of

student eligibility, Virginia limited dual enrollment courses to high school juniors and seniors but granted exceptions to well qualified high school sophomores and first year high school students (Pretlow & Patteson, 2015; Virginia's Community Colleges, 2017).

Faculty members who taught in the dual enrollment programs in Virginia were required to meet the minimum requirements for college level adjunct faculty (Catron, 2001; Education Commission of the States, 2016; Virginia's Community Colleges, 2017). In addition to faculty credentialing requirements, there were dual enrollment course content requirements, as well. All dual enrollment courses had to be a part of a community college's degree or certificate program; they were not to be developmental or remedial in nature and did not include health or physical education courses (Catron, 2001; Virginia's Community Colleges, 2017). To further ensure rigor, all dual enrollment courses maintained the same student learning objectives and outcomes as outlined by the community college for the same course not taught as dual enrollment, and those objectives and outcomes were assessed and measured using the same tools as the nondual enrolled courses (Zinth, 2016).

Ohio

The state of Ohio legislated dual enrollment options starting in 1989 (Cubberley, 2009; Jordan, 2001; Harper, 2017a; Mohker & McLendon, 2009; Smith et al., 2007). Similar to Minnesota, the first dual enrollment program in the state was the Post-secondary Enrollment Option or PSEO (Cubberley, 2009; Jordan, 2001; Smith et al., 2007). Initially, high school juniors and seniors were the only students allowed to participate in the PSEO program; however, state legislation in 1997 permitted high school first year high school students and sophomores to participate in the program

(Cubberley, 2009; Jordan, 2001). The PSEO program in Ohio was designed to allow qualified high school students the opportunity to experience college level course work in a college environment while receiving both high school and college credit for the same course (Jordan, 2001).

In 2008, former Governor Ted Strickland announced a new dual credit program, Seniors to Sophomores, which allowed high school seniors the opportunity to take college courses taught by accredited high school instructors on their high school campuses (Cubberley, 2009). The Seniors to Sophomores program was piloted in the academic year of 2008-09 by 40 school districts in the state (Cubberley). The program was limited to seniors who met specific academic requirements that included: passing all parts of the Ohio Graduate Test, completing Algebra II with a "C" or better, completing three years of high school English with a "C" or better, and scoring "college ready" on the matriculating college's placement assessment (Cubberley). In addition, the state stipulated that courses offered on the high school campus for college credit needed to meet certain standards as well (Cubberley). All Seniors to Sophomores courses were taught by qualified faculty based on the Higher Learning Commission's (HLC) criteria, part of the Transfer Assurance Guide (TAG), used approved college textbooks, assessment protocols and course syllabi, and were monitored by a college faculty member or administrator to ensure quality content and instruction (Cubberley). Although dual credit programs were widely offered across the state, student participation was low, with only 5% of eligible students enrolled in the academic year of 2010-11 (Carey, 2014).

The underutilization of the dual credit programs in Ohio served as the catalyst for the creation of a new dual enrollment program in 2014. At the behest of the Ohio General

Assembly and Governor John Kasich, along with the requirements of section 363.590 of House Bill 59, Chancellor John Carey was charged with making recommendations for a new dual credit program: College Credit Plus or CCP (Carey, 2014). The CCP program was structured to allow students to engage in college level coursework while still in high school and the successful completion of the course would result in high school and college credit (Carey, 2014). The college courses were not permitted to be remedial in nature and were to be paid for via a transfer from the school district's foundation funds or the funds appropriated for non-public and home-schooled students (Carey).

Courses taught through the CCP program were to be offered at the high school and taught by qualified high school teachers or college faculty, or could also have been offered on the college campus and taught by qualified college faculty (Zinth, 2015; Harper, 2017b). High school teachers were identified as "qualified" or "adjunct eligible" based on state defined guidelines. If additional graduate level coursework was needed for the high school teacher to become appropriately credentialed, such coursework was to be applicable to a teacher's continuing education and licensure requirements (Zinth, 2015).

Currently, high school teachers in Ohio need a Master's degree and at least 18 hours of graduate level coursework in the discipline for which they want to teach (Harper, 2017b). Finally, all CCP course offerings had to be the same courses as represented in the college's course catalogue, and if the course was taught at the high school by a high school teacher, the same textbook, syllabus, instructional materials, assessments, and student learning outcomes was used and expected as evidenced for the same course taught on the college campus (Zinth, 2015).

Washington

The state of Washington created the Running Start program through state legislation in 1990 (Boswell, 2001; Krueger, 2006; Reykdal, 2016). Running Start was initially launched as a pilot program to provide more expansive educational opportunities to public school students and by 1992 the program went statewide (Boswell, 2001).

Running Start allowed high school juniors and seniors to take college-level courses, tuition free, at any of the state's community or technical colleges: Washington State University, Eastern Washington University and Western Washington University (Krueger, 2006; Reykdal, 2016). Participating students also needed to demonstrate they possessed the skills to succeed in college by passing a standardized examination (Boswell, 2001; Reykdal, 2016).

The Running Start program saved students, taxpayers, and the state money by using K-12 basic education funds, providing a "two-for-one" credit (high school and college for one class) and by reducing the time students spent in earning a post-secondary degree (Boswell, 2001; Krueger, 2006; Reykdal, 2016). State officials estimated savings in 2001 of \$17.4 million for parents and students in tuition cost savings, and \$34.7 million for taxpayers due to the Running Start program's dual credit options (Krueger, 2006).

The University of Washington studied the original cohort of Running Start students who had transferred into the University in 1993 and found Running Start students had an average GPA of 3.42 compared to non-Running Start students whose average GPA was 3.14 (Boswell, 2001). However, in 2012, Washington State conducted a study analyzing the demographics of the Running Start dual enrollment program and

found that students in all racial/ethnic backgrounds, except White and Asian, were underrepresented in the program (Zinth, 2014a).

The Running Start program allowed each post-secondary institution to determine the academic qualifications of matriculating high school students (Nelson, 2017). Running Start courses were offered on the college or university campuses, and college faculty, both full and part time, were eligible to teach in the program (Zinth, 2016). Finally, the state of Washington legislated that the superintendent of public instruction was responsible for adopting rules for the administration of the program and for defining quality standards to ground coursework that would be informed by nationally recognized standards or models (Zinth).

Kentucky

The Kentucky Community and Technical College System (KCTCS) was created with the passage of the Kentucky Postsecondary Education Improvement Act of 1997 (Pickerill, 2017; Stephenson, 2014). At that time, community colleges in the state of Kentucky were charged with identifying ways in which higher educational opportunities could be provided to underrepresented and underprepared student populations (Pickerill, 2017; Stephenson, 2014). Dual credit programs emerged as a potential promising practice for serving these student populations through the KCTCS (Pickerill, 2017; Stephenson, 2014). Over a decade later, Senate Bill 1 passed in 2009 requiring the Kentucky Department of Education (KDE) and the Kentucky Council on Postsecondary Education (CPE) to work collaboratively in developing a strategy for reducing the need for college remediation courses and decreasing the time-to-degree completion rates (Pickerill, 2017; Piontek, Kannapel, Flory, & Stewart, 2016).

Today, state statutes direct the KDE and CPE to develop guidelines for dual enrollment course content and offerings and to ensure teacher quality (Zinth, 2016). The most common strategy for instruction involves having high school teachers, with the appropriate credential, teach dual enrollment courses on the high school campus (Piontek et al., 2016). However, course syllabi and course materials for all dual enrollment courses held on the high school campuses must be approved by the post-secondary institution and were based upon the post-secondary institutions' curricula and learning outcomes for those same courses (Zinth, 2016). These dual enrollment courses were available to high school juniors and seniors (Zinth, 2015). Finally, post-secondary institutions involved in dual enrollment partnerships were strongly encouraged to pursue accreditation through the National Alliance for Concurrent Enrollment Partnerships (NACEP) (Zinth, 2016).

Table 1 below summarizes the states reviewed above in terms of the year in which legislation was enacted for the dual enrollment programs, whether or not the dual enrollment programs were offered on the high school and/or college campus, whether or not policies existed concerning faculty credentialing (and by what accrediting agency), and what students were eligible to participate in the dual enrollment programs. Table 1

States reviewed by year, name, course location offering, teacher credentials and student eligibility

State	Year	Program Name	HS	College	Credential	Eligibility
CA	1976	College & Career Access Pathway	Yes	Yes	Contractual	K-12/College Admission Agree
FL	1979	College Credit Dual Enrollment	Yes	Yes	SACS	6 th -12th
NY	1984	College Now	Yes	Yes	None	Not specified
IL	1984	Dual Credit	Yes	Yes	ICCB	College Admission
MN	1985	College in the School	Yes	Yes	College Partner	$11^{\text{th}}-12^{\text{th}}/9^{\text{th}}-10^{\text{th}}*$
NC	1986	Career & College Promise	Yes	Yes	SACS	11 th -12th
VA	1988	Dual Enrollment	Yes	Yes	College Partner	$11^{\text{th}}-12^{\text{th}}/9^{\text{th}}-10^{\text{th}}*$
ОН	1989	College Credit Plus	Yes	Yes	HLC	7 th -12 th
WA	1990	Running Start	No	Yes	National Standard	11 th -12 th
KY	1997	Dual Credit & Dual Enrollment	Yes	Yes	College Partner	11 th -12th

Note. In Minnesota and Virginia 9th and 10th grade students may take dual enrollment courses with special permission.

The following portion of this literature review explores the various areas of dual enrollment research. The first section includes research associated with student access to, and success within, post-secondary educational institutions. The second section includes research associated with student college readiness and the impact dual enrollment had on preparing secondary level students for post-secondary education. The third and final section includes research associated with academic rigor, both perceived and actual, of dual enrollment courses and instructor quality assurances guided by state and institutional policies.

Dual Enrollment Access and Success

In a comprehensive report on state level access and quality policies, Karp, Bailey, Hughes and Fermin (2004) examined how and whether state policies were encouraging middle and low-achieving students to participate in dual enrollment options. The researchers posited that traditional dual enrollment programs have been targeted toward academically proficient and gifted high school students; however, contemporary research revealed that dual enrollment programs may benefit a broader range of students. Karp et al. conducted an analysis of state policies to determine if participation in dual enrollment programs promoted or inhibited middle to low-achieving students in terms of participation in dual enrollment courses.

The researchers gathered data for their report from state websites of education governing agencies. Specifically, the researchers were focused on legislative and regulative information pertaining to dual enrollment policies and procedures. They supplemented their findings with other website information including WestLaw, FindLaw and Education Commission of the States (ECS). Karp et al. (2004) explored ten program criteria: target populations, admission requirements, location, student mix, instructor, course content, method of credit-earning, program intensity, funding, and mandatory nature of the policy. In addition to these data, the researchers identified emerging themes and issues as expressed in the policy language.

Karp et al. (2004) found no two states were alike when it came to the policies and regulations that guided dual enrollment programs. Moreover, no state had policies

addressing all ten of the analytical categories and 12 states had no legislation or state regulations addressing dual enrollment programs. Of the 38 states included in this report, 18 mandated that high schools provide opportunities for high school students to take dual enrollment courses and allowed dual credits to be earned. Post-secondary institutions in those same states were also not allowed to deny students access based on their high school status. Eight states had legislation making dual enrollment optional; 10 states did not specify whether or not dual enrollment was mandatory or optional; and two states had a mixed approach (i.e., high schools could choose to offer dual enrollment, but postsecondary schools were required to accept credits earned through dual enrollment).

In terms of student eligibility, Karp et al. (2004) found that 29 states have policies dictating student eligibility requirements, one state had recommendations for student eligibility, and eight states had no admissions requirements concerning student eligibility. The researchers noted the importance of restrictive admission requirements in maintaining academic rigor; however, those same restrictive policies may also have prohibited students who may have needed a little extra encouragement from attending college.

Admission restrictions came in two forms: student grade level and student academic achievement prior to participating in the program. Seventeen states had explicit grade level restrictions; 12 states specify that only juniors and seniors were eligible to take dual enrolled courses; four states limited courses to sophomores, juniors and seniors; and, one state allowed any high school student to participate in dual enrolled programs. Prior academic achievement policies varied greatly among the states. Some states allowed high schools to determine student eligibility while others left student eligibility

up to the matriculating post-secondary institution. Other states based student eligibility on standardized state test scores, and still others looked at minimum GPAs. Some states used a combination of several admission requirements, while others had no academic requirements at all.

Karp et al. (2004) concluded that overall there appeared to be a desire to promote access to dual enrollment programs across the nation to a wide range of students; however, policies concerning academic standards conflict with these goals. Many states (e.g., Colorado, Florida, Idaho, Illinois, Kansas, Montana, Utah, and Washington) used academic standards as a way to ensure academic rigor; that was, only students who were college ready had access to college-level coursework. These policies, however, may have prevented students who were middle and low-achievers in high school from participating in dual enrollment programs.

In an effort to explore the impact dual enrollment had on high school students in terms of improving college access and success, Speroni (2011) conducted a study comparing students enrolled in dual enrollment (DE) courses to students enrolled in Advanced Placement (AP) courses. The researcher noted that the expansion of both AP and DE enrollment had been unprecedented, and yet there was little to no evidence on how well these programs were doing in terms of increasing high school students' college access and success. Speroni specifically wanted to understand the extent to which student participation in AP and DE programs increased the likelihood of high school students to enroll in a 4-year college or university, and then ultimately obtain a bachelor's degree. She wanted to assess the relative power that AP and DE course experiences had on predicting students' college access and success.

Using data from the Florida Department of Education, Speroni (2011) performed a regression analysis while controlling for covariates (i.e., students' gender, race, lunch status, graduation year and standardized exam scores, 10th grade GPA, high school and district demographics, etc.) and measures of academic preparation prior to participating in the AP and/or DE courses. She found that DE students were more likely than similar AP students to go to college, but less likely than AP students to enroll in a 4-year institution directly upon graduating from high school. Speroni also noted that the benefits of DE were found only when the DE course(s) were taught at the college and not at the high school. That is, DE students who took DE courses only at the high school were just as likely to enroll in college as students who did not take either DE or AP courses. Taking DE courses on a college campus improved the likelihood of students matriculating into college. Additionally, Speroni found little difference between college graduation rates of DE and AP students. Speroni further concluded that given the concerns over academic rigor of the college level course offered on the high school campus and given the lack of a standardized curriculum in DE courses, quality control measures may need to be implemented, if not increased.

The Academic Pathways to Student Success (APASS) initiative provided the background for Bragg, Kim, and Barnett (2006) to document emerging and existing academic pathways over all 50 states, designed to facilitate high school students' transitioning through the secondary to post-secondary process. The researchers were specifically interested in how these pathway models were implemented and used to reach student populations from diverse backgrounds. Between January of 2004 and August 2005, Bragg et al. (2006) conducted telephone interviews with 129 state-level secondary

and post-secondary representatives in all 50 states. And, from December 2004 to July 2005, the researchers visited school sites in Florida, Indiana, Idaho, Kentucky, Massachusetts, Oregon, and Washington. The researchers also interviewed state and local officials in each of these states to review state policies and the local implementation of those policies. Finally, from December 2005 to March 2006 the researchers followed up with emails and phone calls to each state and conducted a final online survey to collect information concerning local implementation of policies designed to reach diverse student populations.

Bragg et al. (2006) found nine different academic programs, including dual enrollment partnerships, were represented in various degrees across all 50 states. Dual enrollment partnerships were identified as one of the most prevalent pathways, being found in all 50 states. Further, the researchers noted that in 29 states, local education organizations made special efforts to reach underserved and underrepresented student populations through dual enrollment. In 45 states, specific support mechanisms were in place based on state policy provisions. Finally, the researchers found that dual enrollment offerings were more likely to be available in medium to larger high schools, which led to their conclusion that dual credit programs were not distributed equally in terms of access (i.e., student access to dual enrollment options was often limited based on demographic, geographic and economic variables).

Recognizing the expansion of dual credit offerings and the reported positive outcomes of dual enrollment programs, Taylor (2015) explored how different dual credit policies impacted different demographic populations in terms of college access and degree completion rates. He noticed that much of the research concerning dual credit

options advocated for using the dual enrollment model for underrepresented populations and yet little evidence existed regarding whether this approach would positively impact this demographic in terms of degree completion. The purpose of Taylor's study was to determine the potential differential effects of dual enrollment on access and success in post-secondary institutions for students of color and for students coming from low socioeconomic backgrounds. Specifically, Taylor examined the impact dual credit participation had on college enrollment and completion, and what, if any, different effects occurred among low income and students of color who participated in dual enrollment programs.

Taylor used a data set from the Illinois Educational Research Council (IERC), which consisted of all public high school students in the state (n = 115,677). From this population he pulled his sample based on students who had taken the ACT in their junior year and who had participated in a dual credit program in their senior year. Taylor differentiated dual credit and dual enrollment based on Illinois' policy descriptions that "dual credit students" took classes most often on the high school campus, whereas "dual enrollment students" enrolled independently on the college campus. All dual credit offerings were provided by one of 12 community college partnerships. With these specifications, Taylor's student sample size consisted of an n = 5,315 for his treatment group. For his control group, Taylor identified the specific public high schools from which the 5,315 students were enrolled, and selected all non-dual credit students from the same high school and then created two sub-samples, one for non-whites and one for low-income.

Results from Taylor's study confirmed positive outcomes for dual credit students: 91% enrolled in college and 52% earned a college degree. Of the non-dual credit students, 62% enrolled in college and 29% earned a college degree. For Taylor's subsamples, 91% of dual credit students of color enrolled in college with 43% completing college degrees, compared to 62% of non-dual credit students of color enrolling with a completion rate of 23%. Eighty-five percent of the lower income dual credit students enrolled in college and 34% completed a college degree compared to 58% of the nondual-credit lower income level students enrolled in college with 18% completing a college degree. Overall, Taylor found that dual credit policies (i.e., where students primarily took college classes on the high school campus) had a positive effect on all groups, but with a smaller effect size for students of color and for students from lowerincome backgrounds. Taylor concluded that dual credit policies do not equally benefit all students and dual credit policies will likely have little impact on improving the existing inequities in college access and completion rates.

In response to some educators' skepticism of the ability of students in career and technical education (CTE) programs to perform well in dually-enrolled courses, Karp, Calcagno, Hughes, Jeong, and Bailey (2007) explored the characteristics of high school students in CTE who participated in dual enrollment programs and compared them to CTE students who did not participate in dual enrollment. Using databases from the state of Florida and the City University of New York (CUNY) system's dual enrollment program, also known as College Now, the researchers compared students who did not.

The researchers controlled for students' high school grades and socioeconomic background.

In the state of Florida, the researchers found that the CTE students who participated in dual enrollment were 1% more likely than their peers to earn a diploma, recognizing that although the percentage was small it was still statistically significant. The researchers also found that CTE students who participated in dual enrollment were more likely to enroll in college and were approximately 9% more likely to enroll in a 4year institution than their peers who did not participate in dual enrollment. Finally, once in college, CTE students were more likely to persist in college; they earned on average 15 credits more than their peers and had earned GPAs that were 0.26 points higher than their similar classmates who did not take dual enrollment classes while in high school.

Karp et al. (2007) found students who had participated in the CUNY College Now program earned higher grades and had higher GPAs in college than their peers who had not participated in the College Now program. CTE students had earned on average 10 credits more than their peers who had not participated in the College Now program. Persistence was found to be a benefit of the College Now program for CTE students taking fewer classes in the program compared to those students who had not participated in the program. College Now program participants taking one class were 6.6 percent more likely than students who were not participating in the program to persist to a second year in a post-secondary institution. However, College Now program participants taking more than one course in the program did not differ significantly in terms of persistence from those students who did not participate in the program.

Since the sample size of CUNY College Now was small the researchers could only examine outcome differences by gender and found no statistical significance between male and female CTE students who participated in College Now and those who did not participate. In Florida, an analysis of all sub-groups was conducted and the researchers found that male CTE students from lower incomes benefited the most from dual enrollment programs. Finally, in the state of Florida, the researchers found that CTE students with lower high school grades benefited more than students with higher grade point averages.

Karp et al. (2007) concluded that dual enrollment programs and partnerships were a promising strategy for high school students in providing access and encouraging persistence through post-secondary education. Dual enrollment programs and partnerships were also effective in transitioning students from a broad range of academic backgrounds. Finally, the researchers noted that the current trend in CTE reform should include dual enrollment options.

Building on extant literature Allen and Dadgar (2012) investigated the impact of dual enrollment on students' academic success in an attempt to advance what was known about dual enrollment effectiveness. The researchers focused upon dual enrollment students' accumulated college credits, and course grades while controlling for demographic characteristics and preexisting academic differences between participants and nonparticipants of dual enrollment courses.

Using existing data collected from CUNY's College Now program (the state of New York's dual enrollment program), Allen and Dadgar's sample included students who had participated in the College Now program and who had graduated from a New

York City public high school. The sample was also limited to first year high school students who had matriculated into one of the 17 CUNY colleges within 15 months of their high school graduation. The researchers examined the effect of dual enrollment participation on students' total number of credits earned during their first semester in college, and first semester overall GPA.

Allen and Dadgar (2012) found students who participated in the dual enrollment (College Now) program earned more college credits and had higher GPAs during their first semester in college than students who did not participate in the dual enrollment program. Using a regression analysis, Allen and Dadgar also found that when controlling for demographics such as high school grades and test performances, students who took at least one dual enrollment course earned nearly one more credit hour during their first semester in college and had a GPA 0.16 points higher than students who did not take a dual enrollment course.

The researchers confirmed what other researchers (e.g., Karp, Calcagno, Hughes, Jeong, & Bailey, 2007; and Speroni, 2011) had found: student participation in dual enrollment programs had positive effects on students in terms of earning more college credit hours and higher grades in college. Finally, Allen and Dadgar concluded that not only did dual enrollment programs reduce students' time to degree completion, but these programs also increased degree attainment after students entered college.

Giani, Alexander and Reyes (2014) conducted a quasi-experimental study investigating the effectiveness of dual enrollment programs. Recognizing a gap existed in the literature on dual credit and its influence on post-secondary outcomes, Giani et al. explored the impact of dual credit on post-secondary access, first-to-second year

persistence, and college degree attainment. The researchers wanted to determine if dualcredit participation increased the likelihood of students enrolling in, persisting through, and earning a university degree. The researchers operationalized post-secondary access as the matriculation of a student into any vocational, technical, or community college, or public or private university in the state of Texas within a year of graduating from a secondary school. Persistence was operationally defined as being enrolled in at least one semester of the student's second year at the post-secondary institution and completion was defined as the earning of any degree or certificate within six years.

Giani et al. used data provided by the Texas Education Research Center (Texas ERC) and pulled a sample that included 9th grade public high school students in the 2000-2001 academic year. Students who completed all four high school years and did not repeat a grade level were included in the sample. For the intervention group, Giani et al. included students who had completed at least one dual enrollment course during their junior or senior year in high school. For the comparison group, the researchers included students who attended schools that did not have access to dual enrollment courses during those students' junior or senior years in high school.

The researchers found that dual credit coursework had a positive impact on postsecondary outcomes. Giani et al. noted that dual credit courses in academic subjects including, English, math, social studies and science significantly increased the likelihood that the dual enrolled student would enroll in a college or university, persist through to a second year, and complete a degree or certificate. And, more specifically, successful completion of the dual credit math courses was particularly influential in increasing the likelihood of the dual enrollment student in attaining a Bachelor's degree. Finally, for

future research, Giani et al. suggested investigating other sources of variation to the benefit and impact of dual credit courses, which may include variables such as where the dual credit course was taught (i.e., at the high school, at the post-secondary institution, or online) and whether the course was taught by a high school teacher or college faculty member.

Table 2 provides a summary of researchers who studied dual enrollment in terms high school student access and/or college degree completion success. The researcher(s), year of publication and overall findings are provided.

Table 2

Summary of research exploring dual enrollment students' college access and degree completion success

Year	Findings: Access and/or Success
2004	Policies to ensure academic rigor conflict with policies to help improved access
2011	DE Students more likely than AP students to go to college, DE students more successful in college when course is taken on college campus
2006	Middle to large HSs have more access to DE programs
2015	DE policies do not benefit students equally, have limited impact on improving inequities; DE students complete degrees at higher percentages than non DE students
2007	DE CTE students more likely to earn diploma, persist to post-secondary education, and earn more college credits.
2012	DE students earned more college credits and had higher GPAs in college than non-DE students
2014	DE students more likely to enroll, persist, and complete, especially when taking math courses as dual credit
	Year 2004 2011 2006 2015 2007 2012 2014

Dual Enrollment College Readiness

Piontek, Kannapel, Flory, and Stewart (2016) investigated dual credit programs in six nonurban areas in the state of Kentucky in response to a concern voiced by members of the Regional Education Laboratory (REL), which was housed within Appalachia's Kentucky College and Career Readiness (KCCR) alliance, who wanted more information about the impact of dual credit practices. The alliance members were specifically concerned with how dual credit programs were implemented in nonurban districts where most of their constituents resided, and how information was shared about the programs with potential students.

Piontek et al. (2016) set out to answer questions concerning dual credit programs in terms of practices and policies for determining student eligibility, types of postsecondary institutions, course offerings and locations, instructor credentials, quality assurance measures, and program successes and challenges. The researchers used purposeful, maximum variation sampling to select six districts meeting the nonurban operational definition and conducted multiple phone interviews with key stakeholders in each district (i.e., district administrators, post-secondary administrators, high school administrators, course instructors at the post-secondary schools and high schools). Overall 45 individuals were interviewed. The researchers also looked at extant documents related to each dual credit program gathered from each of the six districts included in the study.

The researchers found that all six districts had dual credit programs with a similar configuration. Each program allowed students to take college level courses at their discretion and in no particular order or prescribed sequence. Most participants were juniors and seniors who had been deemed eligible based on standardized assessments such as the ACT. In three of the districts, course offerings were integrated into the curriculum allowing students to work toward a specific credit hour or credential goal. All districts reported the desire to offer more general education courses but were unable to do so because of credentialing issues with their high school teachers, and/or not enough adjunct faculty in their geographic areas to cover additional courses. To ensure consistent

delivery of course content and quality instruction, all six districts were required to use syllabi and course materials approved by the post-secondary schools with which they partnered. Five of the six districts subsidized the cost of dual credit tuition and fees.

The researchers concluded that dual credit programs in remote rural areas in the six districts included in the study varied widely in terms of the practices used to ensure college and career readiness. The programs were viewed as positive opportunities for dually-enrolled students to earn college credits at a reduced cost. Finally, administrators across all districts desired to increase access for more students but were unable to do so due to a limited number of available credentialed instructors.

While investigating the decrease of dual enrollment course transferability based upon the usage of a high school teacher to instruct college level courses, Hebert (2001) identified a gap in the literature examining the difference between high school teachers' and college faculty members' effectiveness when teaching dual enrollment courses to high school students. Specifically, the researcher wanted to know if there was a difference in learning outcomes for dual enrollment students taught by high school teachers and dual enrollment students taught by college faculty. Hebert operationalized learning outcomes as final course grades in subsequent college level courses for which the original dual enrollment course should have prepared the students.

Hebert (2001) conducted a quasi-experimental study comparing two groups of students who had enrolled in dual enrollment mathematics courses in high school and then in the subsequent mathematics course at the college level. One group of students was taught by a high school teacher; the other group of students was taught by a college

faculty member. Hebert's sample was taken from college students over a 5-year timeframe at a Florida community college that had several campuses.

Hebert (2001) found that the learning outcomes produced by the high school teachers were actually superior to those of the college faculty teaching the same course. That is, she found that dual enrollment students who were taught by high school teachers were better prepared for subsequent coursework at the college level than those dual enrollment students who had been taught by a college faculty member. Hebert concluded that students who had not been granted college credit for their dual enrollment courses, simply because of who had taught the course, were victims of institutional policies that failed to recognize that quality instruction could occur even if the teacher of record was not an assigned college faculty member.

An and Taylor (2015) identified a gap in the dual enrollment literature concerning student college-readiness. These researchers asserted that most dual enrollment literature focused on college readiness by assessing students either right after the dual enrollment course was taken, or immediately after students transitioned into a post-secondary institution. Further, An and Taylor noted that research in this area most frequently explored academic outcomes, or cognitive measures, in an effort to explain a student's level of college readiness while little attention had been paid to non-cognitive measures of college readiness (e.g., persistence). The researchers wanted to ascertain if dual enrolled students outperform non-dual enrolled students on cognitive and non-cognitive college readiness indicators during their first year of college.

Using Conley's 2007 and 2012 models for college readiness as the theoretical framework for their study, An and Taylor used data previously collected by the Wabash

National Study of Liberal Arts Education (WNSLAE) in a longitudinal study of undergraduate students in their first year at post-secondary schools. These post-secondary schools represented 14 states in the West, Midwest, Northeast and Southern regions of the United States. The surveys used in the study were administered by the National Surveys of Student Engagement (NSSE) and the WNSLAE Student Experiences Survey (WSES) and were conducted in the beginning of the fall term in 2008 and then again at the end of spring term in 2009. Both surveys included measures related to college readiness. An and Taylor aligned the survey variables with Conley's 2012 model's four dimensions of college readiness: Key Cognitive Strategies, Content Knowledge, Learning Skills and Techniques, and Transition Knowledge and Skills (An and Taylor, 2015). The researchers grouped subjects based on self-reported participation in either exam based accelerated programs (e.g., AP and CLEP) or dual enrollment programs, and then compared both groups to students who did not participate in either program (nonaccelerators). Then, using a fixed-effects model the researchers estimated the influence of dual enrollment on college readiness.

An and Taylor (2015) found that students who participated in exam based accelerated programs were demographically different from both students who participated in dual enrollment programs and students who did not participate in either accelerated program. Students in exam-based accelerated programs were more likely to be White or Asian, male, with fewer siblings, higher ACT scores and having parents with post-secondary degrees. These students also performed higher on all four college readiness measures than non-accelerated students. Students in the dual enrollment programs tended to have similar demographic backgrounds to students in the non-

accelerator group, with the exception of dual enrollment students having parents who were college educated and higher ACT scores.

In terms of college readiness, dual enrollees were found to be more college ready than the students in the non-accelerated group. Furthermore, there was no statistically significant difference between dual enrollees and exam-based accelerated students in college readiness measures. Overall, the researchers found that dual enrolled students were more likely to be college ready on three of Conley's 2012 model's four dimensions (i.e., Key Cognitive Strategies, Key Content Knowledge, and Learning Skills and Techniques) of college readiness than students who did not participate in college credit opportunities in high school.

Using a qualitative approach, Kanny (2015) wanted to explore students' perceptions of the advantages and disadvantages of dual enrollment course taking. She felt by exploring the perceptions and experiences of students taking dual enrollment courses in an urban setting, information may emerge that could help inform policymakers in terms of shaping dual enrollment programs as these programs continue to reach more diverse student populations.

Kanny (2015) used a small, independent charter school in urban Los Angeles, California for her study site. Demographically, the students were 90% Latino, and 100% were qualified to participate in the free or reduced lunch program. Of the nearly 520 students in the school, five seniors who had taken part in the schools' dual enrollment "City College" program during their junior year, self-selected to participate in her study. All participants identified as Latina/o, had attended the charter school since 5th grade, had GPAs above 3.0, were considered "college-bound" and four of the five were female.

Each informant completed a questionnaire regarding demographics, background characteristics, academic achievement in high school, and experiences in dual enrollment courses provided by City College (Kanny, 2015). Each student also participated in a semi-structured interview. The protocol included questions concerning the student's perceptions of the benefits and disadvantages of taking dual enrollment courses. Responses were recorded and transcribed verbatim. The researcher then employed a constant comparative analysis to generate codes and patterns.

Kanny (2015) found that students who had participated in the dual enrollment program at City College perceived their experiences as both beneficial and detrimental to their academic achievement and personal growth. The three themes that emerged as benefits were, exposure to the college academic environment, learning the hidden curriculum (implicit skills and practices) and personal independence and freedom. The three themes that emerged as detrimental were: issues in credits and grades (i.e., taking courses that did not count toward their degree program), negative interactions with others (i.e., judgmental traditional students), and limited support systems (i.e. advisors, counselors, etc.).

There were clearly limitations with a study like Kanny's in terms of its scope, but because this study provided insight into the dually-enrolled students' perspective it constituted an important contribution to the literature. As dual enrollment continues to be promoted as a practice that contributes to student college readiness, it is important to recognize that along with the benefits of such an approach, that there are perceived drawbacks. Furthermore, these benefits and drawbacks are not mutually exclusive (i.e., students felt positive about their exposure to the college academic environment but

experienced negative interactions with other classmates at the same time). Kanny concluded that more work needs to be done to help manage students' expectations of college prior to enrolling in dual credit courses.

In another qualitative study Karp (2012) wanted to explore dual enrollment in terms of the nonacademic facets that lead to post-secondary success. She contended that in some cases students come to the college experience with the appropriate academic background but fail to succeed because of their inability to navigate the complex bureaucracy, their failure to learn appropriate study habits and time management skills, and/or their struggles with creating and making new social relationships. Karp suggested dual enrollment could be used as a social intervention whereby high school students could learn about the norms, interpersonal interactions, and behavioral expectations that are essential for college success. She further applied the concepts of anticipatory socialization and role rehearsal to the theoretical framework within which she conducted her research.

Using a semi-structured protocol, Karp interviewed 26 high school students dually enrolled through two community colleges in New York City. Additionally, she conducted in-depth observations of the dual enrollment courses, which were held on a high school campus and taught by high school teachers who were certified as adjunct faculty. All informants were first time, dual enrolled students (either juniors or seniors) and from white, Black, Hispanic or Asian backgrounds. Eight of the students reported English was spoken at home. These students were interviewed three times during the semester (i.e., at the beginning, middle and end of the term), resulting in 76 interviews. The researcher also conducted 18 classroom observations. Karp used a case-construction

method to analyze her data in terms of role conceptions categorizing the students' knowledge of roles into four categories: none or little, idealistic or highly generalized, realistic but vague, or strong and accurate.

Karp found that of the 26 students in her study only one was able to accurately articulate what it means to be a college student in terms of norms and expectations at the beginning of the semester. By the end of the semester, however, 17 students had increased their understanding of college student norms and expectations. In her classroom observations, Karp found that some dual enrollment courses mirrored the demands of courses taught on college campuses while others did not. She noted the "authentic" classrooms allowed students to practice the role of college student by requiring them to work independently, engaging them in complex discussions, and having them take responsibility for their own learning. In the "inauthentic" classrooms, students were *given notes* instead of taking them, had fewer required assignments, and engaged in fewer interpersonal and intellectual discussions. Karp further noted that 80% of the students in the "authentic" classrooms were able to strongly articulate their understanding of the role of the college student, while only 45% of the students in the "inauthentic" classrooms could by the end of the semester.

Karp concluded that students in the dual enrolled courses not only learned about what was expected of college students, but also practiced behaviors that helped them adhere to the college level expectations. She further asserted that college readiness goes beyond possessing academic skills, and should include behavioral, cognitive and interaction skills. Finally, authenticity matters when high school students engaged in

college level, role-related activities in dual enrolled classes; authenticity meant that students developed a better understanding of what it means to be a college student.

An (2013) conducted a quasi-experimental study to examine the effectiveness of dual enrollment programs. He wanted to determine if participation in dual enrollment programs effected high school students' college degree attainment. An further wanted to investigate if dual enrollment programs had different effects, in terms of benefits, on first generation college students.

For his intervention group, An used data from a National Education Longitudinal Study (NELS), and pulled a sample of students who had participated in a dual enrollment program while in high school. His comparison group was comprised of students who had participated in other high school programs (e.g., Advanced Placement) but had not participated in dual enrollment.

An found that dual enrollment programs significantly increased the likelihood of dual enrollment students attaining a college and/or Bachelor's degree. The probability of attaining a college degree was increased by 8% and the probability of attaining a Bachelor's degree was increased by 7% for students who had participated in a dual enrollment programs. An further noted that the number of credits earned was also significant for the dual enrolled student in terms of degree attainment. Students taking two courses in dual enrollment programs were found to experience the most positive impact, while students with three credits were no more likely to earn a degree than their nonparticipating counterparts.

In terms of the impact dual enrollment programs had on first-generation college students, An found that students who had participated in dual enrollment programs were

more likely to attain a college degree than student who had not participated in dual enrollment programs. An further noted that some evidence was found indicating firstgeneration students were more likely to benefit from dual enrollment programs than students whose parents were college educated.

In another quasi-experimental study Struhl and Vargas (2012) examined the effectiveness of dual enrollment program participation in terms of increasing post-secondary outcomes. The researchers wanted to explore the extent to which dual enrollment programs not only increased the likelihood of high school students to enroll in post-secondary education, but also wanted to understand to what degree dual enrollment students were more likely to persist through college and earn a degree.

The study was conducted in the state of Texas, using data from the 2003-04 academic year. Included in their sample were high school seniors who had remained in the same school district for four years. The researchers looked at these students longitudinally over a span of six years at the post-secondary level. Students who had participated in dual enrollment programs during high school were compared to students who had not participated in any dual enrollment programs in high school. A treatment group (dual enrollment participants) and a control group (non-dual enrollment students) were created through propensity score matching using variables such as achievement, income, and race.

Struhl and Vargas (2012) found that students who had completed one dual enrollment course while in high school were roughly 2 times more likely to attend a postsecondary institution than student who had not participated in a dual enrollment program while in high school. Additionally, the researchers found that students who had

completed at least one dual enrollment course while in high school, were more likely to persist to a second year of post-secondary education than students who had not completed dual enrollment courses while in high school. Finally, the researchers found 47.2% of the students in the treatment group earned a Bachelor's degree and 8.9% earned an Associate's degree. Of the students in the control group, 30.2% earned a Bachelor's degree and 6.8% earned an Associate's degree. Struhl and Vargas concluded that dual enrollment programs were an effective strategy for increasing rates of college enrollment, persistence and degree completion at both the 2-year and 4-year post-secondary institutions.

Table 3 provides a summary of researchers who studied dual enrollment in terms of preparing high school students to be college ready. The researcher(s), publication year, and overall findings are provided.

Table 3

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Researchers	Year	Findings		
Piontek, Kannapel, Flory, & Stewart	2016	Nonurban DE programs varied greatly in terms of policies and practices to ensure student college readiness		
Hebert	2001	DE students taught by HS teachers scored higher in subsequent courses than those taught by college faculty		
An & Taylor	2015	DE students more college ready than non-DE students		
Kanny	2015	DE has benefits and detriments for students, students need to learn expectations prior to matriculation		
Karp	2012	DE students learn what behaviors are expected of college students		
An	2013	DE students more likely to earn degree, 1 st generation DE students more likely than students with college educated parents		
Struhl & Vargas	2012	DE students more likely to persist through post-secondary education and earn either 2 or 4-year degree		

Dual Enrollment on Academic Rigor and Instructor Quality

In an effort to determine if dual enrollment courses in the state of Florida were maintaining college level rigor, Smith and Holcombe (2010) analyzed the grades dual enrolled and non-dual enrolled students earned. The researchers' analyses included a) a comparison of the two groups' grades in the dually-enrolled courses versus the nondually-enrolled courses, b) subsequent course grades in the Florida College System and the State University System, and c) overall performance of the former dual enrolled students in the State University system. The researchers asked: are dual enrollment courses as rigorous as "regular" college courses, and are dual enrollment programs equally rigorous across different colleges?

Using descriptive statistics from the Florida Department of Education's database, Smith and Holcombe (2010) compared the dual enrollment and non-dual enrollment student grades in College Algebra and First-Year Composition (the two most common courses taken as dual enrollment). The researchers found that the dual enrolled students earned higher grades than the non-dual enrolled students in the same class. The researchers then compared the grade distributions for subsequent mathematics and English courses noting a challenge in the fact that 65% of the dual enrolled students took the subsequent course as a dual enrolled student and not as a high school graduate or first year college student. Overall they noted that course grades did not change significantly in subsequent courses for either the dual enrolled or traditional high school student. Finally, the researchers examined the college grades of former dual enrolled students and found that these students continued to perform well in both the college and university system. Statewide, over 92% of the grades earned by former dual enrolled students were a "C" or higher. Smith and Holcombe concluded that dual enrolled courses were comparable in rigor to college and university level courses.

Ferguson, Baker, and Burnett (2015) explored the perceptions of faculty who taught dual enrollment, accelerated program, and standard community college courses in terms of academic rigor. Using a qualitative research design, the researchers wanted to understand how course rigor was perceived among three faculty groups: qualified high school teachers teaching dual enrolled courses at the high school, college faculty teaching

dual enrolled students on a college campus, and college faculty teaching traditional community colleges students on a community college campus. By analyzing course syllabi and conducting semi-structured interviews with 15 faculty members, five from each group, the researchers identified themes that were descriptive of the different high school and college faculty member's experiences.

In the first group of faculty (i.e., high school teachers teaching dual enrolled courses at the high school), there was agreement that their courses were just as rigorous, if not more so, than those taught on the college campus. In the second group (i.e., college faculty teaching dual enrolled students on the college campus), there were mixed perceptions of how academic rigor in their courses was maintained. That is, three faculty reported using the same syllabi in their dual enrolled courses as they did in their traditional college courses, and two faculty members reported they used their experience in the classroom to ensure rigor in the course. In the last group (i.e., college faculty teaching traditional community college students on a community college campus), there was no consistent perception of academic rigor. These faculty made no differentiation between standard and dual enrollement students when preparing their courses.

Ferguson et al. (2015) summarized their findings by concluding dual enrolled general education courses were perceived to be at least as rigorous, if not more rigorous, than the general education courses offered to traditional community college students on a community college campus. In addition, the researchers found that faculty tended to assess their dual enrolled students' academic ability as higher than traditional community college students.
In response to regional accrediting agencies' growing concerns over how dual credit programs were assuring quality instruction, Taylor, Borden, and Park (2015) investigated how state policies addressed quality in dual credit programs across the nation. The researchers asked several questions concerning what types of dual credit courses can and cannot be offered, who was and was not eligible to teach dual credit courses, what criteria applied to instructors who taught dual credit courses, what was included in state policies that involves quality of dual credit offerings and how were those policies enforced.

Taylor et al. (2015) used an Input-Process-Output (IPO) model to assess how state policies addressed quality issues in dual credit offerings. *Inputs* were considered to be student eligibility, faculty credentials, funding and curriculum standards. *Processes* were considered to be oversight, faculty training, institutional review and state monitoring, and *Outputs* included learning outcomes, credit transferability, and program and course outcomes. This model included an analysis of relevant artifacts, documents, a questionnaire and structured interviews. The researchers reviewed written policies from state legislation and conducted interviews of states agencies and board officials. Fortyseven of the 50 states were included in the analyses;

Taylor et al. (2015) found 34 of the 47 states had policies regulating dual credit offerings. The most frequently reported policies related to disciplinary areas of the course (i.e., policies prohibiting remedial or developmental courses, etc.). The second most common feature of state policies involved transferability and/or availability of course offerings. Thirty-seven of the 47 states had policies concerning student eligibility; some states had class level requirements and others had examination and/or GPA requirements.

Instructor eligibility policies were found in 37 of the 47 states. Thirty-one of the 37 state policies included the requirement that the dual enrollment instructors meet the same standards as regular faculty at the collegiate level teaching the same courses. Other quality assurance provisions included the requirement or encouragement of states to adopt the standards of National Alliance of Concurrent Enrollment Partnerships (NACEP) or that they implement equivalent accreditation standards. Finally, the researchers found limited information about policy enforcement.

The researchers summarized their findings by concluding that the most common state policies centered around the restriction of student eligibility, which could potentially restrict access to the students that need the dual credit opportunities the most. Transferability of dual credit courses remained a concern since "receiving institutions" had the discretion to accept or deny community college credit, which is where most dual enrolled courses take place. Community colleges incurred the majority of the costs associated with dual credit partnerships and, as a result, often needed additional financial and human resources to meet state policy goals. Finally, the researchers asserted that regional accreditation criteria indirectly address dual credit program quality and that the refining of the criteria might help states and educational institutions more clearly understand the expectations of the accreditors.

Windham (1997) investigated a report released by the University of Florida concerning the lack of rigor involved in high school chemistry courses being offered as dual enrollment through the local community college. According to the report, the vast majority of high school students who had taken chemistry as dual enrollment and who did not meet standard admissions requirements were required to retake the course upon

matriculation into the university system. The report was the impetus for an investigation into the state's dual enrollment programs.

Windham (1997) examined dual enrollment students who did meet standard admission requirements from 1991 and 1992 and who had taken English and History courses at two community colleges in Florida: Pensacola Junior College (PJC) and Tallahassee Community College (TCC). She further gathered information from a statewide database, concerning the performance of former dual enrollment students in terms of their grades and frequency with which they had to repeat courses. Windham found that dual enrollment students from PJC had the same GPA at the University level as all transfers while dual enrollment students from TCC had higher GPAs at the University level than all other transfer students. She also found that during the 1991-1992 school year, out of a total of 51,382 dual enrollment students system-wide (within the state of Florida public schools), only 140 classes needed to be repeated at the college level. Windham concluded that the dual enrollment program was a viable option for high school students wanting an accelerated pathway to and through college level coursework.

Based on the premise and evidence that dual enrollment programs increased the likelihood of high school students to attend college, Zinth (2014a) prepared a report for the Education Commission of the States (ECS) addressing the unique challenges of rural school districts in providing high-quality dual enrollment programs. Her report explored what states were doing in an effort to increase the quality of instruction in their rural school districts' dual enrollment programs. In her exploration, the researcher discovered that one particular challenge that rural school districts identified was securing qualified instructors to teach dual enrollment courses.

Working with data from the National Student Clearinghouse Research Center (NSCRC) the researcher examined the college-going rates of students in demographically diverse school districts. She found that the high school students in low-income, rural schools were the least likely to attend college (i.e., 50% attended), while students in highincome, low minority, urban school districts were the most likely to attend college (i.e., 70% attended). Zinth (2014a) noted that urban and suburban schools could provide dual enrollment courses taught by post-secondary instructors more readily because longer travel distances to rural schools made arrangements between secondary and postsecondary schools for dual enrollment partnerships less feasible.

Zinth (2014a) found that many states had policies that required high school teachers to meet the same qualifications as the faculty of the post-secondary school through which the dual enrollment course(s) were offered. These state policies typically required a Master's degree in the subject or discipline in which the instructor was teaching or a minimum of 18 graduate level credit hours completed in the subject or discipline in which they taught. According to Zinth, rural districts had greater difficulty recruiting and retaining high school teachers with these educational qualifications.

Zinth (2014a) reported three strategies states were using to increase the quality of the dual enrollment courses taught by high school teachers on the rural high school campus. The first strategy was offering financial incentives for high school teachers to complete Master's level coursework which occurred in Indiana, Minnesota and Wyoming. These states offered professional development funding, educational loan repayment programs, and scholarships, respectively. The second strategy was using a creative Master's level course delivery method that blended online and face to face

instruction in an 18-month, or less, "teacher friendly" program (e.g., Ohio). Finally, the third strategy Zinth discovered was offering courses to the rural high school dual enrolled student through a blended model whereby the high school teacher facilitated online video instruction delivered from the post-secondary faculty member (e.g., Utah).

Zinth (2015) prepared another report for the ECS which examined dual enrollment course content and instructor quality. She noted that the majority of dual enrollment courses were taught by high school teachers on high school campuses. Zinth explored why there had been an increase in courses delivered on the high school campus and what certain states were doing to ensure dual enrollment course content and instructor quality.

Upon reviewing the practices in all 50 states, Zinth (2015) found that 37 states had policies concerning the expectations for dual enrollment course content and instructor quality. In the states that had policies, Zinth identified numerous differences in terms of who established and maintained the dual enrollment program's rigor of course content and what requirements were needed in order to be considered qualified to teach in a dual enrollment program.

Zinth (2015) separated the dual enrollment programs' state policies into four general approaches for ensuring course content rigor and instructor quality. The first approach, allowed post-secondary institutions sole authority over establishing course content and instructor quality with no state intervention which occurred in Colorado. The second approach included state policies in Delaware and Texas that directed the postsecondary and secondary institutions to develop course and instructor requirements but did not specify what those requirements must be. The third approach involved state

policies that either encouraged or required that the dual enrollment partnerships in the state adopt NACEP standards or similar standards establishing course content rigor and instructor quality, but did not require the post-secondary institutions to become accredited by NACEP (See Colorado, Florida, Idaho, Illinois, Kansas, Montana, Utah and Washington). The fourth and final approach included state policies that either required or encouraged that post-secondary institutions become accredited through NACEP. Zinth noted that states fall into two categories in this fourth approach, either they must undergo NACEP accreditation (See Arkansas, Indiana, Iowa, Oregon and South Dakota) or only programs that have NACEP accreditation will receive state funding for their dual enrollment program (Minnesota).

Zinth (2015) concluded that because the majority of dual enrollment courses were taught by high school teachers on the high school campus, mechanisms needed to be in place to ensure curriculum quality and that high school teachers had the necessary background in the discipline to instruct at the post-secondary level. Finally, Zinth identified future concerns that should be addressed as dual enrollment programs continue to grow. Specially, those concerns focused on high school instructors (particularly in rural areas) who do not possess master's level course work in the discipline in which they teach need to be incentivized to complete advanced coursework; dual enrollment programs that have developed metrics for what content and instructor quality are; but have not articulated how these metrics will be monitored; and, the role of accrediting agencies (i.e., NACEP) should be more clearly defined in terms of course content rigor and instructor quality in dual enrollment programs.

Arnold, Knight and Flora (2017) noted that with the nationwide increase in dual enrollment programs, post-secondary institutions were required to provide a variety of ways in which dual enrollment students could access their courses. Depending upon the location (urban, suburban or rural) post-secondary schools might offer dual enrollment courses through different learning environments (i.e., face-to-face on the high school campus, face-to-face on the college campus, or online). The researchers questioned the effectiveness of each of these different learning environments and examined the extent to which the variation in these learning environments impacted the academic achievement of the dually-enrolled student.

Using a database that housed academic records of community college students in Southwest Virginia, Arnold et al. (2017) examined final course grades of dually-enrolled students taking English, Biology, Math, and English over a five year period. The researchers conducted an ANOVA with the dependent variable of final course grades and the independent variable of course delivery environment. In the subjects of English and Math, the researchers found students received significantly lower final course grades when taking the courses face-to-face on a college campus compared to taking the courses face-to-face on a high school campus or online. There was no significant difference in final course grades between enrolled students taking English or Math on a high school campus and dually-enrolled students taking English or Math online.

In the subject of History, the researchers encountered a smaller sample size of students who took History on the college campus (n = 5) so they used Welch's test to investigate the variance between final course grades for dually-enrolled students on the high school campus and those taking the course online. The researchers found students

who took the course online had significantly higher final course grades than students who took the course face-to-face on a high school campus. Finally, in Biology, the researchers found no significant difference in final course grades among the three different learning environments.

Arnold et al. (2017) concluded that dually-enrolled courses in English and Math held on the college campus may be more rigorous than those offered on the high school campus or online. They further speculated that students who took dually-enrolled courses on the college campus may not have been prepared for the level of rigor or for the freedom of the college environment. The researchers also pointed out that their findings conflicted with previous research in online learning that found students' grades suffered from unfamiliarity with online platforms and lack of connection and interaction with the instructor. Finally, they suggested that students were now more familiar and comfortable with technology and therefore more capable of learning in a self-paced and low interaction (less interpersonal communication with professor) environment.

Table 4 provides a summary of the research conducted concerning dual enrollment programs' course content rigor and instructor quality. The researcher(s), year of publication and overall findings are provided.

Table 4

Researcher	Year	Key Findings Rigor and/or Quality
Smith & Holcombe	2010	DE courses comparable in rigor as college & university level courses
Ferguson, Baker & Burnett	2015	Gen Ed courses at least if not more rigorous when taught as DE
Taylor, Borden & Park	2015	Regional accreditation criteria indirectly address dual credit program quality
Windham	1997	DE students had higher grades and better grades in college
Zinth	2015	Identified four approaches to state policies ensuring DE course content rigor and instructor quality
Zinth	2014	Identified three strategies for increasing quality of instruction in rural districts' DE programs
Arnold, Knight & Flora	2017	Investigated various learning environments; found face-to-face on college campus more rigorous than face-to-face on high school campus or online

Summary of research concerning course content rigor and instructor quality in the dual enrollment course

Based on the review of this literature two areas that remain to be further investigated include the extent to which instructor status (i.e., high school teacher, or college faculty) impacts the overall grades of students in a dual enrolled course and to what degree does where a dual enrollment course is taught (i.e., at the high school or on the college campus) impact the overall grades of the matriculating students? These two questions have been explored to a limited extent by researchers such as Hebert (2001), who found high school teachers better prepared dual enrollment students for their subsequent college level math course than did college faculty, and Speroni (2011), who found that dual enrollment students were more successful in college when taking their dual enrollment courses on a college campus. Additionally, Arnold, Knight and Flora (2017) found that the face-to-face college campus learning environment was more rigorous for the dually-enrolled student than the face-to-face high school campus or online learning environments.

To date no study has been conducted that addresses the impact of both instructor status and course venue on overall academic achievement of the dually-enrolled student. In this study, the researcher will provide additional insights concerning the impact that instructor status and course venue have on the academic achievement of the duallyenrolled high school student.

CHAPTER III METHODS

Introduction

The purpose of this quantitative study was to investigate the impact that an instructor, either high school teacher or college faculty member, had on the overall academic achievement of the dual enrolled high school student. In addition, this study focused on what impact the venue, either the high school campus or the college campus, had on the overall academic achievement of the dual enrolled high school student. Specifically, this research examined if the overall course grades for students taking dual enrollment courses differed based on the Delivery Model (i.e., taught by a high school teacher on a high school campus, taught by a college faculty member on a college campus).

Through a one-way between groups ANOVA, the researcher explored the difference between three groups of dual enrolled students: those taught on a high school campus by a high school teacher, those taught on a high school campus by a college faculty member, and those taught on a college campus by college faculty, in terms of their overall course grades in specific, subject-related course(s).

This chapter provides information concerning the data and data source used for this study and a description of the sample and subjects investigated. A description of the research design, variables, and methods used for the data analysis was also included in this chapter. Finally, this chapter provides information about ethical considerations taken as part of the overall conduct of the study.

Research Questions and Hypotheses

This study was guided by three research questions. The first research question asked: What was the difference in overall course grades for dual enrollment students taught by high school teachers and overall course grades for dual enrollment students taught by college faculty members, taking the same dual enrollment course? The null hypothesis for the first research question stated: There will be no significant difference (p>.05) in overall course grades for dual enrollment students taught by high school teachers and overall course grades for dual enrollment students taught by college faculty, taking the same dual enrollment course. The research hypothesis for the first research question was: There will be a significant difference (p < .05) in overall course grades for dual enrollment students taught by high school teachers and overall course grades for dual enrollment students taught by high school teachers and overall course grades for dual enrollment students taught by high school teachers and overall course grades for dual

The second research question asked: What was the difference in overall course grades of high school students who took dual enrollment courses taught by high school teachers on their high school campus compared to high school students who took the same dual enrollment courses taught by college faculty on their high school campus? The null hypothesis for the second research question stated: There will be no significant difference (p > .05) in overall course grades for high school students who took dual

enrollment courses taught by high school teachers on their high school campus compared to overall course grades for high school students who took the same dual enrollment courses taught by college faculty on their high school campus. The research hypothesis for the second research question was: There will be a significant difference (p < .05) in overall course grades for high school students who took dual enrollment courses taught by high school teachers on their high school campus compared to overall course grades for high school students who took the same dual enrollment course taught by college faculty on their high school campus.

The third research question asked: What was the difference in overall course grades for high school students who took dual enrollment courses taught by college faculty on their high school campus compared to high school students who took the same dual enrollment courses taught by college faculty on a college campus? The null hypothesis for the third research question stated: There will be no significant difference (p > .05) in overall course grades for high school students who took dual enrollment courses taught by college faculty on their high school campus compared to high school students who took the same dual enrollment courses taught by college faculty on their high school campus compared to high school students who took the same dual enrollment courses taught by college faculty on a college campus. The research hypothesis for the third research question was: There will be a significant difference (p < .05) in overall course grades for high school students who took dual enrollment courses taught by college faculty on a college faculty on their high school students who took dual enrollment courses taught by college faculty on their high school students who took dual enrollment courses taught by college faculty on a college faculty on their high school campus compared to high school students who took the same dual enrollment courses taught by college faculty on their high school campus compared to high school students who took the same dual enrollment courses taught by college faculty on their high school campus compared to high school students who took the same dual enrollment courses taught by college faculty on their high school campus compared to high school students who took the same dual enrollment courses taught by college faculty on their high school campus compared to high school students who took the same dual enrollment courses taught by college faculty on a college campus.

Data and Data Source

The study was conducted using existing data, which were collected at a large urban Midwestern community college in accordance with its state's regulation of dual enrollment student records. These data, under state mandate, were collected by the postsecondary institutions in the state and were submitted to the state's department of education on day 15 of each term.

Included in these records was demographic information on each student (i.e. gender, race or ethnic background, date of birth, grade level, address, city, state, zip code, school district, and high school). Also included in these records was information concerning each student's academic record (i.e., math placement score, English placement score, college level courses taken, college level grades, number of college credit hours, college course name, college course section number, college classroom building location, college course modality, instructor name, student final college course grade, student term college GPA, and academic year).

These data were housed internally in a database at the educational institution where this study was conducted. The researcher sought and received permission to access and use these data from the Internal Review Board (IRB) at the institution where the study was supported, and, IRB approval also was secured from the institution where the data were collected, stored and conducted.

Sample

The population for this purposed study included high school students in their junior or senior years who participated in a dual enrollment program through their local community college. Therefore the researcher used a "convenience sample" for this study, which involved using available data based on time, location or ease of access (Ary et al., 2010). The usage of a "convenience sample" necessarily limited the study's findings and generalizability.

The sample was taken from a pre-existing data set that housed information from AY 2015-16 and AY 2016-17 at a large urban Midwestern community college. Specifically, the researcher gathered data from two courses, First-Year Composition and College Algebra, which were taught through a face-to-face modality and which included only high school students in their junior or senior years. Because high school juniors and seniors were more likely to take courses in sufficient numbers to allow for data analysis and because those juniors and seniors also had the ability to transport themselves to a college campus, the researcher excluded all other potential grade levels from the study (i.e., seventh through tenth graders). In this data set the number of dual enrollment students taking First-Year Composition during the designated timeframe of the study was 1,947; the number of dual enrollment students taking College Algebra during the designated timeframe was 223.

Grade Level. Students in this study were either eleventh grade juniors or twelfth grade seniors. In the database for this study under graduation year, students were coded in terms of the year they would graduate from high school and the academic year (AY) in which they took the dual enrollment course. For this study, students who took dual enrollment courses in AY 2015-16 with a graduation year of 2016 or 2017 and students who took dual enrollment courses in AY 2016-17 with graduation years of 2017 or 2018 were included.

First-Year Composition. First-Year Composition is the first college-level English class taken by college-level students. In the database for this study, First-Year Composition was coded using an institutionally-specific label and number. In order to maintain anonymity of the college from which data were collected for this study, the label and number were not included here, but the researcher used the label and number in the statistical analyses.

College Algebra. College Algebra was the first college-level math class taken by college-level students. In the database for this study, college algebra was coded using an institutionally-specific label and number. In order to maintain anonymity of the college from which data were collected for this study, the label and number were not included as part of the research findings, but the researcher used the label and number in the statistical analyses.

Research Design

The researcher in this study used an ex post facto design. According to Ary et al. (2010) an ex post facto research design is used when variation in the dependent variable has already occurred. The dependent variable in the study was the overall course grade of dual enrolled students who had already taken First-Year Composition or College Algebra. The ex post facto design is also appropriate when the groups used in a study are pre-existing and random assignment of the subjects is not possible (Ary et al., 2010). Subjects in the study previously self-selected which groups to be in: either a dual-enrolled course taught by a high school teacher on a high school campus, or a dual-enrolled course taught by a college faculty member on a high school campus, or a dual-enrolled course taught by a college faculty member on a college campus.

Internal validity was a potential threat to the ex post facto design that was used in this study. Ary et al. (2010) noted that in research using an ex post facto design the lack of control over the independent variable results in lower internal validity. However, because there was a dearth of research specifically comparing the overall course grades of dual enrollment students taught by high school teachers to the overall course grades of dual enrollment students taught by college faculty, this study represents an important addition to the literature. Moreover, because there was a paucity of research specifically comparing overall course grades of students taking dual enrollment courses on a high school campus to overall course grades of students taking dual enrollment courses on a college campus, this study's findings should have import for practitioners and policymakers.

Dependent Variable

Academic Achievement: Academic achievement was defined in terms of each student's overall course grade. The overall course grade was the final calculated grade, which included all assessments in the dual enrolled course that contributed to the final grade as it appeared on the college transcript. In the database for this study under grade, dual enrollment students' grades were coded as "A," "B," "C," "D," or "F." Grades of "W" or "I" were not included in this study because these marks do not reflect student academic performance. These grades were based on a 4.0 GPA scale and were a continuous variable in SPSS.

The usage of GPA as a measurement of academic achievement as evidenced in the extant literature is not without criticism. York, Gibson and Rankin (2015) found three reasons why the use of GPAs as measurement of academic achievement was problematic: First, GPAs were not always an accurate measurement of a student's cognitive ability; second, grading approaches differ both among and between higher education institutions thus creating assessment inconsistencies; and, finally, grades and GPAs only represent a narrow portion of student achievement and therefore results may not be generalizable. York et al. however, also noted that 54.8% of the 31 peer reviewed articles they included in their research had used GPA as the measurement for academic success. For example, Choi (2005) used term grades as a measurement of Academic Performance in his study and DeFreitas (2011) measured Academic Achievement using GPA as a dependent variable. York et al. noted that the availability of assessment data in the form of grades and GPA at most institutions of higher education represented the reason why many researchers continued to use grades and GPAs as a measurement for academic achievement.

The researcher acknowledged that grades and GPAs may not accurately reflect a student's cognitive ability; however, little research had been conducted examining the instructor type and classroom location and its impact on academic achievement. In an effort to mitigate the concern of assessment inconsistencies the researcher selected courses that had been standardized in terms of how content was delivered and assessed. Indeed, these "standardized courses" were characterized by the use of a common textbook, common teaching syllabi, common assignments in the form of writing prompts and examinations, and common lecture materials, which were monitored through a learning management system used by both the high school teachers and college faculty. Further, the courses selected for this study met state-wide standards vis-à-vis learning outcomes and objectives, which allowed the identified courses to be included on a state-

wide transfer module, ensuring that successfully completed course credits were guaranteed to transfer to any public higher educational institution within the state. Courses with this guarantee had been reviewed and deemed acceptable by a panel of content experts who were representative of numerous state public higher educational institutions.

Independent Variable

Delivery Model: Delivery Model was defined as the aggregate of who taught the course (high school teacher or college faculty) and by where (high school campus or college campus) the dual enrollment student received the college level instruction. The independent variable included three mutually exclusive levels:

Level One: High school teacher on a high school campus. High school teacher was defined as the instructor who was employed by a school district and credentialed by the state to teach high school level courses. For this study high school teachers were "qualified" by state standards to teach as college-level adjunct faculty. High school campuses were defined as any location where secondary instruction was conducted and exclusively involved high school aged students. In the database for this study, the courses being taught by high school teachers on a high school campus were coded as "HI."

Level Two. College faculty on a high school campus. College faculty involved were employed by an institution of higher education. Faculty must have earned the rank of Assistant Professor, Associate Professor, or Full Professor or may also have been identified as "Instructors" in non-tenured positions or "Adjunct faculty" with appropriate

state mandated and institutionally approved credentials. In the database for this study, the courses taught by college faculty on a high school campus were coded as "CI."

Level Three: College faculty on a college campus. College campus was defined as any location where post-secondary instruction was being conducted involving students who were matriculated as post-secondary students. For this study, college location included the main campus of the educational institution, or any one of the four satellite branch campuses affiliated with the college from which the data were collected. In the database for this study, the dual enrollment courses conducted on the college campus were coded as "OC."

Data Analysis

Descriptive analysis results were summarized prior to testing the null hypotheses in this study. Descriptive statistics in this study included subject self-reported gender, race or ethnic background, and grade level.

The researcher conducted an independent samples t-test to investigate the first null hypothesis. According to Pallant (2013) independent samples t-tests are used when comparing two different groups on some continuous variable. In this study, two levels of the "Delivery Model" variable were combined (Level 2 and Level 3) to create one group of all college faculty. This combined group was then compared to all high school teachers who were exclusively within Level 1 of the Delivery Model variable.

The researcher conducted a one-way between groups ANOVA to investigate the second and third null hypotheses. According to Pallant (2013) the one-way between groups ANOVA is used when the researcher is testing one independent variable that has a number of different levels. The independent variable for this study was the "Delivery

Model" (i.e., high school teacher at a high school campus, college faculty at a high school campus, and college faculty at a college campus). The dependent variable for this study was academic achievement, as measured by overall course grade. The researcher investigated the impact of the Delivery Model on the dual enrollment students' academic achievement as measured by overall course grades.

The researcher reported the comparison of the variability in overall course GPA between the different groups with the variability within each of the groups. Pallant (2013) asserts that when conducting a one-way between groups ANOVA an F ratio is calculated which represents the variance between the groups divided by the variance within the groups. Levene's test of equality of error variances was also conducted. Levene's test was used to test the homogeneity of variance between the groups in analysis of variance (Pallant, 2013). The effect size was also reported using Cohen's criterion (1988). In addition, the researcher conducted a post-hoc test in the form of a Tukey test. The Tukey test was included in the analysis to determine if a significant variance existed between the groups. The IBM Statistical Package for the Social Sciences (SPSS), Version 23, was used to run both the descriptive statistics and the ANOVA.

Ethical Considerations

Because the data for this study were collected and stored in the database at the large Midwestern urban community college, the researcher sought IRB approval at the institution prior to conducting the data analyses. Once IRB approval was secured, the researcher accessed the database. The researcher did not share secured data with any other entity and has and will maintain all records on a private computer that was protected through appropriate passwords. The researcher did not include any identifying

student information (i.e., students' names, student identification numbers, high school name or district, in the research). If names or schools were cited, pseudonyms were used to protect the identity of all those included in the study.

CHAPTER IV RESULTS

Introduction

The purpose of this study was to investigate the level of academic achievement of high school students in dual enrollment courses. This study focused on the impact that the instructor (i.e., high school teacher or college faculty member) had on the academic achievement of the dual enrolled high school student, as measured by the overall course grade. In addition, the researcher examined the impact that the venue (i.e., the high school campus or college campus) had on the academic achievement of the dual enrolled high school student measured by the overall course grade.

In this chapter, the results are presented in three sections. The first section includes demographic information specifically describing the sample population used in the study. The second section provides the results from testing the first hypothesis including statistics from an independent samples t-test. Finally, the results are provided for the one-way ANOVA, which was conducted to investigate the second and third hypotheses.

Demographics

The data set for this study included 2,170 dual enrolled students in their junior or senior years in high school who were taking courses in First-Year Composition and College Algebra over AY 2015-16 and AY 2016-17 at a large, urban, Midwestern community college. Of the 2,170 students, 34.1% were male and 65.9% were female. Seniors made up 69% of the total number of students and juniors accounted for 31% of the student participants. In terms of race, 55.6% of the students identified themselves as White, 12% as African American, 4.4% as two or more races, 3.1% as Hispanic or Latino/Latina and 22% as unknown. Table 5 provides an overall representation of the sample population used in this study.

Table 5

courses		
Demographic	Ν	Percentage
Gender		
Male	740	34.1
Female	1430	65.9
Total	2170	100
Grade Level		
Senior	1498	69
Junior	672	31
Total	2170	100
Race		
White	1206	56.1
African American	260	12.1
Two or more races	96	4.5
Hispanic or Latino/a	67	3.1
Asian	40	1.9
Unknown	482	22.2
Total	2151*	99.1

Descriptive Statistics Overall for sample population of students taking dual enrollment courses

*Nineteen records were missing these data under race

The total number of dual enrolled students in First-Year Composition was 1,947.

In AY 2015-16, 919 students were enrolled in First-Year Composition and in AY 2016-

17, 1,028 students were enrolled in First-Year Composition. Of the total number of students dually-enrolled in First-Year Composition, 33.9% were male and 66.1% were female. Seniors comprised 70% of the total number of students dually-enrolled in First-Year Composition while 30% of the dually-enrolled students were juniors. In terms of race, 55.9 % of the dually-enrolled students identified themselves as White, 11.8% as African American, 4.3% as two or more races, 3.3% as Hispanic or Latino/Latina, 2.0% as Asian and 22.7% as unknown. Table 6 provides an overall depiction of the dually-enrolled students in First-Year Composition included in this study.

Table 6

Descriptive statistics for dually-enrolled First-Year Composition students

Demographic	N for AY 2015-16	N for AY 2016-17
Gender		
Male	314	346
Female	605	682
Total	919	1028
Grade Level		
Senior	631	731
Junior	288	297
Total	919	1028
Race		
White	481	599
African American	110	117
Two or more races	26	58
Hispanic or Latino/a	25	39
Asian	14	24
Unknown	258	180
Total	914*	1017*

*Sixteen records were missing these data under race among both AYs

The total number of dual enrolled students in College Algebra was 223. In AY 2015-16, 104 students were enrolled in College Algebra and in AY 2016-17, 119 students were enrolled in College Algebra. Of the total number of students dual enrolled in College Algebra, 35.9% were male and 64.1% were female. Seniors comprised 61% of

the total number of students dually enrolled in College Algebra while 39% of the duallyenrolled students were juniors. In terms of race, 57.3 % of the dually-enrolled students identified themselves as White, 15% as African American, 5.5% as two or more races, 1.4% as Hispanic or Latino/Latina, .9% as Asian and 20% as unknown. Table 7 provides an overall representation of the dually-enrolled students in College Algebra included in this study.

Table 7

Descriptive statistics for audily-enrolled College Algebra students					
Demographic	N for AY 2015-16	N for AY 2016-17			
Gender					
Male	37	43			
Female	67	76			
Total	104	119			
Grade Level					
Senior	65	71			
Junior	39	48			
Total	104	119			
Race					
White	59	67			
African American	16	17			
Two or more races	5	7			
Hispanic or	3	0			
Latino/a					
Asian	0	2			
Unknown	20	24			
Total	103*	117*			

Descriptive statistics for dually-enrolled College Algebra students

*Three records were missing these data under race among both AYs

Research Questions

The first research question asked: What is the difference in overall course grades for students taught by high school teachers and overall course grades for students taught by college faculty members who are taking the same dual enrollment course? In order to compare the grades given by all college faculty to all high school teachers regardless of where the dually-enrolled course was taught, the researcher combined two of the three levels of the Delivery Model, Level 2 (college faculty teaching the dual enrolled courses on a high school campus) and Level 3 (college faculty teaching the dual enrolled courses on a college campus), and then compared that combined group to Level 1 (high school teachers teaching the dual enrolled courses on a high school campus).

Using an independent samples t-test the researcher compared the overall course grades of students dually enrolled in First-Year Composition taught by college faculty to overall course grades of students dually enrolled in First-Year Composition taught by a high school teacher. Levene's Test for Equality of Variances was significant F(2, 1944) = 228.477, p < .05; indicating equal variances were not assumed, so the researcher analyzed statistics for equal variance assumption violations.

The results of the t-test indicated a statistically significant (t(1523) = -7.710, p = .001) difference in overall course grades of students dually enrolled in First-Year Composition taught by a high school teacher compared to overall course grades of students dually enrolled in First-Year Composition and taught by a college faculty member. The researcher therefore rejected the first null hypothesis that there would be no significant difference (p > .05) in overall course grades for dual enrollment students taught by high school teachers and overall course grades for dual enrollment students taught by college faculty, taking the same dual enrollment First-Year Composition course. More specifically, dually-enrolled students in First-Year Composition taught by high school teachers had significantly higher overall course grades (M = 3.15, SD = .942) compared to the overall course grades of students dually enrolled in First-Year Composition taught by college faculty (M = 2.71, SD = 1.46). The effect size, calculated using Cohen's d, of .03, indicated a small effect.

Using a second independent samples t-test the researcher compared the overall course grades of students dually enrolled in College Algebra taught by college faculty to overall course grades of students dually enrolled in College Algebra taught by a high school teacher. Levene's Test for Equality of Variances was non-significant F(1, 221) = -1.18, p > .05, indicating equal variances were assumed. The results of the t-test indicated no statistically significant (t(221) = -1.18, p = .17) difference in overall course grades of students dually enrolled in College Algebra taught by a high school teacher compared to overall course grades of students dually enrolled in College Algebra taught by a college faculty member. Therefore, the researcher failed to reject the first null hypothesis that there would be no significant difference (p > .05) in overall course grades for dual enrollment students taught by high school teachers and overall course grades for dual enrollment students taught by college faculty, in College Algebra.

The second research question asked: What is the difference in overall course grades of high school students who take dual enrollment courses taught by high school teachers on the high school campus compared to high school students who take the same dual enrollment courses taught by a college faculty member on the high school campus?

The third research question asked: What is the difference in overall course grades for high school students who take dual enrollment course taught by college faculty on the high school campus compared to high school students who take the same dual enrollment courses taught by college faculty on a college campus? In order to investigate these research questions, the researcher conducted two separate one-way ANOVAs, one for First-Year Composition and one for College Algebra.

A one-way ANOVA was used to compare the means of overall course grades of students dually enrolled in First-Year Composition in terms of three different manners of instruction: Level 1, those taught on a high school campus by a high school teacher; Level 2, those taught on a high school campus by a college faculty member; and Level 3, those taught on a college campus by college faculty members, in terms of their overall course grades in specific subject related course(s). Table 8 provides a summary of the overall course grades for dually-enrolled students in First-Year Composition based on Delivery Model levels.

Table 8

Means and Standard Deviations of overall course grades dually-enrolled First-Year Composition students

Delivery Model	n	Mean	SD	
HS teacher/HS campus	1035	3.15	.942	
College teacher/HS campus	135	2.95	1.12	
College teacher/College campus	777	2.67	1.51	
Total Group	1947	2.94	1.23	

The mean of overall course grades for dual enrolled students taking First-Year Composition on a high school campus from a high school teacher was 3.15 (N = 1035, SD = .942), the mean of overall course grades for dual enrolled students taking First-Year Composition on a high school campus by a college faculty member was 2.95 (N = 135, SD = 1.12), and the mean of overall course grades for dual enrolled students taking First-Year Composition on a college campus by a college faculty member was 2.67 (N=777, SD = 1.51).

An alpha level of .05 was used for all analyses. Levene's test for homogeneity of variances was violated, F(2, 1944) = 139.583, p < .05, indicating that equal variances between the groups could not be assumed; therefore, the Welch *F* ratio is reported. There

was a significant effect in terms of the Delivery Model on the overall course grade of dually-enrolled students in First-Year Composition, F(2, 361.311) = 31.34, p < .05.

There was a statistically significant difference at the p < .05 level in overall course grade for dually-enrolled First-Year Composition students for the three manners of instruction: F(2, 361.311) = 35.4, p = .001 (See table 9). The effect size, calculated using eta squared, was .04, which in Cohen's (1988) terms would be considered a small effect size.

Table 9

Analysis of Variance for Delivery Model for First-Year Composition

	1		5			
Source	SS	df	MS	F	р	
Between	103.856	2	51.928	35.443	001	
Within	2848.154	1944	1.465			
Total	2952.009	1946				

Post-hoc comparisons using the Tukey HSD indicated that the mean score for Level 1 (M = 3.15, SD = .942) was significantly different from Level 3 (M = 2.67, SD = 1.51). Level 2 (M = 2.95, SD = 1.12) was also significantly different from Level 3. Levels 1 and 2 did not differ significantly from each other.

Based on these results the researcher failed to reject the second null hypothesis that there would be no significant difference (p > .05) in overall course grades for high school students who take dual enrollment courses taught by high school teachers on their high school campus compared to overall course grades for high school students who take the same dual enrollment courses taught by college faculty on their high school campus in First-Year Composition. However, based on these results, the researcher rejected the third null hypothesis that there would be no significant difference (p>.05) in overall course grades for high school student who take dual enrollment courses taught by college faculty on their high school campus compared to high school students who take the same dual enrolment courses taught by college faculty on a college campus for First-Year Composition. Table 10 provides more details concerning the Tukey comparisons for Delivery Model for First-Year Composition students in dually-enrolled courses. Table 10

			95% CI		
Comparisons	Mean	Std.	Lower	Upper	
	Difference	Error	Bound	Bound	
Level 1 vs. Level 2	.204	.111	06	.46	
Level 1 vs. Level 3	.484*	.057	.35	.62	
Level 2 vs. Level 3	.280*	.113	.02	.54	
* n < 0.05					

Tukey Comparisons of Delivery Model for First-Year Composition

* *p* < 0.05

A one-way ANOVA was used to compare the mean of overall courses grades of students dually enrolled in College Algebra in terms of three different manners of instruction: Level 1, those taught on a high school campus by a high school teacher; Level 2, those taught on a high school campus by a college faculty member; and Level 3, those taught on a college campus by college faculty, in terms of their overall course grades in specific subject related course(s). Table 11 provides a summary of the overall course grades for dually-enrolled students in College Algebra based on Delivery Models. Table 11

Means and Standard Deviations of overall course grades dually-enrolled College Algebra students

Manner	n	Mean	SD	
HS teacher/HS campus	30	2.13	.291	
College teacher/HS campus	65	1.89	1.23	
College teacher/College campus	128	1.77	1.46	
Total Group	223	1.85	1.41	

The mean of overall course grades for dual enrolled students taking College Algebra on a high school campus from a high school teacher was 2.13 (f vN = 30, SD = .291); the mean of overall course grades for dual enrolled students taking College Algebra on a high school campus by a college faculty member was 1.89 (N = 65, SD = 1.23); further, the mean of overall course grades for dual enrolled students taking College Algebra on a college campus by a college faculty member was 1.77 (N=128, SD = 1.46). An alpha level of .05 was used for all analyses. Levene's test for homogeneity of variances was violated, F(2, 220) = 4.28, p < .05, indicating that equal variances between the groups could not be assumed; therefore, the Welch *F* ratio is reported. There was no significant effect in terms of the Delivery Model on the overall course grade of duallyenrolled students in College Algebra, F(2, 74.732) = .723, p > .49.

No statistically significant difference at the p < .05 level in overall course grade for dually-enrolled College Algebra students for the three manners of instruction: F(2, 74.732) = .861, p > .424 existed. Based on these results the researcher failed to reject the second null hypothesis that there will be no significant difference (p > .05) in overall course grades for high school students who take dual enrollment courses taught by high school teachers on their high school campus compared to overall course grades for high school students who take the same dual enrollment courses taught by college faculty on their high school campus. Additionally, based on these results, the researcher failed to reject the third null hypothesis that there would be no significant difference (p > .05) in overall course grades for high school student who take dual enrollment courses taught by college faculty on their high school student who take dual enrollment courses taught by college faculty on their high school campus compared to high school students who take the same dual enrollment courses taught by college faculty on their high school student who take dual enrollment courses taught by college faculty on their high school campus compared to high school students who take the same dual enrollment courses taught by college faculty on a college campus for College Algebra. See Table 12 below for more detailed information concerning the Analysis of Variance for Delivery Model for College Algebra.

Table 12

Analysis of Variance for Delivery Model for College Algebra

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Source	SS	df	MS	F	р	
Between	3.435	2	1.718	.861	.424	
Within	438.682	220	1.994			
Total	442.117	220				

Summary

The purpose of this study was to investigate the differences in terms of academic achievement in high school students in dual enrollment courses based on who taught the course (i.e., high school teacher or college faculty) and where the course was taught (i.e., high school campus or college campus). In order to address these purposes, the researcher used a pre-existing data set from a large Midwestern urban community college, spanning two academic years and isolating students who took First-Year Composition and/or College Algebra as dual enrollment courses.

The researcher analyzed the data using descriptive methods, as well as two separate statistical analysis methods. The results revealed that, in general, dual enrollment students in First-Year Composition taking courses from a high school teacher score higher and perform better in terms of overall course grades compared to dual enrollment students in First-Year Composition who were taking courses from college faculty. However, dual enrollment students in College Algebra taking courses from a high school teacher faired similarly to dual enrollment students in College Algebra taking courses from a college faculty member. Further, the results revealed that the Delivery Model (i.e., high school teacher on a high school campus, college faculty on a high school campus, or college faculty on a college campus) did impact the overall course grade of dually-enrolled students in First-Year Composition but not in College Algebra. That is, dually-enrolled students taking First-Year Composition from a high school teacher on a high school campus and dually-enrolled students taking First-Year Composition from a college faculty member on a high school campus, received higher overall course grades than students taking First-Year Composition from a college faculty member on a college campus. And, dually-enrolled students taking College Algebra received similar overall course grades regardless of whether they took the course on a high school campus by a high school teacher, or on the high school campus by a college faculty member or, by a college faculty member on a college campus.

In Chapter 5, I offer a summary of the study; a discussion of the findings and study limitations; recommendations for practice; a discussion of policy implications; and finally, recommendations for further research.

CHAPTER V

DISCUSSION

Dual enrollment programs have been part of our educational system for several decades (Boswell, 2001; Mokher & McLendon, 2009; U.S. Department of Education, Institute of Education Sciences, What Works Clearinghouse, 2017). Numerous studies have determined that dual enrollment programs provide the dually-enrolled student several advantages in terms of successfully matriculating in, persisting through, and completing a higher education degree (Karp, Calcagno, Hughes, Jeong, & Bailey, 2007; Speroni, 2011; Allen & Dadgar, 2012; Struhl & Vargas, 2012; An, 2013; Giani, Alexander & Reyes, 2014). However, few studies have been conducted investigating the impact that course instructor type (i.e., high school teacher or college faculty member) and classroom venues (i.e., high school campus or college campus) have on academic achievement in terms of overall course grades of the dually-enrolled student.

This study added a different dimension to the understanding of appropriate pedagogy for the dually-enrolled students. By looking at the Delivery Model in which the dual enrollment courses were offered and by whom, this study provides information to individuals in both secondary and post-secondary education as they continue to

conceptualize and offer dual enrollment programs and as they design and implement new instructional delivery mechanisms.

The first research hypothesis stated there would be no difference in overall course grades for dual enrollment students taught by high school teachers and overall course grades for dual enrollment students taught by college faculty, for students taking the same dual enrollment course. The second research hypothesis stated there would be no difference in overall course grades for high school students who took dual enrollment courses taught by high school teachers on their high school campus compared to overall course grades for high school students who took the same dual enrollment courses taught by college faculty on their high school campus. The third and final research hypothesis stated there would be no difference in overall course grades for high school campus. The third and final research hypothesis stated there would be no difference in overall course grades for high school students who took dual enrollment courses taught by college faculty on their high school students who took the same dual enrollment courses taught by college faculty on their high school students who took the same dual enrollment courses taught by college faculty on their high school students who took the same dual enrollment courses taught by college faculty on their high school students who took the same dual enrollment courses taught by college faculty on their high school students who took the same dual enrollment courses taught by college faculty on their high school campus compared to high school students who took the same dual enrollment courses taught by college faculty on their high school campus.

This chapter provides an overview of this researcher's findings, which includes demographic information and data from the statistical analyses conducted to investigate the research hypotheses. A discussion of the study limitations will follow and recommendations for future practice, policy implications, and future research in dual enrollment programs will be offered.

Discussion of Research Findings

The dataset used for the study contained numerous demographic data points; however, only four were analyzed: Academic Year, Age, Gender, and Race. Academic Years included AY 2015-16 and AY 2016-17. Age was examined in terms of students'
year in school (i.e., Senior or Junior); gender was divided into male or female; and race was categorized as White, African American, two or more races, Hispanic/Latino/Latina, Asian, unknown, or no response. There was a slight increase in the number of students dually enrolled from AY 2015-16 (1023) to AY 2016-17 (1147). First-Year Composition grew from 919 dually-enrolled students to 1,028 dually-enrolled students, and College Algebra grew from 104 dually-enrolled students to 119 dually-enrolled students.

Demographic data were similar between the two different courses (First-Year Composition and College Algebra) in that the majority of students enrolled in both courses were Seniors. In First-Year Composition, 70% of the students were Seniors and 30% were Juniors; in College Algebra, 61% of the students were Seniors and 39% were Juniors. These statistics were consistent with state level data within the state in which this study was conducted. Of all the Seniors and Juniors taking dual enrollment courses in AY 2015-16, Seniors made up the majority (61%) as compared to Juniors (39%) (Harper, 2017).

Approximately two-thirds of the participants in each different course (First-Year Composition and College Algebra) were female. In First-Year Composition course, 66.1% of the dually-enrolled students were female, and 33.9% were male. In College Algebra, 64.1% of the dually-enrolled students were female and 35.9% were male. These statistics were somewhat at variance with the data for the state within which this study was conducted. Specifically, for that same state, in AY 2015-2016, 55% of the dual enrollment student population was female and 45% was male (Harper, 2017).

In terms of race, both courses appeared to have similar proportions of students self-identified in all ethnic groups. The majority of dual enrollment students in both

courses identified as White, 55.9% in First-Year Composition and 57.3% in College Algebra. Interestingly, 22% of the First-Year Composition students and 20% of the College Algebra students indicated their ethnic background was unknown. African Americans were the second largest specifically reported ethnic group, with 12% in First-Year Composition and 15% in College Algebra. Students self-identified as "two or more races" were proportionate between the two classes, 4.4% in First-Year Composition and 5.5% in College Algebra. Hispanic or Latino/a students rounded out the specified ethnic groups in First-Year Composition with 3.1% and College Algebra with 1.4%. Asians were the smallest ethnic group represented, with 2% in First-Year Composition and .9% in College Algebra. These demographic data were, again, somewhat at variance with the state level data. That is, in AY 2015-16, Harper (2017) reported that 71.6% of students in dual enrollment courses identified as White, 6.3% as African American, 1.8% as two or more races and 15.5% as unknown. The inconsistencies between the demographic data for this study and state level demographic data may be due to the urban location of the higher education institution from which these data were collected, with an urban population being more diverse than would be evidenced statewide.

Research Question 1

The first research hypothesis stated there would be no difference in overall course grades for dual enrollment students taught by high school teachers and overall course grades for dual enrollment students taught by college faculty, taking the same dual enrollment course. The results of the study demonstrated that First-Year Composition students who took the course from a high school teacher earned a higher overall course

grade (M = 3.15) than students taking First-Year Composition from a college faculty member (M = 2.71).

There were several possible reasons why students taking First-Year Composition from a high school teacher may have earned a higher overall course grade compared to students who took First-Year Composition from a college faculty member. First, it was possible that dual enrollment courses taught by the college faculty were more rigorous than the dual enrollment courses taught by high school teachers. Although college faculty teaching dual enrollment courses and high school teachers teaching dual enrollment courses used the same course materials, syllabi, and assignments with assessment measurements established by the post-secondary institutions, there was simply no guarantee that the two different groups of faculty maintained similar levels of academic rigor or that both groups adhered to collegiate standards and expectations. Alternatively, dual enrolled students who took courses from high school teachers may have found that the instructional methods of high school teachers were more engaging and ultimately more effective in terms of explaining and instructing the college level content of the dual enrolled courses, and, hence, higher grades were earned.

In a similar study, Arnold, et al. (2017) found dual enrolled students taking English from a high school teacher had significantly higher final course grades than dual enrolled students taking English from a college faculty member. The researchers suggested that dual enrolled students taking English on a college campus may not have been prepared for the rigor of an *in situ* college course or for the autonomy afforded to students in a college environment.

Second, familiarity with the high school teachers and the classroom environment may have provided a more comfortable situation within which students received instruction and, as a consequence, may have resulted in higher levels of student academic performances. Because dual enrolled students had some familiarity with the high school teacher, either first hand or through peers, this may have reduced the level of uncertainty about expectations of the course and as a consequence, resulted in higher grades. Kanny (2015), for example, noted that dual enrollment students who took courses on a college campus revealed experiencing negative impacts on their grades because they were not prepared for college norms, college grading practices and the different types of interactions that were evidenced with their professors.

Third, high school teachers were typically available to their students five days a week as opposed to college faculty members who may have only been on a high school campus two or three times a week. Additional contact time with instructors may have provided students more possible interaction opportunities that could have led to further discussions concerning course content and performance expectations.

For the dually-enrolled student taking College Algebra, the results of the study demonstrated that students who took the course from a high school teacher were no more likely to earn a higher overall course grade (M = 2.13) than students taking College Algebra from a college faculty member (M = 1.82). Interestingly, these findings differ from recent studies investigating the academic achievement of dually-enrolled Math students. For example, Arnold et al. (2017) found that students taking dual enrollment Math courses from college faculty had statistically significant lower final course grades (M = 2.20) than students taking the same dual enrollment Math course from a high school

teacher (M = 3.10). However, Hebert (2001) found that dually-enrolled students taught by high school teachers performed better in their subsequent college level math courses than dually-enrolled students who had been taught by a college faculty member. It appears that research examining the academic achievement of dual enrolled math students is producing a variance of results and thus may require further examination.

One reason significance may have been found for First-Year Composition dual enrollment students and not for College Algebra dual enrollment students could be because First-Year Composition assessment measurements were inherently more subjective than College Algebra assessment measurements. That is, grades for writing assignments of the First-Year Composition student (even when using grading rubrics) may have been influenced by a teacher's perception of the quality of the student's ideas. Grades for assignments of the College Algebra student could have been more objective because there was only one correct answer and qualitative assessment is not part of College Algebra.

The mixed results of the various studies clearly provide grounds for conducting further research on dually-enrolled Math students. Because Math is typically a required General Education course for most higher education degrees and because many dual enrollment programs include Math courses as part of their curriculum offerings, it is imperative that both the secondary and post-secondary educational institutions understand what the best pedagogical practices are for instructing dual enrollment students in all classes that are offered, but especially in critical courses such as those in mathematics. Additionally, administrators of dual enrollment programs may need to take a closer look at their course offerings and develop appropriate measures for ensuring

consistency in terms of academic expectations among high school teachers and college faculty in relation to course objectives, outcomes, and curricula.

Research Question 2

The second research hypothesis stated there would be no difference in overall course grades for high school students who took dual enrollment courses taught by high school teachers on their high school campus compared to overall course grades for high school students who took the same dual enrollment courses taught by college faculty on their high school campus.

The results of the study demonstrated that there was no difference in overall course grades for First-Year Composition students taught by a high school teacher on a high school campus (M = 3.15) compared to First-Year Composition students taught by a college faculty member on a high school campus (M = 2.95). These results revealed that who teaches the course (i.e., high school teacher versus college faculty member) does not have a significant bearing on the overall final course grade for dually-enrolled students taking First-Year Composition on the high school campus.

For the dually-enrolled students in College Algebra, the results of the study demonstrate that there was no difference in overall course grades for students taught by a high school teacher on a high school campus (M = 2.13) compared to overall course grades for students taught by a college faculty member on a high school campus (M =1.89). These results reveal that who teaches the course (i.e., high school teacher versus college faculty member) does not have a significant bearing on the overall final course grade for dually-enrolled students taking College Algebra on their high school campus.

These findings further supported the notion that the familiarity of the high school campus for the dually-enrolled student may provide an environment more conducive to positive student academic performance in a dual enrollment course. Both First-Year Composition and College Algebra had similar results indicating that regardless of the instructor (high school teacher or college faculty member) when students are receiving dual enrollment instruction on their high school campus they will perform no differently academically.

Research Question 3

The third research hypothesis stated there would be no difference in overall course grades for high school students who took dual enrollment courses taught by college faculty on their high school campus compared to high school students who took the same dual enrollment courses taught by college faculty on a college campus.

The results of the study demonstrated that First-Year Composition students who took the dually- enrolled course from a college faculty member on a high school campus earned a higher overall course grade (M = 2.95) than students taking First-Year Composition from a college faculty member on a college campus (M = 2.67). These results supported the conclusion that where the course was taken (i.e., high school campus or college campus) appeared to have an impact on the dually-enrolled students' academic achievement as measured by overall course grade.

There were several possible reasons why students taking First-Year Composition from a college faculty member on a high school campus may earn a higher overall course grade compared to students taking First-Year Composition from a college faculty member on a college campus. First, students who took the dual enrollment course on the

high school campus did not have to navigate the unfamiliar territory of a college campus, which the students taking dual enrollment courses on the college campus did. Having the faculty member come to the high school allowed the dually-enrolled high school students to focus on their coursework and not on other challenges such as transportation, where to park, and arriving on time to class.

Second, the dually-enrolled high school students taking the course on the high school campus were among peers within their classroom providing a more comfortable learning environment, unlike the high school student on the college campus who was in a classroom with a more diverse range of students with both traditional and nontraditional backgrounds. Kanny (2015) found that one disadvantage of dual enrolled high school students attending classes on the college campus was that the students experienced negative interactions with others. She stated that the majority of the participants in her study mentioned feeling uncomfortable due to their "nontraditional" enrollment status. Participants felt that they were negatively judged (i.e., not viewed as really being acceptable as part of the college culture) by both students and faculty, indicating that other students were potentially implicitly mocking them for "thinking" they were smart, and faculty explicitly expressing discontentment with having to teach high school students who should not be in college classes.

The results of the study demonstrated that College Algebra students who took the dually-enrolled course from a college faculty member on a high school campus were no more likely to earn a higher overall course grade (M = 1.89) than students taking College Algebra from a college faculty member on a college campus (M = 1.77). These results differed from the findings for dual enrolled students in First-Year Composition classes

who scored higher on overall course grades when taking the course from a college faculty member on a high school campus as opposed to taking the course from a college faculty member on a college campus. The performance differences between student academic achievement in First-Year Composition versus College Algebra is another area for potential research. Understanding why student performance in dual enrollment courses varies based on subject, instructor, and venue could provide additional data to inform how best to provide instruction in dual enrollment programs.

Study Limitations

As with all research, several factors limited this investigation. First, the researcher used an ex post facto design, which limited the internal validity of the study. Subjects were not randomly assigned into the three different groups; therefore, the independent variable was not manipulated. Although the data were pre-existing (i.e., students had already taken and received their final course grades), the analysis still provided beneficial information for administrators, faculty, and policy makers who are concerned with the success rates of dually-enrolled students.

Second, because this study used groups that were preexisting, selection bias also represented a potential threat to internal validity. Students chose between taking the dual enrollment course on the high school campus or on the college campus. Using only high school juniors and seniors created a more homogenous group and should have mitigated, but clearly would not eliminate, the issues associated with selection bias.

A third limitation of this study was the inability to manipulate the independent variable: Delivery Model. High school teachers and college faculty were scheduled to teach sections of the dual enrollment courses based on the needs of the college

department and at the departmental chairperson's discretion. Students self-selected the manner in which they wanted to receive their course instruction and, thus, manipulation of the independent variable was not plausible. Manipulation of the independent variable would have been unethical, and therefore this limitation was unavoidable.

Finally, because the data were limited to one geographical area, southwest Ohio, and because the data were coming from students who had matriculated at a participating community college, the results were not generalizable to a broader population, particularly to students who matriculated at a 4-year university.

Recommendations for Practice

It is clear that the benefits of dual enrollment programs (i.e., preparing students for college readiness, providing access to college, and improving retention, persistence and completion rates) outweigh the numerous challenges associated with administering, staffing, and providing quality instruction within the context of dual enrollment classes. As post-secondary institutions continue to grow their dual enrollment program options, and secondary school students continue to take advantage of these opportunities, it is necessary that these programs be developed and maintained in such a way that quality, collegiate-level instruction (from qualified instructors) is provided, regardless of location (i.e., at a high school or on a college campus). In light of this study, the following recommendations are offered as educators and higher education administrators determine the best way to offer dual enrollment classes.

First, as high school teachers continue to be assigned to collegiate level courses on their high school campuses, appropriate mentoring and professional development should be provided by the post-secondary institution to ensure that an appropriate level of

rigor is evidenced, regardless of where a course is being taught. Classroom observations of high school teachers would be one way to evaluate course rigor (i.e., does the high school teacher demonstrate the same expectations for academic performance as are evidenced by a college faculty member?). Teacher in-services focused on collegiate-level instructional best practices and academic expectations could provide professional development opportunities for high school teachers who are planning to instruct dual enrolled students.

Second, college faculty members should be provided with professional development opportunities in order to better understand the needs and characteristics of the secondary level student learner. Community college faculty spend many hours in developing lessons plans that appeal to the adult learner; therefore, adding a new dimension and emphasis focused on the academic needs of the high school learner would be an important step forward in terms of ensuring that every dual enrollment classroom offers the potential for a positive learning environment.

Third, because one of the major goals of dual enrollment programs is to assist high school students in achieving a college degree or credential in a timely manner, providing opportunities for college faculty and high school teachers to work collaboratively (sharing best practices for instructing the high school student learner) could help improve the consistency of the dual enrollment course. Moreover, bringing together individuals with expertise and enhanced training in both curriculum (college faculty) and pedagogy (high school teachers) in a cooperative environment may further help produce more consistent outcomes in a dual enrollment program.

Policy Implications

As dual enrollment programs continue to expand and provide educational opportunities for a wider range of high school students, there are a variety of potential policy considerations at the state, regional, and national levels. Based on the findings of this study, the following should be considered by state level policymakers.

First, policies guiding academic credentialing of high school teachers who have responsibility for teaching dual enrollment courses should be explored, developed and potentially adopted. As shown in this study and in Arnold et al. (2017), dual enrolled students taking First-Year Composition from high school teachers achieved significantly higher grades than those who took the same course from a college faculty member, even though the course was standardized across all sections using the same syllabus, course materials, and assignments. If this outcome were to be evidenced through other similar studies conducted in a variety of contexts, then that suggests that policy makers and higher education administrators need to determine why this outcome is evidenced and what it might mean for the way in which teaching faculty are identified and trained for their instructional roles. The impact of such practices could be particularly significant for underrepresented student populations.

Second, the consequences of highly restrictive admission standards for dual enrollment programs should be further investigated. Several researchers (Karp, Bailey, Hughes, & Fermin, 2004; Ferguson, Baker, & Burnett, 2015; and Zinth, 2015) found higher educational institutions addressed academic rigor challenges by adopting more restrictive admission requirements (i.e., high GPAs, ACT and/or SAT scores) for their dual enrollment programs. However, these restrictive admission requirements have also

been found (Taylor, 2015) to have a negative impact on students of color and low to middle achieving students, many of whom come from underrepresented populations. The research results emerging from this study suggest that the majority of the dual enrolled students in both First-Year Composition and College Algebra were identified as White. Therefore, policies surrounding the consideration of multiple measures of student college readiness may be warranted particularly in secondary school districts where students of color and low and middle-achieving students are in the majority.

Third, most states offering dual enrollment courses follow their regions' higher education accrediting agency requirements (i.e., Florida and North Carolina follow Southern Association of Colleges, and Ohio follows the Higher Learning Commission) to ensure their programs are meeting state level and regional standards in terms of quality of instruction. At the same time, some states (California, New York, and Washington) have no governing agency providing an overarching set of guidelines to ensure the quality of their dual enrollment programs. Because concerns of the transferability of dual credit courses (particularly to out-of-state institutions of higher education) continue to emerge (Gewertz, Harwin, Sparks, & Lewandowski, 2016), and because the appropriate structure of dual enrollment programs has yet to be determined (Karp, 2015), policy makers and higher education administrators may need to work collaboratively to establish policies that clearly define the goals, objectives, and quality standards of dual enrollment programs across the nation.

Recommendations for Future Research

Because this study found mixed results in terms of academic achievement of dually-enrolled students in First-Year Composition and College Algebra, more research

is needed to investigate these differences and provide additional data for those participating in the policy making for, and administration of, dual enrollment programs. Future research focused on academic achievement of the dually-enrolled student may take the form of a number of possibilities.

- 1.) A study that investigates the academic achievement of dual enrollment high school students during their first year in college could provide additional information concerning the effectiveness of the dual enrollment courses in preparing high school students for college. That is, to what extent are students who take dual enrollment classes really college ready as a result of their matriculation through a college credit-bearing class while still in high school? It would be especially important to compare whether it makes a difference in terms of college enrollment, persistence and completion? Is student success impacted differently by having had high school teachers or college faculty teaching their dual enrollment classes?
- 2.) A qualitative study that explores the perceptions of the dual enrolled students taking classes at the high school versus the perceptions of dual enrolled students matriculating on the college campus could provide a deeper and richer understanding of the lived experiences of students as they navigate the different learning environments and prepare for college. In essence, there needs to be a deeper and richer understanding of how dual enrollment classes impact the success of matriculating students. Given the aggressive dual enrollment efforts in states such as Ohio (College Credit Plus), it is imperative

that students, parents and higher education administrators fully understand the impact that dual enrollment classes have on student academic success.

- 3.) A study that investigates the persistence and completion rates of duallyenrolled students based on subject matter to determine if certain subjects are better suited for high school level students who participate in dual enrollment options would be informative. Because dual enrollment programs are designed to encourage high school students to earn college credit and pursue and complete college degrees, it imperative that these early college experiences ensure that participating high school students are successful. Understanding which course subjects students can persist through and complete more readily would inform those who are designing college pathway models, as well as assist those who are advising students.
- 4.) A study that investigates if the type of instructor and venue impacts the academic performance of dual enrollment students differently based on their economic status is crucial to helping further the mission of dual enrollment. That is, are different types of students (i.e., high poverty, underrepresented, etc.) more or less impacted by the type of instructor (e.g., high school teacher or college faculty member) and venue (e.g., high school campus or college campus)? Because one of the goals for dual enrollment is to bring college level courses to underserved and underrepresented populations, research examining what model works best for different student populations would provide important information to those charged with administering dual enrollment programs.

5.) A study that investigates what impact high school teachers' qualifications (i.e., Master degree in the discipline, versus Bachelor's degree plus 18 credit hours in the discipline) have on the academic performance, persistence, and completion rates of the dually-enrolled student would aid schools and accrediting agencies. Because states have differing criteria and credentialing standards for high school teachers who teach dual enrollment courses, further investigation of the variance in qualifications may help inform state regulative policies.

Conclusion

This quantitative study investigated the impact that instructor type (i.e., high school teacher or college faculty member) had on dual enrollment students taking First-Year Composition and College Algebra courses. Furthermore, this study examined what impact the educational venue (i.e., high school campus or college campus) had on the dual enrolled student in First-Year Composition and College Algebra classes.

The basis for this study stemmed from literature that suggested that although there are many benefits for dual enrollment students in terms of access to, persistence through, and completion of college degrees, little research had been conducted to more fully understand the implications of who is (or should be) doing the instruction and where the instruction is (or should be) being conducted. At the same time, previous research showed that both administrators and faculty alike had concerns surrounding the quality and rigor of dual enrollment courses, particularly when the dual enrollment course was taught by a high school teacher on a high school campus. The mixed results from this study demonstrate that depending upon the subject matter (e.g., First-Year Composition or College Algebra) the impact of the instructor and venue varies. In this research, students taking First-Year Composition courses tended to experience higher levels of academic achievement when taking their courses from a high school teacher on a high school campus. First-Year Composition students also did better when taking their course on the high school campus from a college faculty member than they did taking the course on a college campus from a college faculty member. However, the same is not true for students taking College Algebra. There was no significant difference for College Algebra students when taking their course from a high school teacher versus a college faculty member or when taking their course on the high school campus versus the college campus.

Dual enrollment programs are an important option for high school students pursuing college degrees. As these programs continue to expand and as more course offerings are made available, there will necessarily be more reliance on teachers in high schools to help meet the demand; therefore, it is imperative that policy makers and higher education administrators work together to develop the appropriate scaffolding to ensure successful programs. Additionally, as high school teachers and college faculty members continue to find more and more dually-enrolled students attending their classes, a collaborative spirit should be encouraged among all educators who together are preparing the next generation of intellectual capital that our country requires and that will be essential for the personal success of young people as they pursue careers and explore professional opportunities.

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