UNDERSTANDING DUAL ENROLLMENT: FACTORS AFFECTING MATRICULATION INTO THE HOST INSTITUTION

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In Partial Fulfillment of the Requirements for

The Degree

Doctor of Education in Leadership Studies

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UNDERSTANDING DUAL ENROLLMENT: FACTORS AFFECTING MATRICULATION INTO THE HOST INSTITUTION

By

Kristy L. Tipton

ASHLAND UNIVERSITY, 2024

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Abstract

This dissertation investigates the factors influencing the matriculation trends of former College Credit Plus (CCP) participants to host institutions in Ohio, utilizing Perna's (2006) College Choice Model as a framework. The study examines variables such as course modality, geographical proximity to the host institution, course load, and grade point average, utilizing three postsecondary institutions: a private 4-year, a public 4-year, and a 2-year community college. High school cohorts from the past three graduating years (2021-2023) were analyzed to provide current insights into dual enrollment trends. Significant associations were found between matriculation and variables of course modality, course load, and proximity. The study's limitations include a restricted sample size, exclusion of homeschooled and online high school students, and a focus on a limited set of variables. Future research should explore additional qualitative and quantitative factors influencing dual enrollment students' college choices, including socioeconomic status, parental education levels, and institutional characteristics.

DEDICATION

To Alex and Andrew, my beloved sons,

The completion of this dissertation represents years of dedication, hard work, and perseverance in the pursuit of knowledge and personal growth. As you embark on your own journeys, I hope this accomplishment serves as a reminder that with unwavering determination and a resolute spirit, you can overcome any obstacle and achieve your most ambitious dreams.

Never allow the doubts or limitations imposed by others to hinder your aspirations. Embrace challenges as opportunities for growth, and let your passion be the driving force that propels you forward. The road may be arduous, but the rewards of perseverance are immeasurable.

This dissertation is not only a testament to my academic endeavors but also a symbol of the sacrifices and support that have made this achievement possible. May it inspire you to fearlessly chase your dreams, to never settle for mediocrity, and to leave an indelible mark on the world with the brilliance of your minds and the strength of your character.

With love and pride,

Mom

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER I

INTRODUCTION

Background

In recent years, educational strategies and paradigms have evolved to meet the changing needs and expectations of students, parents, and educational stakeholders. One of the transformative educational practices that have gained significant momentum is dual enrollment (DE), a program that allows high school students to enroll in college-level courses while still completing high school requirements, earning credit for both (Coleman & Latta, 2022; Dever, 2017; Faber, 2022; Ison & Nguyen, 2021; Kasturiarachi, 2022). The purpose of DE is to bridge the gap between secondary and postsecondary education, reshaping the traditional education landscape and pathing the way to higher educational attainment for high school students (Alsup & Depenhart, 2023; Coleman & Latta, 2022; Dever, 2017). Furthermore, higher education institutions are offering DE programs not only for student benefits but also as a recruitment strategy (Alsup & Depenhart, 2023; Jagesic et al., 2022; Martinez, 2018; Moore & Williams, 2022). In fact, some institutions even offer a tuition waiver to students who participated in DE and choose to continue their postsecondary education at that same institution after high school graduation (Faber, 2022).

According to the U.S. Department of Education (2019), about one-third of U.S. high school students are currently taking at least one DE course, and nearly 70% of high schools offer DE programs nationwide (Robson & O'Neal, 2020). Research has demonstrated that participation in these programs is associated with a greater likelihood of enrolling in a college or university and later graduating (An & Taylor, 2019; Arnold et

al., 2017; Gagnon et al., 2021; Ison & Nguyen, 2021; Jagesic et al., 2022; Kasturiarachi, 2022; Martinez, 2018; Puyear et al., 2001). Despite tremendous growth and participation in DE, gaps still exist pertaining to traditionally marginalized and low-income students, who tend to participate in DE programs at a much lower rate than students from other demographics (Spencer & Maldonado, 2021). Therefore, research is needed to identify gaps in participation and matriculation trends to develop strategies for serving student populations who are less likely to attend or complete a college degree (Holten & Pierson, 2016).

Since the pursuit of higher education is essential for individual career prospects and local and national economic development (Field, 2021; Vargas et al., 2017), many DE programs, such as Ohio's College Credit Plus (CCP) program, operate in the context of increasing the accessibility and affordability of higher education, forging more effective pathways to degree attainment. Within this context, DE programs are emerging as a promising solution to address several issues, including college affordability, student readiness, degree completion rates, and postsecondary institution enrollment challenges (Kasturiarachi, 2022; Martinez, 2018; Moore & Williams, 2022).

While DE programs are increasingly viewed as a means to enhance college readiness, lower the cost of higher education for students, and accelerate degree completion (An & Taylor, 2019; Dever, 2017), the practical and empirical impacts of DE remain subjects of significant interest and debate (Faber, 2022; Lee et al., 2022). As many students seek DE programs to increase the affordability of college and reduce the time to completion, some postsecondary institutions perceive DE as a potential strategy for increasing students' college readiness, enrollment, persistence, and completion (An &

Taylor, 2019; Dever, 2017; Jagesic et al., 2022; Kasturiarachi, 2022; Rivera et al., 2019). However, more empirical evidence supporting these perceptions is necessary (Martinez, 2018; Moore & Williams, 2022).

A substantial body of research has explored the effects of DE on students' academic achievement, college readiness, and early college experiences (Barshay, 2023; Hooper & Harrington, 2022). Furthermore, abundant research exists regarding students' access to DE programs (Dever, 2017; Hooper & Harrington, 2022; Rivera et al., 2019; Spencer & Maldonado, 2021). However, there are notable gaps in the existing literature concerning the influence of DE on students' future matriculation to college, particularly in the DE host institution (Alsup & Depenhart; An & Taylor, 2019; Martinez, 2018; Moore & Williams, 2022).

In Ohio, all public institutions of higher education participate in CCP with many private institutions also electing to participate (Faber, 2022). Furthermore, CCP participation has increased by over 240% since 2015, with over 76,000 participants during the academic year 2021, one of the highest DE enrollment rates in the country (Faber, 2022).

However, there is still a need for empirically grounded insights into the effectiveness of DE programs, such as CCP, in preparing students for and promoting future college enrollment and matriculation after DE participation. The practical implications of this research extend to secondary and postsecondary educational institutions, state departments of education, policymakers, and families, all who have a vested interest in understanding the long-term impacts of DE programs on students' educational trajectories (An & Taylor, 2019; Witkowsky et al., 2020).

Problem Statement

In a 2016 report by the American Association of College Registrars and Admissions Officers (AACRAO), higher education institutions responded regarding the utility of DE programs (Kilgore & Taylor, 2016). Of the surveyed institutions, 75% reported using DE as a recruitment tool. However, the report also highlighted the perceptions of DE as a recruitment strategy by colleges and the lack of empirical evidence supporting its use. Additionally, for institutions experiencing enrollment challenges and budget concerns, DE can be viewed as a source of supporting student enrollment and generating state revenue (Kilgore & Taylor, 2016). Specifically in Ohio, public institutions are required to participate in the CCP program, and many private institutions elect to participate due to the potential of recruiting CCP participants as undergraduate students in the future (Faber, 2022). However, concerns have arisen nationwide concerning the value of DE as a recruitment strategy compared to the financial burden on the institution for providing DE programming (Martinez, 2018).

Overall, the available literature is incomplete and inconclusive regarding the use of DE as a recruitment strategy, particularly regarding student matriculation to the host institution. A study in Florida examined DE students' matriculation to any college and not specifically to the DE host institution (Moore & Williams, 2022). Kinnick (2012) found that one-third of DE participants return to the host institution, and Tipton (2023) found a strong association between course modality and future matriculation. As colleges use DE in their strategic enrollment plans, it is pertinent that they understand the matriculation patterns of former DE participants in an effort not to continue using

institutional resources for ineffective practices (Kilgore & Taylor, 2016; Moore & Williams, 2022).

Purpose of the Study

The purpose of this dissertation was to investigate and provide empirical insights into the relationship between DE programs, specifically CCP in Ohio, and the matriculation patterns of former participants to the host institutions after high school graduation. This research aimed to address the gaps in existing literature regarding the effectiveness of DE as a recruitment strategy for higher education institutions and its impact on student matriculation (Kilgore & Taylor, 2016; Moore & Williams, 2022). Furthermore, it aimed to assess whether the recruitment strategies regarding DE programming ultimately contribute to the matriculation of students to the host institution (Martinez, 2018).

This research addressed matriculation patterns in former DE participants regarding specific demographics, course modality, course load, high school location, and culminating grade point average (GPA) while enrolled in a DE program. By examining the matriculation patterns of former DE participants, this study sought to inform educational institutions and policymakers about the utility of DE programs as a strategic enrollment tool (Kilgore & Taylor, 2016). Overall, this research is critical for higher education institutions as they seek to optimize enrollment strategies and allocate personnel and financial resources efficiently in response to the evolving educational landscape and enrollment challenges (Kilgore & Taylor, 2016; Moore & Williams, 2022).

Research Questions

This study was guided by specific research questions regarding Ohio's DE program, CCP. In particular, this research aimed to determine trends in former CCP participants' host institution matriculation by answering the following questions:

1. Is there an association between DE course modality and the impact on matriculation rates to host institutions in Ohio for high school graduating cohorts in the years 2021, 2022, and 2023?
2. Is there a significant difference in the geographical proximity of the high school between DE students who matriculate and those who do not matriculate to the DE host institution in the state of Ohio for high school graduating cohorts in the years 2021, 2022, and 2023?
3. Is there a significant difference in the CCP course load between students who matriculate and those who do not matriculate to the DE host institution in the state of Ohio for high school graduating cohorts in the years 2021, 2022, and 2023?
4. Is there significant difference in academic performance as measured in GPA in DE courses between DE students who matriculate or do not matriculate to the DE host institution in the state of Ohio for high school graduating cohorts in the years 2021, 2022, and 2023?

Significance of the Study

This study was designed to make significant contributions to the field of DE, particularly in the context of Ohio's CCP program, by addressing critical gaps in understanding the trends and factors influencing the matriculation of former CCP participants to their CCP host institutions. There are several advantages for students and

institutions when former CCP participants elect to remain with their host institution. This continuity can ease the transition from high school to college, guarantee credit transfer, and improve the likelihood of those students remaining in Ohio for employment after graduation, boosting the state's economic growth (Faber, 2022). The research questions outlined hold the potential to advance this existing knowledge base and inform educational institutions, families, and policymakers.

In Ohio, approximately 30-50% of CCP courses, depending on institutional type, are delivered through online modalities, with instruction at the high school being the second most common modality (Faber, 2022). By investigating the association between DE course modality and matriculation rates, this study sought to determine if specific modes of CCP course delivery offer a more significant impact on a student's decision to attend the host institution after high school (Alsup & Depenhart, 2023; Tipton, 2023). This insight can guide institutions in optimizing course offerings and strategies to better align with recruitment goals.

Furthermore, examining the proximity of the high schools enrolling the CCP participants to the host CCP postsecondary institution and its effect on matriculation can provide valuable information for future planning and resource allocation (Rivera et al., 2019). Public universities with regional campuses in multiple locations have a larger reach and can serve more students over a larger geographical area than a single campus institution (Faber, 2022). Therefore, understanding the role of geographic accessibility in students' choices can assist institutions in developing targeted outreach strategies.

Assessing academic performance, measured by postsecondary GPA while enrolled as a DE student, and its impact on matriculation decisions can provide colleges

and universities with additional insight into the role of academic preparedness in student choices (Kilgore & Taylor, 2016). This information will provide more clarity into the importance of providing academic support to high school students enrolled in college coursework. Furthermore, GPA is associated with academic preparedness, which ultimately leads to greater success rates for post-secondary graduation, greater employment rates, and greater lifetime earnings since having a post-secondary degree is related to positive economic benefits (Faber, 2022).

Lastly, by exploring demographic factors of race, gender, and geographic location with matriculation rates, this study can contribute to existing literature in understanding equity and access issues with DE programming (Rivera et al., 2019; Spencer & Maldonado, 2021). While past research has shown that minority and economically disadvantaged students participate in DE programs at a lower rate than others, these students have been shown to enroll in college at higher rates after having participated in a DE program (Faber, 2022). These students also tend to have better outcomes while in college regarding retention rates, GPA, and graduation rates. Further defining disparities in matriculation rates can inform policies aimed at promoting diversity and inclusion in higher education.

The benefits of completing this study were multifaceted and included the potential to optimize postsecondary enrollment strategies, which can improve outreach efforts, equitable access to DE programs, and academic support for dually enrolled students. This study can help institutions make informed decisions to enhance the efficacy of their programs and strategic plans, this positively impacting student's postsecondary experiences.

Furthermore, the results of this study seek to enhance the college choice model (Perna, 2006) by providing a more nuanced understanding of college choice in the context of DE participation. The college choice model considers factors such as student demographics, academic preparation, family influences, and proximity to the institution as influential in selecting a college to attend (Perna, 2006). While the model was originally developed for exploring traditional college choice decisions, the growing prominence of DE programs necessitates its adaptation and application to this unique educational context. By examining how these factors interact and influence the matriculation decisions of DE participants, this study aimed to extend Perna's (2006) model to encompass the specific dynamics of DE, thereby contributing to a more comprehensive understanding of the complexities involved in the college choice process for this population.

Conceptual Framework

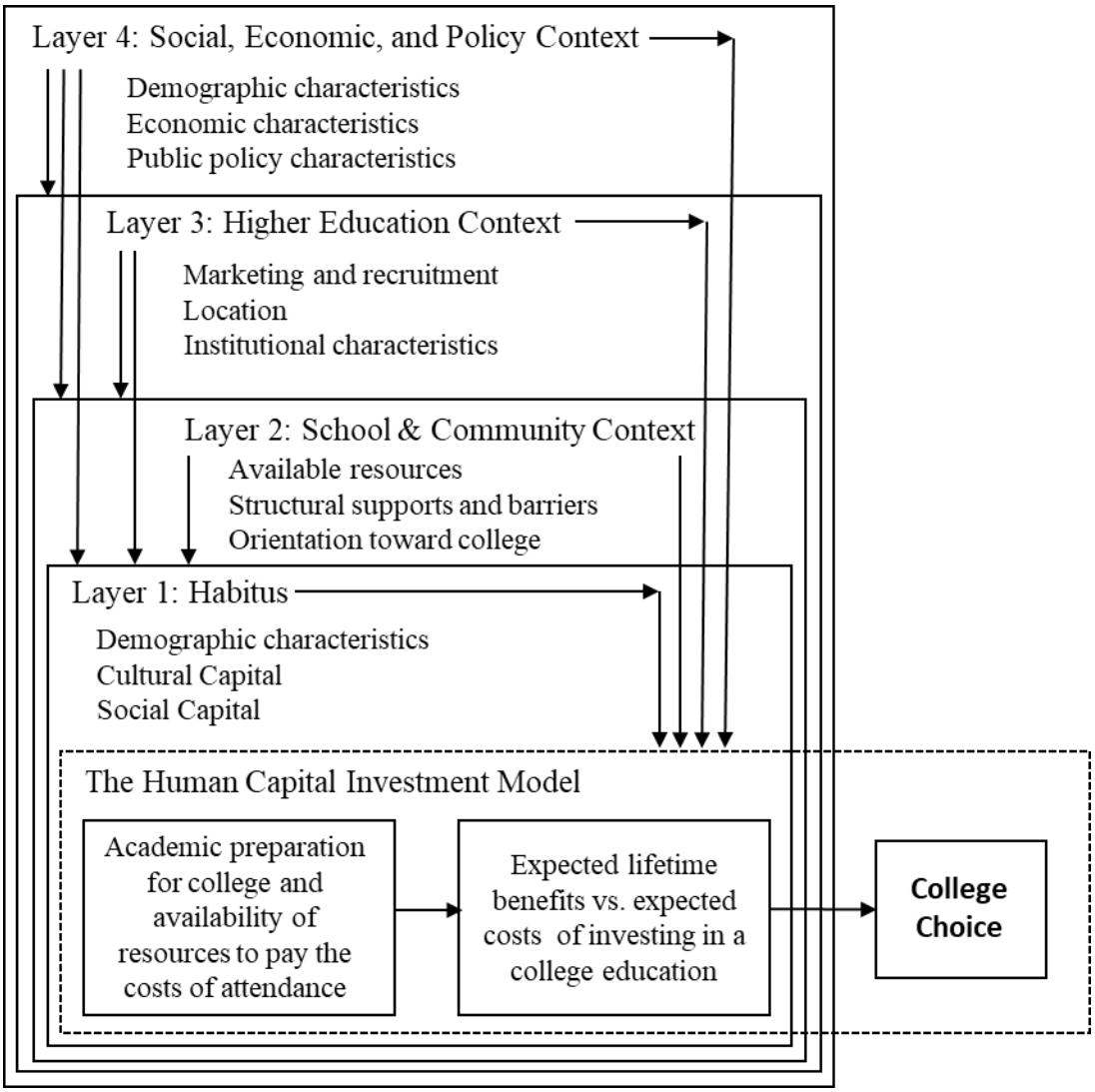
Perna's (2006) college choice conceptual model synthesizes economic principles from the human capital investment model and sociological concepts encompassing individual habitus, cultural and social capital, and the organizational context. This model acknowledges the potential for multiple routes to college enrollment, where decisions center upon a comprehensive evaluation of anticipated benefits against anticipated costs, encompassing both monetary and non-monetary qualities. These assessments of expected benefits and costs are nested within a multi-layered framework.

An individual's decisions regarding college choice are intricately shaped by four distinct contextual layers: the individual's habitus, the context of the family, school, and

community, the context of higher education, and the broader social, economic, and policy context (Perna, 2006). These layers can be seen in Figure 1.

Figure 1

Perna's (2006) Student College Choice Model



Note. Adapted from Studying college access and choice: A proposed conceptual model (117), by L. W. Perna, 2006, Springer.

Layer one encompasses key demographic traits of gender, race/ethnicity, and socioeconomic status. Layer two acknowledges the influence of social structure and resources on college choice. Layer three highlights the institution's role in shaping a student's college choice, including marketing and recruitment resources, location, proximity to students' homes, and available student resources. Layer four recognizes that student choice is impacted by the external policy and economic context seen in demographic shifts, unemployment rates, and economic policies.

Perna's (2006) college choice model demonstrates that institutions must navigate a complex web of factors as students make choices about college matriculation. Identifying these factors affecting student choice highlights the need for an in-depth examination to better understand the role of DE programs on matriculation. Factors such as course modality, high school location, and academic performance in DE programs have been shown to affect enrollment, persistence, and completion (Buckley et al., 2020; Field, 2021; Lee et al., 2022; Martinez, 2018; Moore & Williams, 2022). Additional research is needed to better understand the influences of matriculation on the host institution after DE participation (Kilgore & Taylor, 2016; Moore & Williams, 2022; Tipton, 2023). As the model's four contextual layers highlight factors affecting student matriculation, this study aims to provide a deeper understanding of student choice in the context of DE.

Perna's (2006) framework had a direct impact on the formulation of the research questions. Question two, investigating campus location and proximity to students in relation to matriculation, was framed by layer two of the model, recognizing that social structures and resources affect college attendance. This question sought to determine

whether the physical proximity of the high school to the DE host institution impacts students' choices to matriculate, exploring postsecondary outcomes in relation to accessibility and proximity.

Research question one drew upon both the school and community context and the postsecondary context in layers two and three. It examined course modality, which involved the delivery of courses in both the secondary school (layer two) and the postsecondary institution (layer three), and the influence on matriculation patterns. This study recognizes that course modality is not only a function of where courses are taught but also encompasses the broader perception that DE courses on a high school campus may be vastly different experiences than the authentic college courses on a postsecondary campus (Kasturiarachi, 2022; Witkowsky et al., 2020).

Drawing on the human capital underpinnings of the model, questions three and four, CCP course load and GPA, were guided by the expected benefits and costs of higher education (Perna, 2006), which circles back to layer one, questioning if an individual's habitus towards college enrollment influences their academic preparedness. Both GPA and course load may influence feelings and perceptions regarding the value of postsecondary education and of the institutions offering that education.

Layer four is a much broader layer, encompassing social, economic, and policy contexts (Perna, 2006). This layer indirectly influenced all research questions through secondary, postsecondary, and state policies affecting CCP participation. By acknowledging the interplay of various contextual layers in college choice, the model provides a foundation for investigating the intricacies of former DE participants' matriculation trends within Ohio's CCP program.

Delimitations

This study focused on former CCP participants who were enrolled and taking coursework at one of the three selected postsecondary institutions within the state of Ohio, which all possess dissimilar Carnegie Classifications (American Council on Education, 2023). Participating institutions were those that responded to an invitation to participate in this research in December 2023. The institutions included those from the private and public sectors, as well as two- and four-year institutions in order to have a representative of different types of higher education institutions within the state participating in the CCP program. Data was limited to three high school cohorts of former CCP participants who had graduated from high school. The data collection period was limited to three high school graduation year cohorts (2021, 2022, and 2023) in order to analyze the dependent variables following the COVID-19 pandemic.

Limitations

This study was limited in scope to former CCP participants who completed their CCP courses at one of the institutions included in this study. Ohio's marketplace model for CCP allows students to complete courses through multiple institutions (An & Taylor, 2019). This study did not account for other institutions where students may have taken courses and only included data from participating institutions. Furthermore, this study excluded students who were homeschooled, enrolled in an online high school, and those whose high school was unknown. This study was limited by the influence of other characteristics not controlled for, such as cultural influences and the age or grade when the student first enrolled in CCP.

Abundant postsecondary research focuses on student outcomes associated with student retention and college degree completion (Aljohani, 2016; Crosling, 2020; Oliveira, 2017; O'Keeffe, 2013; Perry et al., 2020; Sparkman et al., 2012). This study used a different perspective, focusing on matriculation into higher education after participation in a DE program. This study did not examine the effects of CCP participation on future college outcomes, such as college GPA (An & Taylor, 2019; Coleman & Latta, 2022; Field, 2021; Jagesic et al., 2022; Martinez, 2018), beyond the CCP courses, persistence (Buckley et al., 2020, 2022; Kasturiarachi, 2022), and graduation. (Buckley et al., 2020; Field, 2021; Lee et al., 2022; Martinez, 2018; Moore & Williams, 2022).

The COVID-19 pandemic has had enduring repercussions on both secondary and postsecondary education, as indicated by research (Daumiller et al., 2023; Horton, 2020). The students included in this study experienced high school during and after the pandemic. Amidst the shutdown, confusion arose regarding the responsible institution for ensuring that dually enrolled students and their instructors had sufficient resources for a swift transition to an online learning environment (Horton, 2020). Instructors operating from high schools lacked training in online learning platforms, and college faculty did not supervise students taking DE courses at their high schools.

The disruption caused by the pandemic resulted in a loss of approximately 35% of a school year, leading to students missing essential learning needed to progress to the next levels of education (Daumiller et al., 2023). Beyond the academic impact, the sociological and psychological effects of the pandemic have imposed significant costs on both students and instructors. Research on DE prior to the pandemic is lacking

information regarding the impacts of COVID-19 and the findings of this research will reflect the impacts of the pandemic.

Definition of Key Terms

College Choice: Students selecting a postsecondary institution to attend following high school graduation (Perna, 2006).

Course Load: The total number of credit hours a student completed as a CCP participant while still in high school prior to matriculation to a university (Coleman & Latta, 2022).

Course Modality: Courses offered for CCP participants can be traditional courses on the college campus, online courses, or can be offered at the high school and taught by a credentialed instructor (Kasturiarachi, 2022).

College Credit Plus (CCP): Ohio's DE program allows students in grades 7-12 to complete college courses through Ohio universities while simultaneously earning credit for high school and college, usually at no cost (Ohio Department of Higher Education [ODHE], 2022).

Dual Enrollment (DE): A program allowing high school students to complete college courses while earning credit for both high school and college (Rhine, 2022).

Host Institution: The postsecondary institution providing the CCP/DE courses (Moore & Williams, 2022).

Matriculation: Students enroll as undergraduates at a college or university following high school graduation (Mustafa, 2019).

Summary

This dissertation evaluated Ohio's DE program, CCP, and its impact on the matriculation patterns of former participants to the host institutions. DE serves as a

transformative educational practice, bridging the gap between secondary and postsecondary education (Coleman & Latta, 2022; Kasturiarachi, 2022). DE also serves as a means to address various challenges in higher education, including affordability (An, 2013; Dever, 2017; Field, 2021; Jagesic et al., 2022; Martinez, 2018; Moore & Williams, 2022; Witkowsky et al., 2020), completion rates (An & Taylor, 2019), student readiness (An & Taylor, 2019; Martinez, 2018), and enrollment challenges (Ison & Nguyen, 2021; Jagesic et al., 2022; Kasturiarachi, 2022; Martinez, 2018).

The problem statement emerged from existing literature, emphasizing the gap in understanding the practical and empirical impacts of DE programs on student matriculation to host institutions (Kilgore & Taylor, 2016; Kinnick, 2012; Moore & Williams, 2022). While DE is viewed as a recruitment strategy for colleges and universities, the empirical evidence supporting its use is lacking (An & Taylor, 2019; Kilgore & Taylor, 2016; Martinez, 2018), and concerns about its value persist (Martinez, 2018). This problem statement emphasizes the need for empirical research to justify the strategic use of DE programs for increasing undergraduate enrollment.

The purpose of this study was to investigate the relationship between CCP participation in Ohio and future matriculation to the postsecondary institution hosting the CCP program through which the students participate. The study addressed gaps in existing literature by providing insights into the effectiveness of CCP as a recruitment strategy (Martinez, 2018; Moore & Williams, 2022). It examined matriculation patterns based on CCP participant demographics, CCP course modalities, high school location, CCP course load, and college GPA while enrolled in CCP courses.

The significance is apparent in this study's potential to inform educational institutions, policymakers, and families about the utilization of CCP as a strategic enrollment tool. The study can inform postsecondary enrollment strategies, improve outreach efforts, promote equitable access, and enhance academic support for dually enrolled students. Furthermore, this study will enhance Perna's (2006) college choice model by providing a more nuanced understanding of college choice in the context of DE participation. This framework guides the research questions by considering four contextual layers rooted in economic and sociological principles, which influence student matriculation decisions. Chapter two of the dissertation examines existing research on dual enrollment and relationships to the research questions contained in this study.

CHAPTER II

REVIEW OF THE LITERATURE

The landscape of secondary and postsecondary education has witnessed a significant transformation, with an estimated one-third of high school students engaging in DE programs to earn college credits before their high school graduation (An & Taylor, 2019; National Center for Education Statistics, 2019). While the appeal of DE is evident with the potential of tuition-savings and shorter time-to-degree, the transition from DE participation to matriculation at the host institution remains a complex and multifaceted process (Moore & Williams, 2022). In a 2014 study by Khazem and Khazem (2014), the researchers found that three-quarters of DE participants enrolled in postsecondary education after high school but did not specify the proportion returning to the host institution. Additionally, Kinnick (2012) found that approximately one-third of DE participants returned to their host institution. With rapidly changing enrollment in DE programs and lacking empirical literature, updated research is warranted regarding dual enrollment and its impacts on future matriculation (Moore & Williams, 2022).

Another concern is the ever-growing challenge faced by college students in accruing sufficient credits for the completion of their undergraduate degrees, particularly pronounced among racial minorities and low-income students (Spencer & Maldonado, 2021). Students need to be better prepared for the rigors of a college education (An & Taylor, 2019; Arnold et al., 2017; Spencer & Maldonado, 2021). DE participation holds the potential to shape the aspirations and trajectories of participants within the postsecondary landscape (An & Taylor, 2019) by providing a more seamless transition between secondary and postsecondary education, thereby equipping students with the

necessary skills to navigate the demands of a collegiate curriculum (An & Taylor, 2019; Arnold et al., 2017; Coleman & Latta, 2022; Gagnon et al., 2021; Kasturiarachi, 2022; Spencer & Maldonado, 2021).

DE is emerging as a prominent strategy as institutions seek to develop new enrollment pipelines (Hemelt et al., 2019). According to the 2023 report by the Lumina Foundation, the State of Higher Education reported that college enrollment rates were falling prior to the Covid-19 pandemic but severely dropped in 2020 and 2021, intensifying existing enrollment challenges. Even in 2023, college enrollment levels remained well below pre-pandemic levels, forcing institutions to re-evaluate their recruitment strategies and other operational models (Lumina Foundation, 2023). In this study, researchers determined that is has also become more difficult to retain students, especially Black, Hispanic, and male students. This challenge highlights the need to increase the affordability of higher education and the academic preparedness of future students.

The surge in DE participation over the last decade underscores its significance as a tool for bolstering college completion rates (An & Taylor, 2019) and as a recruitment and enrollment tool (Ison & Nguyen, 2021; Jagesic et al., 2022, 2022; Kasturiarachi, 2022; Martinez, 2018). DE is also viewed by states as a method to increase postsecondary degree attainment as completion rates in the nation continue to drop (Field, 2021; Jagesic et al., 2022; Shapiro et al., 2015). Higher levels of education attainment are linked to better employment opportunities, income, and health (Levin et al., 2007). The existing body of research on college matriculation reveals disparities and inconsistencies in findings (An & Taylor, 2019), necessitating a comprehensive investigation into the

diverse factors influencing the matriculation decisions of DE participants. This dissertation aims to contribute to this critical discourse by delving into variables shaping the future academic pathways of DE students, thereby shedding light on strategies for optimizing their successful transition to postsecondary institutions.

Search Strategy Description

A variety of research databases and keywords were used in the search. Beginning with the Ashland University One Search and Google Scholar, keywords, *dual enrollment*, *matriculation*, and *College Credit Plus* were initially searched. Within Google Scholar, results covered a wide range of disciplines, but many of the education-based sources stemmed from the ERIC database (Booth et al., 2008). Therefore, One Search and ERIC were primarily used moving forward. Within those databases, more literature specifically focused on DE programs. Searches continued to examine literature for *dual enrollment*, *College Credit Plus*, *student outcomes*, and *matriculation*. Access concerns were a prominent topic, as well, within search results.

Article titles found in the initial search were sorted by topic in a spreadsheet. The spreadsheet allowed the researcher to see where much research had been and topics requiring more information. This helped to refine future searches. Initially, a large array of publications featuring student outcomes, such as persistence, time-to-degree, and effects on GPA, were found. Additionally, the largest amount of research obtained regarded access to DE programs. This led to the finding that more literature on enrollment management, matriculation, college choice, and financial aspects was needed.

Before conducting new searches, the researcher sorted through references available in existing resources to find references relevant to the study in terms of DE

participation and the effects on future matriculation. By searching the reference lists of these articles, 16 resources were highlighted, five of which had already been listed in the spreadsheet. The additional 11 resources focused on trends in DE, administrative codes and policies, college enrollment considerations, and performance gaps.

The researcher utilized library databases and references for additional literature published within the last five years. Literature was also considered with publication dates within 10 years for accomplished authors and to corroborate other literature. After struggling with an excessive number of resources, research specific to International Baccalaureate (IB), Advanced Placement (AP), and early college high schools were excluded. Primary resources were used over secondary summaries.

As much as possible, references were limited to 2018-2024. Literature older than this pertained to the history and evolution of DE programs, Perna's (2006) college choice model, and authors who had been noted as prominent researchers as their work was seen in a number of others' publications. Most of these searches occurred from May 25, 2023, through August 10, 2023, with additional searches in October and November 2023 to fill in holes within the review and to expand on the current state of DE programs and higher education.

Overview

There are many options for advanced coursework for high school students. AP, IB, and DE are all options for high school students, as well as college preparatory courses in high schools (Gagnon et al., 2021). DE offers many advantages over other advanced programs, such as a greater variety of coursework, course modality, and a more seamless transition from high school to college. DE on campus, unlike AP and IB, can help

students develop greater social capital and familiarity with the non-academic aspects of college when completed on a college campus (Gagnon et al., 2021).

The scope of this review includes matriculation patterns of DE participants, benefits of DE participation, and challenges for students and institutions. Factors analyzed include graduation rate, college matriculation, persistence, retention, benefits and challenges for participants and organizations, and access. The literature review excludes research specific to other advanced placement programs such as early college high schools, IB, and AP courses. All the resources originated in the United States and include perspectives from students, secondary schools, community colleges, and four-year postsecondary institutions. Through a close read of the resources, eight themes emerged, with supporting sub-themes including historical context, matriculation trends, DE trends, DE in Ohio, DE models, student outcomes, DE program implementation challenges, and concerns regarding equitable access.

Historical Context

The original concept of DE can be dated back to J. W Osborn in 1928, who called to eliminate the repetitiveness of the high school curriculum and introductory college courses (Osborn, as cited in Puyear et al., 2001). However, it was not until 1978 that the first institution, Jamestown Community College, launched the practice of enrolling high school students in college courses (Collins, as cited in Puyear et al., 2001). Since then, these endeavors have culminated in the practice of high school students earning college credit prior to their high school graduation (Coleman & Latta, 2022; Dever, 2017; Gagnon et al., 2021; Ison & Nguyen, 2021; Kasturiarachi, 2022). It is noteworthy that DE programs have evolved beyond their initial role of accelerating advanced students

(Coleman & Latta, 2022; Dever, 2017; Field, 2021; Hooper & Harrington, 2022; Rivera et al., 2019; Spencer & Maldonado, 2021) to encompass a broader mission of preparing and fostering a postsecondary education culture among students (Dever, 2017; Jagesic et al., 2022; Kasturiarachi, 2022; Rivera et al., 2019).

DE was originally envisioned as a means to provide intellectually stimulating coursework for high-achieving students and address the issue of academic dissatisfaction within high school curricula (Puyear et al., 2001). Accelerated programs like AP and DE have significantly evolved since their inception (An, 2013; Coleman & Latta, 2022; Field, 2021). The strategic utilization of DE programs by states and educational departments aims to amplify college access and success in higher education by increasing rigor in high school (Dever, 2017; Ison & Nguyen, 2021; Rivera et al., 2019; Zinth, 2014).

In a broader policy context, these programs have been advocated by policymakers as mechanisms to ease the escalating cost of higher education and widen access, particularly by encouraging first-generation and other disadvantaged students to pursue postsecondary education (Coleman & Latta, 2022; Field, 2021; Zinth, 2014). Enhancing college graduation rates holds the promise of augmenting tax revenue while concurrently curbing expenditures on social services (Dever, 2017; Field, 2021). A more able and educated workforce not only strengthens the economy but also reduces the need for tax-funded social services (Dever, 2017; Field, 2021).

As states and postsecondary institutions fervently pursue strategies to strengthen postsecondary attainment and fortify workforce development, DE programs are emerging as a promising approach (Zinth & Barnett, 2018). In addition to utilizing DE as a

recruitment technique, institutions also view it as a means to advance the mission of the institution and provide community service (Kilgore & Taylor, 2016). Specifically, in Ohio's robust DE system, the state is diligently striving to bolster its population's attainment of postsecondary credentials that align with workforce requirements (Faber, 2022; Hornbeck et al., 2023; ODE & ODHE, 2022).

Matriculation and Enrollment Trends

The matriculation and enrollment trends of former DE participants provide valuable insights into the efficacy of these programs as a catalyst for college enrollment immediately following high school graduation. A pronounced association between DE participation and postsecondary enrollment is evident, as students engaged in DE are significantly more inclined to enroll in college within the first year after high school completion (Arnold et al., 2017; Buckley et al., 2020).

Institutions persist in offering DE programs due to their potential to serve as a recruitment pipeline for incoming students (Alsup & Depenhart, 2023; Jagesic et al., 2022; Martinez, 2018; Moore & Williams, 2022). In a 2016 study, Kilgore and Taylor (2016) found that 59% of the institutions in their study used DE as an enrollment strategy. Furthermore, the allure of DE extends beyond its academic merits, as it is strategically employed to expose high school students to the college environment and subsequently retain them on campus upon graduation (Jagesic et al., 2022). Recent shifts in the labor market dynamics and concerns surrounding the value of a college education have propelled a heightened focus on middle-achieving students and underrepresented individuals who find themselves on the fringe of college attendance (Hemelt et al., 2019).

Furthermore, geographical and logistical considerations influence students' choices regarding matriculation. Factors such as available majors, transfer options, and the proximity of the institution to the student's home assume critical importance in shaping college decisions (Damrow, 2017; Moore & Williams, 2022). The potential for cost savings and expedited degree completion serves as powerful motivators for students to participate in DE programs (Rivera et al., 2019; Witkowsky et al., 2020).

The perspectives of different types of institutions on DE programming also vary. Two-year institutions often view DE as a potent enrollment strategy, whereas four-year institutions give it less significance (Martinez, 2018). This disparity in perception necessitates a more comprehensive evaluation of the impact of DE programs on differing institutional settings. Further research is imperative to refine program structures, define benefits, and interpret their impact on college choice and subsequent matriculation and persistence (Martinez, 2018; Moore & Williams, 2022).

Despite the positive attributes of DE programs, several research gaps persist. The structural components and modalities of these programs warrant further exploration to better understand their implications for student outcomes (Moore & Williams, 2022). Moreover, while DE initiatives are recognized as a response to the challenges posed by declining high school graduates on enrollment management (Kasturiarachi, 2022), the precise alignment of these programs with broader enrollment management goals requires more empirical substantiation (Martinez, 2018).

Dual Enrollment Trends

A significant presence of DE students is observed across higher education sectors. In fact, some community colleges experience enrollment proportions of nearly half

attributed to DE participation (Field, 2021). Utilizing estimates from the National Student Clearinghouse to cross-reference students aged 17 and below with available high school records, it is posited that DE participation has surpassed the two million mark (Barshay, 2023). Notably, in Ohio, the credit hours undertaken by CCP students have surged by over 240% between 2015 and 2021, cementing the state's status as a frontrunner in DE participation (Faber, 2022).

While DE program structures may vary, community colleges emerge as the dominant choice for DE enrollment (Hooper & Harrington, 2022); community colleges oversee approximately 70% of the total DE programs, with the remaining 30% being coordinated by four-year institutions (Barshay, 2023). DE also serves as a lifeline in the face of declining adult enrollments at community colleges, attributed in part to a robust labor market (Barshay, 2023). There is also a discernible trend toward increased offerings of DE programs by four-year institutions (An & Taylor, 2019).

In Ohio, statistics for the academic year 2021-2022 reveal a substantial matriculation rate for CCP participants, with 78% transitioning to a college or university succeeding high school graduation, and of these, 83% opting for attendance at four-year universities (ODE & ODHE, 2022). These figures underscore the considerable impact of DE participation on facilitating postsecondary educational pathways.

Dual Enrollment in Ohio

In 1989, the Postsecondary Enrollment Option (PSEO) was introduced, which later evolved into the CCP program in 2015 (Dever, 2017). Originally, PSEO was exclusively for high school students in grades 11 and 12, and later underwent expansion, first encompassing grades 9-12 in 1997 and then extending its reach to students in grades

7-12 in 2015 under its new name of CCP. The drive behind these modifications stemmed from a concerted effort by state officials, including the Chancellor for the Ohio Department of Higher Education and the Ohio Board of Regents, to fortify high school curricula and equip students with a more robust foundation for college success (Dever, 2017). An overarching aspiration within Ohio's educational landscape is to facilitate the completion of a bachelor's degree in a condensed period of three years. Awarding college credit during high school years may be an efficient way to reach this goal (Dever, 2017).

CCP is a mandatory offering across all public high schools and universities in the state (Kasturiarachi, 2022). CCP in Ohio exists as a dynamic marketplace where high schools forge partnerships with a multitude of postsecondary institutions, thereby fostering a culture of competition (An & Taylor, 2019). While the proliferation of such partnerships can potentially introduce complexities for high schools, students, and parents, it simultaneously furnishes a wealth of options for students to choose from when determining their preferred educational institution (Kasturiarachi, 2022).

Dual Enrollment Models

When considering the instructional models within the realm of DE, it becomes evident that different approaches offer varying benefits and challenges. Options exist allowing students to complete their DE courses on the college campus, at their high school, online, or a combination of all formats (Alsup & Depenhart, 2023; Ison & Nguyen, 2021; Kasturiarachi, 2022).

On-Campus Model

In the traditional model of DE, students physically commute to the college campus to complete their courses (Alsup & Depenhart, 2023; Ison & Nguyen, 2021;

Kasturiarachi, 2022; Puyear et al., 2001). This method requires deviations from the typical high school schedule, potentially leading to missed class periods and desired high school activities. However, students engaged in the traditional DE model often enjoy comparable access to services and activities as their college counterparts, fostering an immersive experience (Jagesic et al., 2022; Kasturiarachi, 2022). Secondary schools perceive that high school students may prefer this model because they meet less often than traditional high school courses (Hornbeck et al., 2023).

High School Model

In contrast, the concurrent model allows students to complete DE courses at their high school under the guidance of high school instructors (Alsup & Depenhart, 2023; Ison & Nguyen, 2021; Jagesic et al., 2022; Kasturiarachi, 2022; Puyear et al., 2001). Qualified high school teachers are university-approved adjunct faculty members (Kasturiarachi, 2022). This approach alleviates barriers such as transportation, time constraints, and food insecurity, thus rendering the curriculum more accessible to disadvantaged students (Kasturiarachi, 2022). These students remain at their high school, allowing them to partake in all high school courses and activities. In Ohio, the concurrent model is the prevalent approach to DE, and this model is encouraged to increase student participation (Faber, 2022). Despite the advantages for students, the academic outcomes in the concurrent model do not consistently surpass those of non-DE participants (Alsup & Depenhart, 2023).

Online Model

Online DE courses provide a distinct modality where students complete their college coursework entirely online (Alsup & Depenhart, 2023). While this approach

offers flexibility, it is associated with diminished interaction with both instructors and peers, potentially impacting students' sense of belonging (Alsup & Depenhart, 2023). Furthermore, the absence of a physical campus experience hinders DE students from fully engaging in the college atmosphere (Moore & Williams, 2022). Nevertheless, online DE courses serve as a valuable option, particularly for rural and remote areas and high schools with limited course offerings (An & Taylor, 2019).

Impact of Different Modalities

The impact of various modes of instruction on college outcomes, encompassing factors such as persistence and completion rates, varies across different approaches (Alsup & Depenhart, 2023; Jagesic et al., 2022). For example, students who complete CCP courses on the college campus are more likely to matriculate to that host institution after high school graduation compared to their peers completing CCP courses at their high school or online (Alsup & Depenhart, 2023; Tipton, 2023). This is likely due to increased interactions with college faculty and students, and familiarity with the college campus. On-campus experiences and social interactions better prepare DE students for traditional college programs by helping them gain confidence and life skills necessary for matriculation and persistence through college (Alsup & Depenhart, 2023; Columbia University, 2012).

Furthermore, DE courses embracing an authentic college experience yield tangible benefits, particularly concerning their future postsecondary success (Kasturiarachi, 2022; Vargas et al., 2017). A broader spectrum of courses becomes available when completing CCP on the college campus, surpassing what credentialed high school instructors can provide (Ison & Nguyen, 2021). This expanded access to the

curriculum translates into increased opportunities for students to fulfill the requisites for their desired degree. DE courses are more authentic when held on the university campus and taught by university faculty, with a mixture of high school and college students (An & Taylor, 2019). Extensive access and time on campus provide access to campus resources and events, offering students a heightened engagement with the full scope of university life (Ison & Nguyen, 2021).

Students completing DE courses on the college campus have increased feelings of autonomy and often have higher educational aspirations than students who complete the courses at their high school (An & Taylor, 2019). Former DE participants later have greater persistence rates as college students than students who never participated in DE (Alsup & Depenhart, 2023) and also exhibit heightened rates of attaining a bachelor's degree (Jagesic et al., 2022). A challenge of DE courses on campus is that high school students may feel isolated or have difficulty fitting in with traditional students (Ison & Nguyen, 2021). Despite this challenge, some research indicates that on campus DE participation on campus yields the greatest benefits for both students and the postsecondary institution (An & Taylor, 2019).

It is pertinent to note that the majority of DE courses are typically conducted within high school premises, instructed by high school teachers (Jagesic et al., 2022). Students completing these courses at their high school often have limited access to university tutoring services, whereas students completing their courses on campus have full access to all student services (Kasturiarachi, 2022). However, DE participants in enrolled in high school courses are able to maintain a high school schedule and are more easily able to participate in high school resources and activities. Taking DE courses at a

high school while living at home is fundamentally different from taking a full course load on a college campus while managing new expectations and social pressures (Kasturiarachi, 2022; Witkowsky et al., 2020). Students completing DE courses at their high schools tend to matriculate to postsecondary institutions at a lower rate than students completing DE courses on the college campus (D'Amico et al., 2013). In fact, Columbia University (2012) found that there was no discernible difference between DE students competing in courses at their high schools versus non-DE participants. Additional research is needed to examine the effects of course modality on student and institutional outcomes (Alsup & Depenhart, 2023; An & Taylor, 2019; Arnold et al., 2017; Tipton, 2023).

Student Outcomes

DE programs offer a range of benefits that contribute to building college awareness, readiness, and affordability among participants. DE initiatives also foster college awareness in students, with some variation depending on whether courses are completed on high school campuses or college campuses (Alsup & Depenhart, 2023; Martinez, 2018). Successfully completing DE courses instills a sense of self-efficacy and diminished intimidation, reinforcing the belief that these students are indeed suited for college (An & Taylor, 2019; Field, 2021; Hooper & Harrington, 2022; Jagesic et al., 2022; Vargas et al., 2017). By engaging students in campus culture, DE exposure on college campuses further enhances college readiness (An & Taylor, 2019; Martinez, 2018). DE participation, especially for courses on the college campus, is associated with increased academic motivation and performance among college students, amplifying their

momentum and engagement in degree-seeking programs (An & Taylor, 2019; Ison & Nguyen, 2021; Moore & Williams, 2022).

High School Achievement

DE initiatives exert a positive influence on high school motivation, academic achievement, and graduation rates (Hooper & Harrington, 2022; Jagesic et al., 2022; Kasturiarachi, 2022). Completing college-level courses during high school has a transformative effect on time-to-degree completion, overall completion rates, and first-year college retention rates (Dever, 2017). These benefits are particularly pronounced among low-income and first-generation college students, who gain substantial academic momentum through DE participation, contributing to the potential to narrow the college completion gap across diverse populations (An, 2013; Lee et al., 2022). Furthermore, research has shown that DE students perform as well as, and sometimes better than, traditional undergraduate students (Puyear et al., 2001).

Academic Preparedness

Engaging in college-level coursework during high school is associated with enhanced academic preparedness, as evidenced by state standardized test scores (Jagesic et al., 2022; Martinez, 2018). DE participation correlates with a reduced need for remedial courses among college students, indicating a higher level of initial college readiness (An, 2013; Jagesic et al., 2022). The prevalent courses in DE often include English 101 and College Algebra, reflecting students' preference for fundamental subjects (Barshay, 2023). Participation in DE, particularly completion of advanced algebra, increases enrollment in higher-level math courses and mitigates the necessity for remedial math instruction (Hemelt et al., 2019). Furthermore, the completion of college

algebra in high school through a DE program positively influences enrollment in four-year institutions after high school graduation (Hemelt et al., 2019).

DE participants consistently exhibit higher college GPAs compared to non-participants, demonstrating the positive academic outcomes of DE engagement (An & Taylor, 2019; Coleman & Latta, 2022; Field, 2021; Jagesic et al., 2022; Martinez, 2018). However, a contrasting study suggests that non-participant high school GPAs increase at a higher rate than DE participants; this could potentially be attributed to high-achieving DE participants having less room for GPA improvement (Rivera et al., 2019).

Attendance, Persistence, and Completion

DE participants exhibit enhanced rates of college attendance and graduation (Buckley et al., 2020; Field, 2021; Lee et al., 2022; Martinez, 2018; Moore & Williams, 2022). Several studies have found the probability of enrolling in college after high school graduation is six to eight times greater for DE participants, compared to non-participants (An & Taylor, 2019). In Colorado, for example, 77% of DE participants enrolled in college within a year of high school graduation, compared to 52% of non-participants (Buckley et al., 2020). Furthermore, this study found a greater effect size for students slightly below average in measures of achievement. In Ohio, college enrollment was 46% higher for CCP participants compared to the state average (Faber, 2022). DE participation has been shown to create and comfortable transition to college and accelerate degree attainment (Arnold et al., 2017; Puyear et al., 2001).

Furthermore, former CCP students exhibit higher first-year retention rates compared to their non-participant counterparts, highlighting the positive impact of DE engagement on initial college success (Buckley et al., 2020; Kasturiarachi, 2022).

Participating in DE courses on a college campus contributes to higher college persistence rates, as these experiences provide students with the necessary confidence, social interactions, and life skills for successful navigation through traditional college programs (Alsup & Depenhart, 2023; Arnold et al., 2017). However, more research is needed to fully understand this phenomenon, but early credit accumulation is suggested as a catalyst (Lee et al., 2022). While few studies have specifically addressed college persistence, existing research indicates that DE participation positively influences first-year retention at both two-year and four-year institutions (An & Taylor, 2019). Furthermore, the Ohio Department of Higher Education found that former CCP participants demonstrate first-year retention rates ranging from 94 to 95%, compared to non-participants at 57% (Faber, 2022). This evidence suggests that DE programs, particularly on-campus courses, contribute to reducing college dropout rates (Alsup & Depenhart, 2023; Faber, 2022).

The flexibility of DE empowers students to explore potential career paths while still in high school (Coleman & Latta, 2022; Hooper & Harrington, 2022; Moore & Williams, 2022). Importantly, credits earned through CCP courses taken during high school can often be transferred to public universities, both within Ohio and in other states (Kasturiarachi, 2022). These factors provide the potential for shortened time to degree completion, with significance to on-time degree attainment (Jagesic et al., 2022; Moore & Williams, 2022; Witkowsky et al., 2020). According to Buckley et al. (2020, 2022), former DE participants demonstrate a medium-to-large effect size for on-time degree completion, reflecting their heightened likelihood of graduating within the expected period.

DE participants are more inclined to attend four-year institutions compared to community colleges (Ison & Nguyen, 2021). In fact, a significant portion of DE students enrolling with a host community college proceed to complete transfer programs, leading to enrollment in four-year institutions (Moore & Williams, 2022). These areas of enrollment, future college persistence, and degree completion remain relatively understudied within DE research, indicating a need for further exploration in these realms (An & Taylor, 2019).

College Undermatch

It is important to note that students who remain at the host community college for their studies beyond high school are less likely to complete a bachelor's degree compared to those who transition to a four-year institution shortly after graduation (Jagesic et al., 2022). Dual enrolled students are more likely to experience college undermatch than non-participants (Jagesic et al., 2022). When former DE participants who re-enroll at the host community college are able to gain admission to more selective institutions, an undermatch occurs (Jagesic et al., 2022). Students who undermatch are significantly less likely to graduate from college (Jagesic et al., 2022).

Transfer Credit and Course Load

A streamlined path to degree completion, particularly in STEM fields, is not always guaranteed for DE participants due to potential unfamiliarity with transfer policies and college curricula, which can hinder their progress (Dever, 2017; Witkowsky et al., 2020). Private institutions are less likely to honor previously earned credit through DE than public institutions; however, 86% of institutions studied did accept DE credit with few restrictions (Kilgore & Taylor, 2016). A potential issue may be students accruing

additional elective credits that do not align with their degree requirements, resulting in complications (Witkowsky et al., 2020). Furthermore, the completion of lower-level and general education courses during high school may lead to demanding college schedules with limited options for lighter course loads (Witkowsky et al., 2020).

Financing College

DE programs are increasingly becoming more prevalent as states consider the boost in economic activity from a more educated population and households save money on postsecondary attendance (Hornbeck et al., 2023). DE participation offers tangible financial advantages, potentially reducing the costs associated with obtaining a postsecondary credential (An, 2013; Dever, 2017; Field, 2021; Jagesic et al., 2022; Martinez, 2018; Moore & Williams, 2022; Witkowsky et al., 2020). Specifically, students in Ohio save an average of $4,400 in college tuition, fees, and books through DE programs (Faber, 2022).

According to Field (2021), DE participation does not, however, appear to substantially reduce student loan borrowing for the majority of participants. Student loan debt represents the second largest form of household debt and poses a plethora of challenges related to degree completion for students acquiring heavy debt (Hu & Ortagus, 2023). Studies have shown that degree completers, compared to non-completers, take on similar amounts of student loan debt; the national study by Hu and Ortegus (2023) found that completing DE courses in high school is not associated with borrowing less money in the form of student loans, regardless of socioeconomic status, race, or gender.

Student Age and Maturity

An aspect worth considering in future research is the age of the students engaging in DE programs (Alsup & Depenhart, 2023). Engaging in substantial college coursework during high school can potentially enable students to skip multiple years of college, positioning them as some of the youngest individuals in higher-level courses and entering the job market younger than their peers (Witkowsky et al., 2020). However, concerns arise regarding the competitiveness of younger graduates in comparison to their older peers within the job market.

It is noted that younger students may encounter greater difficulties in managing challenges and setbacks compared to their older counterparts in college (Witkowsky et al., 2020). Although some DE participants might be perceived as more mature due to their exposure to on-campus experiences at an earlier age and interactions with older peers and faculty, this can potentially lead to overconfidence and a false sense of security (Witkowsky et al., 2020). Faculty have expressed apprehensions that even academically well-prepared high school students may lack the social-emotional maturity that is often observed in older college students, further highlighting the complexities associated with age and readiness in a college and work environment (Ison & Nguyen, 2021). It is crucial to acknowledge that DE courses yield college credit on a college transcript. Subpar grades and immaturity may have repercussions on cumulative college GPAs, access to scholarships, high school academic standing, and possibly even post-college outcomes.

DE Program Implementation Challenges

Although DE programs have gained significant popularity in recent years, the implementation of these programs presents a range of challenges for both secondary and

postsecondary institutions. Financial implications have surfaced for both institutions, as well as concerns regarding student age and campus culture, legal liabilities, and the applications of federal mandates, such as Family Educational Rights and Privacy Act (Dever, 2017; Ison & Nguyen, 2021). Furthermore, challenges persist between institutions in communication, student readiness, and college-level expectations (Alsup & Depenhart, 2023; Barshay, 2023; Dever, 2017; Field, 2021; Vargas et al., 2017).

Financial Implications for Institutions

The allure of state funding associated with dually enrolled students is a notable factor motivating institutions to implement DE programs (Field, 2021; Rivera et al., 2019). However, the transition, occurring in 2015, from postsecondary enrollment option to CCP in Ohio led to significant revisions, allowing high schools to retain their high-achieving students within their own campuses, eliminating the necessity for them to travel to college campuses (Kasturiarachi, 2022). As described by the Ohio Department of Higher Education (2022), this transformation also mandated the inclusion of tuition and textbook expenses for secondary institutions and local school districts for CCP participants. Consequently, school districts express apprehensions regarding the financial strain imposed on them due to the obligation to cover tuition and textbook expenses (Dever, 2017).

It is important to note that universities in Ohio only receive a percentage of their full tuition rate for CCP participants, and this varies depending on course modality (Dever, 2017; ODHE, 2022). State funding that was allocated to high schools for those students is redirected to postsecondary institutions to cover tuition of CCP participation, thereby reducing the financial allocation to the local school district (Dever, 2017; ODHE,

2022). According to the 2022 Performance Audit of CCP, colleges receive $41.64-$166.55 per dual enrolled credit hour, based on course modality, with on-campus courses receiving the highest payments and courses at the high school receiving the least (Faber, 2022).

Ohio school principals perceive that the primary reason for students to enroll in CCP is because of the economic value of getting college credit at no cost (Hornbeck et al., 2023); however, a 2023 study determined that DE participation has not reduced student loan debt (Hu & Ortegus, 2023). Furthermore, the positive impact of completing a modest number of DE courses, typically ranging from one to three, on future college enrollment and persistence rates has been substantiated by research (An & Taylor, 2019; Lee et al., 2022). This observation suggests that states could achieve substantial benefits and cost savings by strategically allocating funding for a limited number of DE courses, as opposed to financing years of participation per student. This could also alleviate some of the financial burdens on institutions receiving reduced tuition for these students and for local districts that have had their funding redirected to postsecondary institutions. The implementation of DE programs presents a complex financial dynamic for both high schools and postsecondary institutions (Rivera et al., 2019).

It remains uncertain whether the costs incurred by colleges for DE programming are balanced out by the implementation of effective enrollment management tactics. (Martinez, 2018). Those institutions lacking DE offerings find that the cost of establishing such programs is cost-prohibitive (Martinez, 2018) or institutional culture is not conducive to offering DE (Kilgore & Taylor, 2016). Those institutions assert that the time required to establish relationships with secondary schools is a significant challenge.

However, once fixed costs are met through state funds based on a baseline of dually enrolled students, additional enrollees can serve as a means of augmenting revenue for the institution, thereby incentivizing the development of expansive DE programs (Barshay, 2023).

An additional concern revolves around the potential consequences of subsidizing higher education for DE participants, which could adversely impact the future cost of college tuition for non-participants as institutions strive to mitigate the financial ramifications of DE participation (Rivera et al., 2019). As many universities rely on large, introductory-level courses to subsidize smaller, upper-level courses, the completion of core undergraduate courses during DE may contribute to the contraction of these course offerings at four-year institutions, thereby amplifying their financial challenges (Field, 2021).

Administrative and Operational Challenges

Higher Education Institutions

The notable increase in DE students participating on college campuses has the potential to reshape the student body composition and impact the prevailing campus culture (Ison & Nguyen, 2021). The surge of minors present on campus raises concerns about potential liabilities and prompts inquiries into legal protections for both minor CCP students and faculty members (Dever, 2017; Ison & Nguyen, 2021). Amid this context, faculty and advisors express apprehensions regarding the application of FERPA regulations when dealing with minors enrolled as CCP students (Dever, 2017).

Effective monitoring of high school instructors engaged in teaching DE courses across diverse school buildings and districts also becomes essential for universities (Ison

& Nguyen, 2021). While DE courses conducted on campus demand less administrative involvement and external instructor mentoring, close proximity between postsecondary institutions and neighboring high schools facilitates information sharing, advising, and the provision of DE course options (An & Taylor, 2019).

Secondary Institutions

High school teachers have voiced concern over the workload and compensation associated with teaching CCP courses alongside their traditional high school responsibilities (Dever, 2017). Suggestions have been made for university academic advisors to hold advising sessions for CCP students at high schools, aiming to facilitate better support and guidance (Dever, 2017). Enhanced communication between high school counselors and postsecondary academic advisors is deemed essential, encompassing aspects like requirements, prerequisites, scheduling, timelines, and summer availability (Dever, 2017; Witkowsky et al., 2020). Ensuring accessibility and information dissemination for students necessitates strong support from district leaders, emphasizing the importance of shared objectives, policies, and procedures between school districts and postsecondary institutions (An & Taylor, 2019).

Some high school principals perceive higher education institutions as having more autonomy in the governance of CCP programs than school districts (Hornbeck et al., 2023). In Hornbeck et al.'s (2023) study, principals were frustrated that they could not influence teaching quality when professors provided the instruction, yet public-school funding was being diverted to the college to fund the tuition and textbooks for CCP participants. In other literature, high school teachers expressed that they appreciated the opportunities to interact with college faculty to compare content and levels of rigor

(Charlier & Duggan, 2009). The abundance of CCP courses often replaces AP, IB, and traditional high school courses and can be frustrating to secondary teachers and administrators because they have little control over the content and rigor (Hornbeck et al., 2023). Some school district superintendents were even concerned that DE could impact high school staffing and courses due to the costs associated with funding CCP (Clayton, 2021).

Quality and Rigor

DE programs have gained substantial recognition for their potential to ease the transition between high school and college. However, questions persist regarding the readiness and preparation of high school students for college-level expectations (Vargas et al., 2017). Concerns persist over the rigor and quality of DE courses, particularly those conducted at high schools, which are often viewed as less rigorous than their college campus counterparts (Alsup & Depenhart, 2023; Barshay, 2023; Dever, 2017; Field, 2021; Martinez, 2018; Witkowsky et al., 2020). For some students, DE courses taken at high schools seem to be an extension of high school rather than a true college experience, leaving students feeling less satisfied and unprepared for college demands (Dever, 2017; Ison & Nguyen, 2021). However, some DE participants have also expressed that their DE courses completed at the high school seem more challenging as the teachers may overcompensate to maintain college-level rigor (Ison & Nguyen, 2021).

Disagreements have arisen regarding the capabilities of high school teachers to maintain the same level of rigor as college instructors (Alsup & Depenhart, 2023; Field, 2021). In Ohio, high school teachers are required to meet minimum standards established by the Higher Learning Commission in order to teach DE courses (Kasturiarachi, 2022).

The CCP Credentialing Grant Initiative by Ohio Department of Higher Education addresses this requirement by offering pathways for high school teachers to meet accreditation standards for teaching CCP courses (Kasturiarachi, 2022).

Some high school principals have raised concerns about the rigor and pedagogical methods used in DE courses taught by college faculty (Hornbeck et al., 2023). Faculty teaching DE courses on campus may require professional development to effectively instruct high school students (Alsup & Depenhart, 2023; Dever, 2017; Moore & Williams, 2022). To maintain rigor and adapt to evolving student demographics, faculty and administrators should grasp the priorities underpinning state DE policies, enabling the establishment of coherent standards and protocols (Ison & Nguyen, 2021). Ultimately, while DE offers opportunities, challenges related to rigor, instructional quality, and faculty qualifications warrant further examination and improvement (Field, 2021; Kasturiarachi, 2022).

High schools and college campuses have distinct settings, each one with its own etiquette and decorum (Arnold et al., 2017). In an Idaho study, it was found that the college course passage rate was higher for students who completed courses while dually enrolled compared to students who were traditionally enrolled (Arnold et al., 2017; Holten & Pierson, 2016). However, another study indicated that high school students completing college courses on campus performed significantly lower than those completing the courses at their high school (Arnold et al., 2017). These challenges associated with DE course quality, delivery, and the learning environment necessitate continuous examination and improvement to ensure the effectiveness of DE programs.

Access

DE access is a well-researched topic, and some believe it improves access to college courses (Kilgore & Taylor, 2016). However, many concerns exist regarding the lack of target populations participating in the program. Access and equity in DE programs have undergone shifts in recent times, with efforts aimed at broadening participation and promoting success among underrepresented populations (Holten & Pierson, 2016; Rivera et al., 2019). Despite these initiatives, high-achieving White students still dominate DE participation (Rivera et al., 2019), often driven by strong grades and affluent backgrounds (Rivera et al., 2019; Spencer & Maldonado, 2021). The CCP program strives to democratize college access by reducing costs and expanding course availability for high school students (Dever, 2017; Kasturiarachi, 2022). In general, DE aims to create attainable pathways for racial-ethnic minorities and socio-economically disadvantaged students to be successful in college (Kasturiarachi, 2022). However, gaps persist, particularly for Black and Latinx students, for whom equitable access to DE programs remains essential for postsecondary readiness and graduation rates (Hooper & Harrington, 2022).

These disparities are pronounced, with Black and Hispanic students participating less than their White and Asian peers (Dever, 2017; Field, 2021; Hooper & Harrington, 2022; Reindl, 2006). While racial and socioeconomic factors play a role, lower socioeconomic status and prior achievement levels contribute to the observed disparities (Gagnon et al., 2021; Rivera et al., 2019). High school performance and socioeconomic status are critical determinants of access, often relegating underrepresented students to lower classes and hindering their participation (Rivera et al., 2019). Ideally, DE programs

should reach middle-achieving students, aiding them in discovering their interests and future plans (Zinth & Barnett, 2018).

Gender differences also emerge as female students participate at higher rates than males (Holten & Pierson, 2016; Rivera et al., 2019; Spencer & Maldonado, 2021), though the reasons behind this discrepancy warrant further exploration. The impact of DE participation is positive across demographics, although it appears particularly advantageous for low-performing and low-SES students (An & Taylor, 2019; Buckley et al., 2020). Particularly, positive associations with college outcomes are stronger for racial-ethnic minorities, first-generation students, and those from lower-income backgrounds (Lee et al., 2022).

Additionally, the accessibility and effectiveness of DE programs are influenced by school characteristics. Schools with predominantly students of color are less likely to offer DE courses compared to those serving mostly White students (Spencer & Maldonado, 2021). High-poverty schools, often enrolling a significant number of minority students, encounter difficulties in recruiting adequately qualified teachers for DE courses at high schools (Field, 2021; Gagnon et al., 2021). These students also tend to have less reliable means of transportation to a college campus. The composition of school counseling staff can also impact access, with unintentional racial biases potentially influencing recommendations for DE programs (Field, 2021). Socioeconomic factors play a role as well, as schools with Title I status and higher numbers of students receiving free and reduced lunches generally offer more DE programs, except in urban settings with a significant proportion of racial minorities (Gagnon et al., 2021; Spencer & Maldonado, 2021).

To foster greater equity and inclusivity in DE programs, it is imperative to actively monitor DE participation among underrepresented student groups at district, state, and national levels, as advocated by Holten and Pierson (2016). By consistently assessing participation rates and identifying potential disparities, educational institutions, and policymakers can develop a deeper understanding of the challenges faced by these groups. Furthermore, this insight should be utilized to identify and dismantle barriers to DE participation among underrepresented populations (Holten & Pierson, 2016). Strategies that promote inclusivity and increase access to DE programs should be formulated and implemented, aiming to create a more level educational playing field. By taking these steps, educational institutions can make significant progress towards ensuring that DE programs benefit all students, regardless of their background or demographic factors.

Perna's (2006) College Choice Model

A theoretical framework serves to support relationships between personal interests, topical research, and the conceptual framework (Ravitch & Riggan, 2012). Discretion should be exercised when selecting the appropriate frameworks for a study. Although many frameworks may fit an intended study, careful analysis should confirm that the selected framework is a valid choice for the study (Ravitch & Riggan, 2012). The theoretical framework exists to support why and how research is obtained; what is learned through empirical research may challenge some theories, support others, and seem irrelevant to an array of others (Ravitch & Riggan, 2012).

The college choice model has evolved as a comprehensive framework that considers the complexities of students' college enrollment choices. The roots of this

model begin in human capital investment theory, which emphasizes the evaluation of economic benefits and costs when making choices related to college attendance, considering both economic and non-economic factors (Perna, 2006). The model emphasizes the pivotal role of academic preparedness and financial resources as significant influencers in students' college choice decisions (Perna, 2006). Perna's model is set apart by its incorporation of various layers of context that shape students' perceptions of these benefits and costs.

While many models primarily focus on economic aspects, Perna's framework goes beyond, incorporating multiple layers of context, including sociological factors, which contribute to a more holistic understanding of real-world college enrollment decisions (Perna, 2006). Moreover, its explicit inclusion of diverse stakeholder perspectives sets it apart. The framework recognizes the roles and interdependencies of parents, K-12 institutions, higher education institutions, and policymakers, providing a more inclusive view of the influences impacting students' choices (Perna, 2006). Table 1 provides an overview of each component of the college choice model.

Table 1

College Choice Model Overview

Component	Description
Layer 1: Habitus	Originally used by Bourdieu (Bourdieu & Wacquant, 1992), referring to an individual's internalized system of thoughts, beliefs, and perceptions acquired through life experiences, environments, expectations, and aspirations. Family, socioeconomic status, and cultural background greatly shape a student's habitus (Perna, 2006) Self-perception, identity, educational aspirations Values and expectations of peers and family influences Personal beliefs, attitudes, and self-concept
Layer 2: School and Community Context	Acknowledges that schools and communities can either facilitate or hinder students' access to higher education (Perna, 2006) Schools vary in the resources they provide School culture and norms Peer beliefs about education's importance Community expectations, resources, and supporting entities (scholarships and mentoring programs) Geographical access to institutions
Layer 3: Higher Education Context	Diverse characteristics and features of higher education institutions interact with the other layers, such as the public policy layer and the individual context layer, to influence students' college enrollment decisions (Perna, 2006). Emphasizes the "fit" between students and institutions. Size, location, academic offerings, selectivity, and reputation Tuition, fees, and financial aid Available academic programs Location and proximity to home Selectivity, reputation, and accreditation

Table 1 Continued

Layer 4: Social, Economic, and Policy Context	Recognizes that the policy environment, at both state and federal levels, can shape various aspects of the college access and choice process, and it considers a wide array of policies that influence students' decisions. (Perna & Titus, 2004). The level of state appropriations for higher education institutions significantly influenced the cost of attending college, which, in turn, affected students' choices. Financial aid programs: merit-based versus need-based K-12 education policies affect academic preparation and education quality Federal policies regarding Pell grants and accreditation
Human Capital Investment Model	Economic theory assumes that individuals make decisions about college enrollment by rationally weighing the costs and benefits (Perna, 2000, 2006) Students and their families assess the expected benefits of obtaining a college degree (monetary and non-monetary) and compare them to the expected costs (tuition, fees, living expenses, and forgone earnings) Education is an investment

Comparative Analysis

Research on college matriculation and enrollment has drawn from various theoretical frameworks and models to understand the factors influencing students' decisions to pursue higher education. Other frameworks used for matriculation research include the Theory of Planned Behavior (TPB) (Ajzen, 2005), Social Cognitive Career Theory (Lent et al., 1994), Social Capital Theory (Bourdieu, 1986), and the student college choice model (Hossler & Gallagher, 1987).

These theories have many similarities, but also different focus or less emphasis on critical components of college choice. For example, the TPB does consider attitude,

subjective norms, and perceived behavioral control at any moment in time; it does not consider temporal changes in those factors, such as growing, maturing, and other life changes (Foltz et al., 2015). The theory also does not consider if the individual has all the resources needed to be successful (LaMorte, 2022). Furthermore, the model does account for normative influences, such as social pressures, and it does not consider economic and environmental factors that may further influence a person's intentions (LaMorte, 2022). Social Cognitive Career Theory is more geared toward career decisions, and while it considers self-efficacy and outcome expectations, it may not comprehensively address the specific nuances of college choice, including financial aspects (Lent et al., 1994).

Drawbacks of Hossler and Gallagher's (1987) model include its potential oversimplification of the complex decision-making process involved in college choice. It mainly focuses on a linear sequence of stages, which may not capture the non-linear and dynamic nature of students' decision-making (Southerland, 2006). The model might not fully account for the broader context in which students make their choices. It emphasizes individual decision stages but may not sufficiently incorporate external factors such as social and cultural influences or structural barriers.

Framework Justification

Through its development, the college choice model has become a robust and multifaceted framework, offering a comprehensive view of college enrollment decisions. It encompasses sociological and economic influences and acknowledges diverse stakeholder perspectives, making it an ideal choice for analyzing the complexities of matriculation patterns in former DE participants or exploring various aspects of college access and choice (Perna, 2006). This model has been applied in traditional college

student enrollment studies regarding study abroad (Dykens, 2013), Pell-eligible students (Perkins, 2021), minority students (London et al., 2021; Nuñez & Kim, 2012), high-achieving students (Furukawa, 2011; Perkins, 2021), rural students (Gannon, 2022; Grant & Roberts, 2022; Sowl & Crain, 2021), and for youth in foster care (Gross et al., 2020). The model has been applied to DE in a limited number of qualitative studies (Moore, 2021; Moore & Williams, 2022).

This study specifically seeks to examine DE matriculation patterns using a quantitative perspective. Demographic data, such as race and gender, will be generated to develop an understanding of how these factors shape students' decisions regarding college enrollment, whether by acting as encouraging factors or barriers. Perna's model, which incorporates habitus and demographic elements, provides a robust foundation to explore these influences.

Investigating the influence of physical proximity between the high school and the DE host institution aligns with this model as it delves into how social structures and resources affect students' choices when it comes to college attendance. Representing the school and community context and the higher education context, with respect to course modality, acknowledges that course delivery involves both secondary schools and postsecondary institutions and extends to the broader perception of differences between high school and college courses. Perna's model provides essential support for understanding these distinctions.

Additionally, Perna’s (2006) model considers the expected benefits and costs of higher education. Consequently, these research questions related to CCP course load and GPA aim to establish how an individual's habitus towards college enrollment influences

their academic preparedness. Perna's model also encapsulates the broader social, economic, and policy contexts that indirectly influence all research questions, mainly through policies affecting CCP participation. This model offers a sturdy foundation to comprehend the intricate interplay of these contextual factors in college choice.

Summary

The literature underscores the complex nature of DE programs and the critical role they play in enhancing the different aspects of college readiness, accessibility, and success for high school students. While historically accessed primarily by high-achieving students, recent efforts have sought to promote access and success for underrepresented populations (Rivera et al., 2019). DE initiatives, such as the CCP program, aim to reduce costs and expand course availability for students, particularly those from racial-ethnic minorities and socio-economically disadvantaged backgrounds (Dever, 2017; Kasturiarachi, 2022). Despite these efforts, achieving equitable access remains a persistent challenge, warranting comprehensive studies that address the specific barriers, challenges, and strategies for promoting equitable participation and outcomes for underrepresented populations (Rivera et al., 2019; Spencer & Maldonado, 2021).

Research has highlighted the immediate benefits of DE participation, but there is an evident gap concerning our understanding of the long-term educational and economic outcomes for DE participants (Martinez, 2018). Exploring whether DE experiences translate into enhanced career opportunities, financial benefits, and overall educational attainment can offer valuable insights into the lasting impact of DE programs. Furthermore, despite the advantages DE programs provide in terms of college awareness, readiness, and persistence (An & Taylor, 2019; Hooper & Harrington, 2022), more

research into the differences in degree completion time, graduation rates, and education loan debt between DE participants and non-participants is essential (Martinez, 2018). Additionally, future research should focus on the influence of DE course location, modality, and type on educational outcomes, particularly how these variables impact the success of students (An & Taylor, 2019; Tipton, 2023).

Quality and rigor concerns pertaining to DE programs are prominent, with ongoing debates about whether high school-based DE courses meet the quality and rigor standards of those offered on college campuses (Alsup & Depenhart, 2023; Field, 2021). At the same time, high school instructors' qualifications and pedagogical methods for maintaining college-level rigor have come under scrutiny, requiring more in-depth investigation (Dever, 2017; Kasturiarachi, 2022; Moore & Williams, 2022). On the other hand, college faculty may need professional development regarding appropriate pedagogy for reaching younger students (Alsup & Depenhart, 2023; Dever, 2017; Moore & Williams, 2022). Furthermore, concerns have emerged regarding the maturity and social-emotional readiness of younger DE participants compared to older college students (Ison & Nguyen, 2021; Witkowsky et al., 2020), and many wonder if DE programs inadvertently lower expectations for college readiness and college student performance (Field, 2021; Vargas et al., 2017). Therefore, a comprehensive analysis of the factors influencing DE program quality, including professional development, instructor qualifications, and course content, is necessary to better assess their impact on students (Barshay, 2023; Dever, 2017).

As postsecondary institutions increasingly employ DE programs as an enrollment strategy, they tap into a powerful tool to attract and engage diverse cohorts of students,

but there is also a growing need to examine how these programs intersect with K-12 policies, creating a comprehensive view of the evolving educational landscape (Field, 2021; Perna & Titus, 2004). Furthermore, a deeper investigation into how socioeconomic status, race and ethnicity, courses completed, delivery mode, course types, and grade point average affect future matriculation patterns is essential (An & Taylor, 2019; Tipton, 2023). Expanding the scope of DE studies to encompass various colleges and college types will demonstrate the generalizability of findings across higher education (Arnold et al., 2017).

By addressing these gaps and advancing our knowledge, scholars and educators can contribute to the continual improvement and equity of DE initiatives. Therefore, this research seeks to better understand CCP participant matriculation patterns following high school graduation. Perna's (2006) model provides an exceptional framework, given its capacity to consider multiple layers of context that impact college choice. By aligning each research question with the relevant layers within the model, the study aims to uncover the complexities of matriculation patterns among former DE participants within Ohio's CCP program. Perna's (2006) framework offers a comprehensive and structured approach to navigating these multifaceted influences on college enrollment. Chapter three describes the data collection and analysis methods utilized to examine the research questions.

CHAPTER III

METHODOLOGY

This chapter provides details of the research questions, research population, sample, variables, instrumentation, and data analysis. Furthermore, it describes how the collected data was protected for human subject safety (HSRB Compliance) during the research. The methods describe how the data was analyzed and which measures were utilized to maintain valid and reliable research.

Overview

This research study was designed to identify the variables in DE programs that contribute to matriculation into undergraduate programs. Quantitative research was utilized as it appropriately addresses how specific variables affect the outcomes being studied (Creswell & Creswell, 2009). Statistical procedures were used to draw inferences about the population at hand by comparing experimental groups (Creswell & Creswell, 2009), particularly students who matriculated at the host university versus those who did not. In previous DE studies examining matriculation, qualitative methods have been used with Perna's (2006) college choice model. This study seeks to further generalize this model, typically used in traditional matriculation, to DE scenarios (Creswell & Creswell, 2009; Moore, 2021; Moore & Williams, 2022; Perna, 2007).

A quasi-experimental (causal-comparative) design was utilized to generate trends in Ohio CCP participants who matriculated to their CCP host institution in comparison with CCP participants who did not matriculate to their host institution (Creswell & Creswell, 2009). Quasi-experimental designs are appropriate for field assignments where differences in the independent variable of experimental groups are analyzed based on the

dependent variables. In this design, participants were not randomly assigned to a group, as in the experimental design, but in the group,, they naturally engaged (Jhangiani et al., 2019).

Hypotheses

This study was guided by specific research questions regarding Ohio's DE program, CCP. In particular, this research aimed to determine trends in CCP host institution matriculation by former CCP participants. This study assessed the following hypotheses:

- H1:1: There is a significant association between DE course modality and matriculation to the host institution in the state of Ohio for high school graduating cohorts in the years 2021, 2022, and 2023.
- H2:1: There is a significant association between the geographical proximity of the high school and student matriculation to the DE host institution in the state of Ohio for high school graduating cohorts in the years 2021, 2022, and 2023.
- H3:1: There is a significant association between the CCP course load and student matriculation to the DE host institution in the state of Ohio for high school graduating cohorts in the years 2021, 2022, and 2023.
- H4:1: There is a significant association between academic performance, as measured by GPA in DE courses and student matriculation to the DE host institution in the state of Ohio for high school graduating cohorts in the years 2021, 2022, and 2023.
- H0: There is no significant association between DE course modality and matriculation to the host institution, no significant association in the geographical

proximity of the high school between students who matriculate and those who do not, no significant association in the CCP course load between students who matriculate and those who do not, and no significant association in academic performance (GPA in DE courses) between students who matriculate and those who do not in the state of Ohio for high school graduating cohorts in the years 2021, 2022, and 2023.

Population and Sample

According to the most recent audit of Ohio's CCP program in August 2022, 76,601 students statewide participated in CCP (Faber, 2022). Specifically, the unit of analysis for this study consisted of former CCP participants who graduated from high school in 2021-2023 to be sure participants had graduated and had the choice to matriculate as undergraduate students. Participants who completed CCP coursework at a university included in this study were eligible for participation; however, homeschooled students, those from online high schools, and unknown high schools were excluded from this study due to the inability to calculate proximity to the host institution. Students who will graduate after 2023 were also not considered, as they had not graduated from high school and did not have the option to matriculate to undergraduate status. The scope of the study embraced former CCP participants from three institutions of higher education. Two experimental groups, matriculated to the host institutions versus did not matriculate to the host institution, were compared with variables of course modality, proximity in miles to the students' high schools, completed credits as a CCP student, and CCP GPA. In total, 5,606 students made up the sample for this study.

Institutional Offices of Research and Institutional Effectiveness were contacted for each participating university or college to obtain the data. Institutions of higher education collect this data across each academic year using an Enterprise Resource Planning System, such as Ellucian Colleague (2021). The data was collected for three high school graduation cohorts who completed CCP courses through one of the participating CCP host institutions (Creswell & Creswell, 2009). The course modality of each course completed at the university was obtained, along with the name of the high school or miles to the high from the host institution where each student attended. Additionally, the number of total credits completed as a CCP student at the institution and the culminating CCP GPA were acquired. The sample consisted of 5,606 students from three universities, which was dependent on the number of students who attended as CCP students during those years for postsecondary institutions who agreed to participate.

Human Subjects Protection (HSRB/IRB Compliance)

Researchers are required to have research plans reviewed by institutional review boards on college and university campuses (Creswell & Creswell, 2009). Federal regulations exist to protect research participants from human rights violations. For this study, the researcher obtained written permission from each participating institution by providing them with the research methods, data storage protections, and the data deletion timeline.

Data was stored password-protected in a cloud storage service only for the duration of the dissertation completion, up to 18 months, and not in conflict with any data retention policies (CITI Program, 2021). Furthermore, personally identifiable information, such as names and social security numbers, was not collected. Student

identification numbers were used to identify individual students. Institutional assigned identification numbers were replaced with generic and anonymous identifiers. Table 2 provides descriptive statistics of the population sample using collected demographic data.

Table 2

Population Sample Demographic Data (Gender and Race/Ethnicity)

	Community College	Private 4-Year University	Public 4-Year University	Percent of Total
Male	823	506	846	39%
Female	1326	724	1381	61%
White	1697	1007	1545	76%
Black	117	82	135	6%
Hispanic	40	49	170	5%
Asian or Pacific Islander	45	20	112	3%
Two or more Races	124	29	101	5%
Unknown or Other	122	38	163	2%
American Indian or Alaska Native	5	5	0	0.001%
Total	2,150	1,230	2,226	5,606

In addition to the demographic data shown in Table 2, Table 3 provides the details of high school cohorts by institutional type for CCP participants at each institution of higher education. Furthermore, it lists the numbers and percentages for matriculation status for each institution type. The matriculation status refers to students who did matriculate to their CCP host institution versus those who did not matriculate to the host institution. It is not known if students who did not matriculate to the host institution matriculated to a different institution or did not matriculate to undergraduate status at all.

Table 3
Matriculation Status (Yes/No) by Institution Type and High School Cohort

	Community College	Private 4-Year University	Public 4-Year University	Percent of Total
2021 Yes	96 (17.1%)	45 (11.6%)	275 (35.9%)	24.3%
2021 No	465 (82.9%)	343 (88.4%)	491 (64.1%)	75.7%
2022 Yes	118 (16.6%)	48 (12.2%)	218 (30.5%)	21.1%
2022 No	594 (83.4%)	344 (87.8%)	496 (69.5%)	78.9%
2023 Yes	120 (13.7%)	48 (10.7%)	245 (32.8%)	19.9%
2023 No	757 (86.3%)	402 (89.3%)	502 (67.2%)	80.1%

Variables

Multiple variables were analyzed to determine if an association exists with the matriculation result. The independent variable was a dichotomous, nominal variable (Frankfort-Nachmias & Leon-Guerrero, 2011), matriculation to the host university or not. This was coded as a yes (0) or a no (1) for each student. Each participating institution was asked to specify if each CCP participant in the study matriculated to that same university after high school graduation (yes/no).

Course Modality

Course modality is a nominal variable and was coded based on each student's course modality percentage (Frankfort-Nachmias & Leon-Guerrero, 2011). Participating institutions were asked to specify the mode for each course completed by CCP participants. Options for the mode included on-campus, online, or at the student's high school. Microsoft Excel formulas were utilized to sort students into the appropriate categories for course modality. These percentages were created based on the data sample. Table 4 provides details of each option.

Table 4

Course Modality Categories

Course Modality	Description	SPSS Code
Mostly On-Campus	61% or more of CCP courses were completed on the host institution campus.	0
Mostly High School	61% or more of CCP courses were completed at the student's high school.	1
Mostly Online	61% or more of CCP courses were completed fully online.	2
Hybrid	No modality was utilized more than 60% of the time. Students had a mixture of course modalities	3

Geographical Proximity

Geographical proximity is an interval-ratio variable, meaning it uses standard, equally spaced numbers with a natural zero point (Frankfort-Nachmias & Leon-Guerrero, 2011). Geographical proximity was measured in miles from each student's high school to the participating host institution. Google maps was used to determine this distance, and Excel was used to create a mileage category and added to the collected data. Close geographic proximity allows high school-college partnerships to offer a larger variety of programs and more courses on the college campus (An & Taylor, 2019). This increase in offerings may provide an advantage in future matriculation of the dually enrolled students

to that host institution or may encourage students to move on to other institutions as they may feel more ready for college beyond the proximity of their home.

Course Load

Course load is an interval-ratio variable, meaning it uses standard, equally spaced numbers with a natural zero point (Frankfort-Nachmias & Leon-Guerrero, 2011). Course load consists of the number of CCP credits that each student completed with the host institution. In a 2021 study by Lee et al. (2021), course load was referred to as the "dosage" of DE. Even when the researchers limited their sample to participants with three DE courses or less, there was still a significant difference in positive outcomes associated with GPA, college enrollment, and persistence. However, this study aims to determine if variances in the number of college courses completed as a CCP participant affect matriculation to the host institution.

CCP Grade Point Average

CCP grade point average is also an interval-ratio variable, meaning it uses standard, equally spaced numbers with a natural zero point (Frankfort-Nachmias & Leon-Guerrero, 2011). This variable consists of the cumulative earned GPA of all completed CCP courses for each student. GPA is often used by secondary and postsecondary institutions as a measure of academic performance and college preparedness (Faber, 2022; Kilgore & Taylor, 2016).

Data Collection

Utilizing single-stage sampling, data was collected from each participating institution on one occasion from the appropriate institutional data office using their data request procedures (Creswell & Creswell, 2009). Cluster sampling was used to collect

existing data from each participating institution. Each institution serves as a cluster of data. This type of sample was selected due to the dependent variable's preceding occurrence, matriculation to the CCP host university or not, and the availability of the data by the institutions of higher education. This study was not stratified because it only consisted of students involved in CCP (Creswell & Creswell, 2009). The sample size consisted of 5,606 former CCP participants from three institutions of higher education. The three institutions included a 2-year community college, a 4-year private university, and a 4-year public university, all within the state of Ohio. The large size of this population across varying institutional types provided more accuracy in inferencing and generalization for CCP participation and its relationship to matriculation to the host institution (Creswell & Creswell, 2009).

Data Analysis

This quasi-experimental design utilized one-way multivariate analysis of variance (MANOVA) and the Chi-square test. Microsoft Excel was used to code raw data as required, and IBM SPSS was used to run all of the statistical tests described in these methods. A one-way MANOVA was used to determine if there are significant differences between independent groups (Matriculation to the host institution or not) and multiple interval-ratio variables (Lund Research LTD, 2018). In statistics, one-way MANOVA is an omnibus test that cannot tell you which specific groups are different, so additional post-hoc tests were needed. Due to violations of MANOVA test assumptions, the confidence interval was reduced ($p < .001$), and Welch's ANOVA was utilized to examine each individual variable in a more robust test to ensure accuracy and reliability (Lund Research LTD, 2018).

The one-way MANOVA determined if there was a significant difference in these dependent variables:

A. High School-University Proximity (Miles)

B. Course Load (Number of Courses)

C. CCP Culminating GPA

The one-way MANOVA requires data from two or more dependent variables measured at the internal-ratio level and the independent variable to be two or more categorial, independent groups (Lund Research LTD, 2018). Furthermore, an adequate sample size is needed, with single participants only existing in one of the categorical groups. A normally distributed sample is assumed given the large sample size and proved with the Normal Q-Q Plot in SPSS (Lund Research LTD, 2028). If the p-value of the one-way MANOVA is greater than 0.001, the results would not be statistically significant, and further post hoc tests would not be needed. In the event of statistically significant results ($p < 0.001$), Welch's ANOVA was utilized to further examine the statistical significance of each dependent variable.

Chi-square tests were used to analyze two nominal variables, CCP course modality and matriculation to the host institution. Chi-square is designed to test for a meaningful relationship between two nominal or ordinal variables, which can then be organized into a bivariate table (Frankfort-Nachmias & Leon-Guerrero, 2011). Chi-square does not require a normally distributed population, and variables can be measured at a nominal or ordinal variable. The random sampling requirement is met through a large sample size. The chi-square test determines if observed values are different enough from predicted values to convince researchers that a pattern does exist (Frankfort-Nachmias &

Leon-Guerrero, 2011). In the event of a meaningful association between the variables, the post hoc test, Cramer's V, was used to determine the strength of the relationship. Cramer's V measures the strength of an association for nominal variables and is a nondirectional measure (Frankfort-Nachmias & Leon-Guerrero, 2011).

Validity and Reliability

In quality research, the goal is to remain as error-free as possible (Frankfort-Nachmias & Leon-Guerrero, 2011). Reliability means that a measurement yields consistent results over time. In this research, existing literature was utilized to examine processes and procedures that have been used in the past. For example, DE matriculation research is emerging; however, the results of this study aimed to expand on existing matriculation research on traditional student enrollment. This will further generalize matriculation research to multiple contexts. This research was quasi-experimental in design, meaning that it eliminated the directionality problem associated with non-experimental research (Jhangiani et al., 2019).

Validity indicates if the research measured what it intended to measure (Frankfort-Nachmias & Leon-Guerrero, 2011). Validity can be ensured by using a large sample size and appropriate statistical techniques. For example, a one-way MANOVA could not be used to examine course modality and matriculation because the variables do not meet the interval-variable measurement assumption.

In this research, an important limitation to consider is the researcher's career in higher education. As institutions struggle with enrollment challenges, DE is an exciting strategy for improving matriculation. Excitement about the possibilities of DE as an enrollment strategy may influence the researcher's opinions of its use. However,

obtaining quantitative data from multiple institutions across multiple school years ensures reliable and valid data. As existing literature was reviewed, the researcher also took contradicting data and opinions into consideration in order to examine the whole picture.

Using historical data prevented the researcher from utilizing experimental research instead of quasi-experimental research. However, in generalizing data to the natural environment, it is also important to consider variables in this design without manipulation from a researcher as they naturally occur by students and institutions. It does, however, fail to account for true random assignment and counterbalancing found in experimental designs (Jhangiani et al., 2019). This means that participants who matriculated to the host institutions may have different characteristics than non-matriculants that are not accounted for in this study. Examples include socioeconomic status and parental education attainment.

This study was limited to DE in Ohio through the CCP program. Similar research in other states may be influenced by differing program structures, financial implications, and population demographics (Hornbeck et al., 2023; Hu & Ortagus, 2023; Spencer & Maldonado, 2021). This study aimed to study former CCP participants from different types of institutions, identified by sector and Carnegie Classification and different geographical areas, in order to generalize the results to the state of Ohio. This study did not examine if students matriculated to another institution or not at all and only examined matriculation to the host institution or not. Broader studies could remove this limitation by studying matriculation at any institution.

Another limitation is the emergent nature of DE matriculation and the lack of quantitative studies reflecting its use. The researcher was not able to obtain any existing

quantitative research regarding DE participation and matriculation trends. Qualitative studies provide observational and interview data, and this study sought to open a new realm of study into quantitative research on this topic to corroborate qualitative studies and build upon traditional student matriculation (Moore, 2021; Moore & Williams, 2022).

Applying Ohio's marketplace format for CCP participation, high school students have the ability to complete CCP courses through more than one postsecondary institution (An & Taylor, 2019). This study did not account for the credit hours, CCP GPA, proximity to the institution, or course modalities of courses taken at other institutions beyond the scope of this study. It is possible that factors at other institutions might have influenced the results of this study. Furthermore, it is also possible that students completing CCP courses at the institutions included in this study may have been counted more than once if they completed CCP courses through more than one of the participating three institutions. Anonymized data from participating institutions did not allow for the cross-referencing of these students.

Conclusion

This methodology chapter outlined a comprehensive plan for investigating the variables influencing matriculation to CCP host institutions following CCP participation from 2020-2023. The research questions aimed to uncover trends related to course modality, credits completed, student's high school proximity to the college campus, and CCP culminating GPA, employing a quasi-experimental design. The use of quantitative research methods, MANOVA and Chi-Square, aligned with the research goals of comparing groups and identifying patterns.

The population being studied was comprised of 5,606 CCP participants across three higher education institutions who graduated from high school from 2021-2023. Utilizing single-stage sampling, data was collected from offices of research and institutional effectiveness at participating colleges and universities, ensuring a large and varied sample across the state of Ohio. Human subjects' protection measures, including Human Subjects Review Board compliance, data storage protections, and anonymization, were integral in maintaining ethical standards throughout this study.

The chosen statistical tests, MANOVA and Chi-square, aligned with the nature of the variables being analyzed. MANOVA examined differences in high school proximity, course load (credits), and GPA between groups, while Chi-square assessed the association between course modality and matriculation. These analyses provided insights into the selected variables and matriculation outcomes.

While the study was carefully designed to ensure reliability and validity, certain limitations should be acknowledged. The quasi-experimental design, while eliminating biases found in qualitative research, did not allow for random assignment. Additionally, the study was limited to DE in the state of Ohio only, and broader generalizations should be made with caution. The absence of existing quantitative research on DE matriculation trends underscores the novelty of this study and the need for further exploration in this emerging research field.

CHAPTER IV

RESULTS OF DATA ANALYSIS

This study was guided by specific research questions regarding Ohio's DE program, CCP. In particular, this research aimed to determine trends in CCP host institution matriculation by former CCP participants. This study addressed the following hypotheses:

- H1:1: There is a significant association between DE course modality and matriculation to the host institution in the state of Ohio for high school graduating cohorts in the years 2021, 2022, and 2023.
- H2:1: There is a significant association between the geographical proximity of the high school and student matriculation to the DE host institution in the state of Ohio for high school graduating cohorts in the years 2021, 2022, and 2023.
- H3:1: There is a significant association between the CCP course load and student matriculation to the DE host institution in the state of Ohio for high school graduating cohorts in the years 2021, 2022, and 2023.
- H4:1: There is a significant association between academic performance, as measured by GPA in DE courses and student matriculation to the DE host institution in the state of Ohio for high school graduating cohorts in the years 2021, 2022, and 2023.
- H0: There is no significant association between DE course modality and matriculation to the host institution, no significant association in the geographical proximity of the high school between students who matriculate and those who do not, no significant association in the CCP course load between students who

matriculate and those who do not, and no significant association in academic performance (GPA in DE courses) between students who matriculate and those who do not in the state of Ohio for high school graduating cohorts in the years 2021, 2022, and 2023.

Both descriptive statistics and inferential statistics were utilized to analyze the data. Descriptive statistics are those that help researchers organize and describe the data collected from the sample, whereas inferential statistics are those that allow researchers to make predictions and inferences regarding the data from a sample (Frankfort-Nachmias & Leon-Guerrero, 2011). In chapter three of this study, descriptive statistics were used to depict the makeup of the sample, tabulating demographic, and matriculation status frequencies. In this chapter, descriptive statistics are employed to provide a comprehensive overview of the characteristics of CCP participants. These characteristics include students' GPAs, course loads, course modalities, and the distance between their high schools and the host postsecondary institutions. Inferential statistics will be used to analyze the relationships between these variables and the matriculation status of each student.

Results

Chi-square and MANOVA were chosen as the appropriate statistical analyses to investigate CCP data concerning enrollment in the host institution. Chi-square tests were employed to examine two nominal variables: CCP course modality and enrollment in the host institution. Chi-square analysis is specifically designed to assess the presence of a significant association between two nominal or ordinal variables, which can then be represented in a bivariate table (Frankfort-Nachmias & Leon-Guerrero, 2011. The one-

way MANOVA necessitates data on two or more dependent variables measured at the interval-ratio level, with the independent variable categorized into two or more independent groups (Lund Research LTD, 2018). Due to the violation of assumptions for the one-way MANOVA, Welch's ANOVA was also utilized as it is designed to handle situations where the assumption of equal variances across groups is violated, providing a more reliable test under these conditions (Lund Research LTD, 2018).

Research Question 1

Research question one considers matriculation to the host institution compared with a student's dominant course modality. It states, "Is there an association between DE course modality and the impact on matriculation rates to host institutions in Ohio for high school graduating cohorts in the years 2021, 2022, and 2023?"

A chi-square test of independence was performed to examine the relation between CCP course location and university matriculation. A bivariate table was completed to describe the data, which can be seen in Table 5.

Table 5

Dominant Course Modality by Matriculation Status

Dominant Mode	Matriculated	Did Not Matriculate
Mostly On Campus	185 (36.9%)	317 (63.1%)
Mostly at the High School	242 (10.6%)	2,048 (89.4%)
Mostly Online	624 (28.7%)	1,551 (71.3%)
Hybrid	162 (25.4%)	477 (74.6%)
Total	1213 (21.6%)	4393 (78.4%)

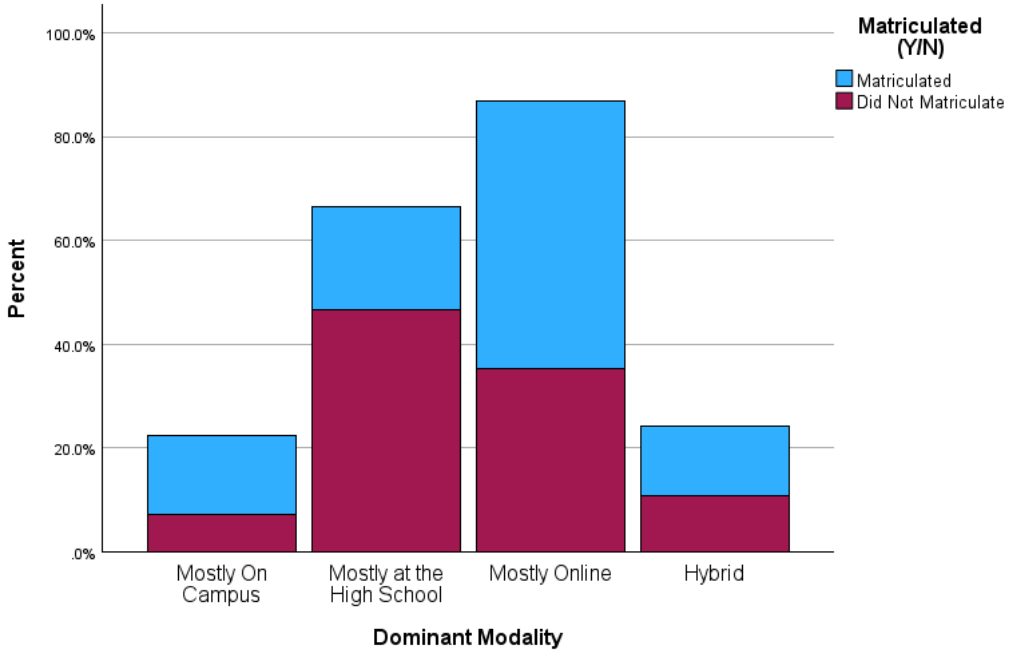
With a chi-square value of 303.035 with 3 degrees a freedom, a corresponding p-value of <.001 is a significant difference at a .001 alpha level. This is an appropriate test

with zero cells having an expected count of less than 5. In this case, the null hypothesis can be rejected. There is a meaningful relationship between the modality of CCP courses and future matriculation to the host institution.

Additionally, the post hoc test, Cramer's V, was used to measure the strength of the association between CCP course modality and matriculation to the host university. A Cramer's V value of .232, which is nondirectional, indicated a moderate, but not strong, association between the variables, meaning that 23.2% of the variance in course modality affects matriculation. According to the Chi-Square and Cramer's V results, there is a significant association between CCP course modality and future matriculation to the host institution in Ohio. Figure 2 displays students' matriculation status by course modality.

Figure 2

Matriculation (%) by Course Modality



Research Questions 2-4

Research Questions 2-4 consider matriculation to the host institution with three interval-ratio dependent variables: GPA obtained as a CCP student, credit hours completed as a CCP student, and each student's high school's mileage from their host institution. This data violated the assumptions of homogeneity of variances, homogeneity of covariance matrices, and a lack of outliers. To correct for the violation of homogeneity of covariance matrices, Pillia's Trace was used, as it is more robust than Wilk's Lambda (Lund Research LTD, 2018). Welch's ANOVA was utilized to account for the violation of homogeneity of variances as it is used in lieu of traditional ANOVA to analyze dependent variables individually when variances are unequal across groups (Lund Research LTD, 2018). The use of these more robust statistical analyses is also appropriate when considering outliers. Table 6 displays descriptive statistics for these variables. Welch's ANOVA provides further insights into each dependent variable.

Table 6

High School Mileage, GPA, and Credits versus Matriculation

	Matriculation	Mean	Standard Deviation
High School Mileage	Yes	16.42	24.416
	No	34.62	43.903
CCP GPA	Yes	3.182	0.884
	No	3.104	0.917
CCP Total Credits	Yes	19.11	16.534
	No	12.69	12.135

According to MANOVA Pillai's V, there was a statistically significant difference between matriculation status and the combined dependent variables, F (5,603) = 118.674,

$p < .001$; Pillai's V = .060; partial $\eta^2 = .060$. This indicates that there is a significant impact between the combined dependent variables and matriculation status. The effect size of .060 indicates that approximately 6.0% of the variation in dependent variables can be attributed to the students' matriculation status. The null hypotheses can be rejected.

Welch's ANOVA was utilized for each interval-ratio dependent variable due to the violation of the homogeneity of variances assumption. A post-hoc test was not utilized because there were only two groups: matriculated and did not matriculate.

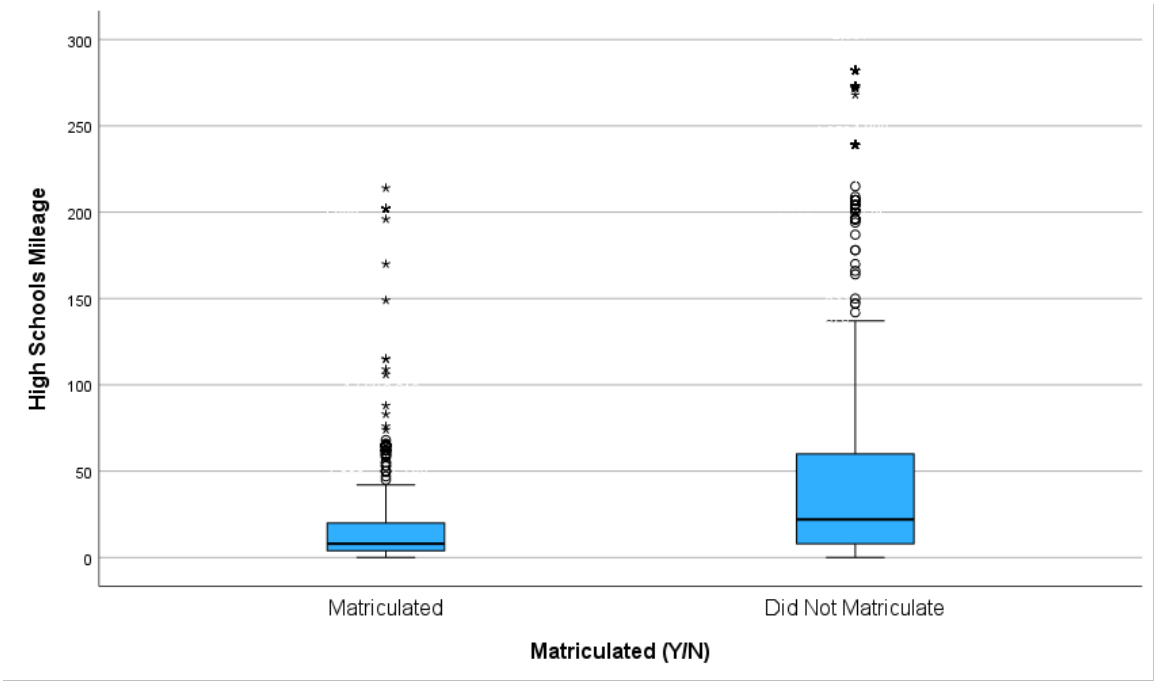
Research Question 2: Geographical Proximity

Research Question 2 states, "Is there a significant difference in the geographical proximity of the high school between DE students who matriculate and those who do not matriculate to the DE host institution in the state of Ohio for high school graduating cohorts in the years 2021, 2022, and 2023?"

The one-way Welch's ANOVA revealed a significant difference ($p < .001$) between matriculation status and the students' high school's mileage from the host institution. The effect size is reported as .033, which is a relatively small effect size in that only 3.3% of the variance in mileage affects future matriculation. Figure 3 displays box plots of geographical proximities by matriculation status. As shown in the box plot, the mean mileage of the students' high schools from the host institution was less than half the distance for matriculated students compared with students who did not matriculate. The associated standard deviations further confirm the significant association. A smaller standard deviation in matriculated students shows that those students are grouped closer around the mean than students who did not matriculate.

Figure 3

Geographical Proximity (Miles) by Matriculation Status



Research Question 3: Course Load

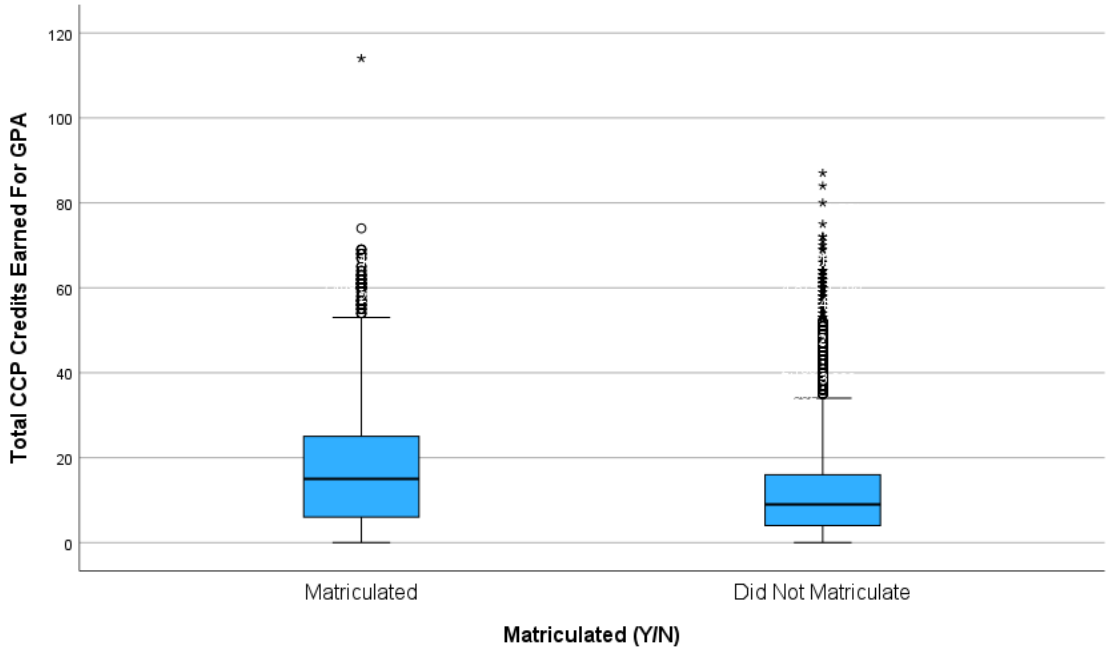
Research Question 3 states, “Is there a significant difference in the CCP course load between students who matriculate and those who do not matriculate to the DE host institution in the state of Ohio for high school graduating cohorts in the years 2021, 2022, and 2023?”

The one-way Welch’s ANOVA revealed a significant difference ($p < .001$) between matriculation status and the number of credits the student completed as a CCP student at the host institution. The effect size is reported as .038, which is a relatively small effect size in that 3.8% of the variance in credits completed affects future matriculation. Students who matriculate tend to complete a higher number of credits than those who do not matriculate. However, the standard deviation for students who did

matriculate is larger than for students who did not matriculate, meaning the completed credit hours are spaced out more from the mean than students who did not matriculate. Figure 4 displays the mean credit hours and standard deviation by matriculation status.

Figure 4

Course Load by Matriculation Status



Research Question 4: GPA

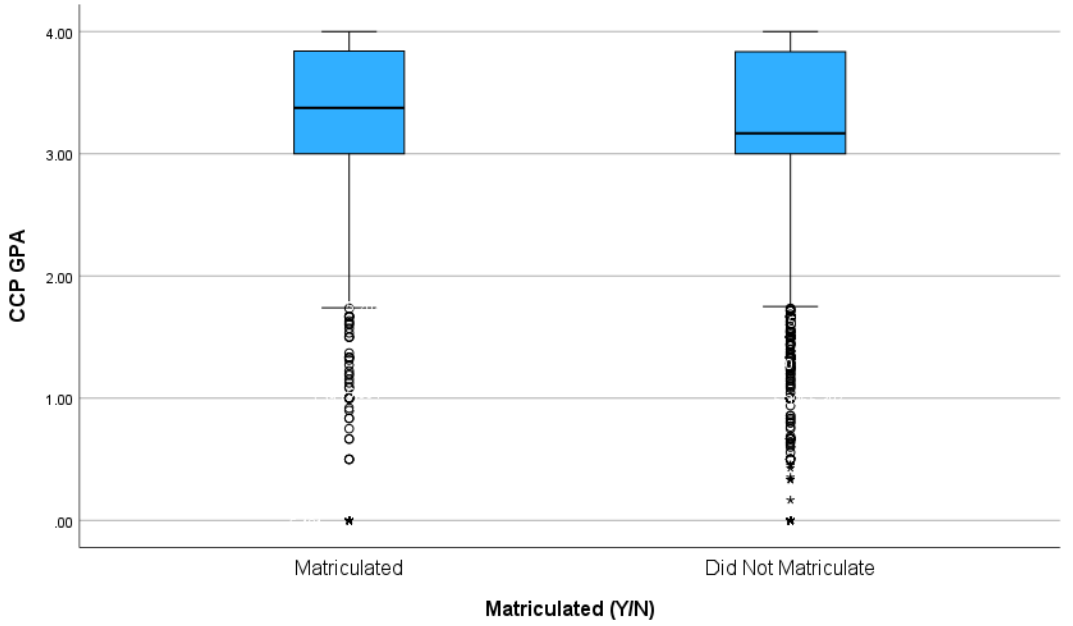
Research Question 4 states, “Is there significant difference in academic performance as measured in GPA in DE courses between DE students who matriculate or do not matriculate to the DE host institution in the state of Ohio for high school graduating cohorts in the years 2021, 2022, and 2023?”

The one-way Welch’s ANOVA revealed that there was not a significant difference ($p = .008$) between matriculation status and the GPA the student earned as a CCP student at the host institution for an alpha level of $p < .001$. This means that the

minute differences found in the GPAs between groups were not significant enough to affect the matriculation status. This is apparent in the small effect size (effect size = .001). Furthermore, the mean and standard deviations for each group, matriculated (M = 3.182; S.D. = 0.884) and did not matriculate (M = 3.104; S.D. = 0.917) are very similar, indicating that there are not large variances in the GPAs between groups.

Figure 5

CCP GPA by Matriculation Status



Summary

This study examined the associations between several factors related to Ohio's CCP program. Variables of dominant course modality, geographical proximity of students' high schools and the host institution, student course load, and cumulative CCP GPA were examined in relation to future matriculation to that same host institution. The results indicated that there are significant associations between course modality, distance

from the high school to the host institution, course load, and students' choices to matriculate. Effect sizes were relatively small for course load (.038) and distance from the students' high school to the host institutions (.033), but the effect size was moderate for course modality (effect size = .232). The association between CCP GPA and matriculation was insignificant.

The data revealed that students who took most of the CCP courses on the host campus or online were more likely to matriculate to that institution compared to those who completed CCP courses primarily at their high school. Proximity played a role, as students from high schools located closer to the host campuses tended to matriculate at slightly higher rates. While students who matriculated completed more credits as CCP students, there was not a significant difference in CCP GPA between students who matriculated or not.

Overall, the results highlight some key elements highlighting students' college choices after DE participation. Small effect sizes do suggest that matriculation is likely influenced by a complex array of other factors, such as socioeconomic status, parental education attainment, desired major, and perhaps even brand loyalty. Further research is needed to fully understand the factors influencing college choice in the growing populations of dually enrolled students. As DE programs continue to evolve and expand, it is pertinent that educators dig deeper into this body of research to ensure supportive pathways to maximize the potential participant, institutional, and economic benefits.

CHAPTER V

CONCLUSION

Introduction

The purpose of this dissertation was to investigate and provide empirical insights into the relationship between the DE program, specifically CCP in Ohio, and the matriculation patterns of former participants to the host institutions after high school graduation. This research aimed to address the gaps in existing literature regarding the effectiveness of DE as a recruitment strategy for higher education institutions and its impact on student matriculation (Kilgore & Taylor, 2016; Moore & Williams, 2022). By examining the matriculation patterns of former DE participants, this study sought to inform educational institutions and policymakers about the utility of DE programs as a strategic enrollment tool (Kilgore & Taylor, 2016). Furthermore, it aimed to assess whether the recruitment strategies regarding DE programming ultimately contribute to the matriculation of students to the host institution (Martinez, 2018).

Four factors regarding student enrollment in CCP were analyzed to examine the effects on matriculation to the host institution as an undergraduate student. The study considered the impact of the students' dominant course modalities, their high schools' proximity to the host institution, students' course load, and their cumulative GPA earned while enrolled as a CCP student. Perna's (2006) College Choice Model guided this study with is multi-layered framework examining students' habitus, the school and community context in which they reside, the higher education connect regarding the host institution, and social, economic, and policy contexts of Ohio (Perna, 2006).

This study utilized a quantitative design and obtained historical information for over 5,000 former CCP participants from three postsecondary institutions in Ohio, including a community college, a 4-year private university, and a 4-year public university. Student participants graduated from high school in Ohio between the years 2021-2023. Lastly, both nominal and interval-ratio measured variables were collected, resulting in the utilization of both Chi-square and one-way MANOVA to evaluate any statistical associations (Frankfort-Nachmias & Leon-Guerrero, 2011).

Discussion of Results

Four research questions guided the study design and data collection.

1. Is there an association between DE course modality and the impact on matriculation rates to host institutions in Ohio for high school graduating cohorts in the years 2021, 2022, and 2023?
2. Is there a significant difference in the geographical proximity of the high school between DE students who matriculate and those who do not matriculate to the DE host institution in the state of Ohio for high school graduating cohorts in the years 2021, 2022, and 2023?
3. Is there a significant difference in the CCP course load between students who matriculate and those who do not matriculate to the DE host institution in the state of Ohio for high school graduating cohorts in the years 2021, 2022, and 2023?
4. Is there significant difference in academic performance as measured in GPA in DE courses between DE students who matriculate or do not matriculate to the DE host institution in the state of Ohio for high school graduating cohorts in the years 2021, 2022, and 2023?

Statistical analyses found a significant association between three of the four variables and matriculation to the host institution after high school graduation at a confidence level of $p < .001$. Table 7 provides a summary of these findings.

Table 7

Summary of Statistical Analyses

Research Question & Variable	P-value	Effect Size	Significant Association
RQ1: Dominant Course Modality	< .001	.232	Yes
RQ2: High Proximity to the Host Institution (Miles)	< .001	.033	Yes
RQ3: Course Load (Credits)	< .001	.038	Yes
RQ4: CCP GPA	.008	.001	No

Research Question 1: Course Modality

The relationship between course modality and future matriculation was significant, with a moderate effect size. Students who experienced a more authentic campus experience had higher matriculation rates than those who remained mostly at their high school. Students whose dominant mode was mostly on campus was the smallest category, yet it had the highest matriculation rate for the number of students. At the opposite end of the spectrum, students who completed most of their courses at their high school had the lowest percentage of matriculation compared to those who did not matriculate. Students who completed their courses mostly online had the second highest matriculation rate within their course modality. This suggests that mostly on campus and mostly online course modalities expose students to a more authentic college course

experience and greater loyalty to the university with more exposure to campus faculty and college-level expectations and routines.

Three major factors influence a student's choice to stay at an institution of higher education: fulfilling academic tasks, positive and frequent interactions with faculty and staff, and engagement in extracurricular activities and peer groups (Jagesic et al., 2022). As the data showed, students who took CCP courses on the university campus and online were more likely to matriculate to that same institution after high school graduation. This is likely due to their firsthand experience being successful in a college course not taught by a high school teacher (Coleman & Latta, 2022; Ison & Nguyen, 2021; Jagesic et al., 2022; Kasturiarachi, 2022), interactions with faculty and staff, and peer relationships that were formed. Prior research demonstrates that course formats more closely resembling traditional college classes may leave a better impact on what it takes to succeed in higher education (Coleman & Latta, 2022).

In addition, DE students are more likely to consider that same institution after high school graduation due to its familiarity and proximity to their home (Jagesic et al., 2022). Students who have completed CCP courses on campus most likely live in proximity to the institution and have already been engaged at that institution and have made connections. Taking courses at a college or university close to home has numerous financial and familial support benefits (Jagesic et al., 2022). Evidence shows that attending a higher education institution close to home is becoming more of a priority, especially for first-generation college students and underserved students (Jagesic et al., 2022).

Furthermore, students completing CCP courses at their high school had the lowest matriculation rate of all course modalities. Although this mode is more accessible by alleviating barriers, such as transportation, time constraints, food insecurity, and high school involvement, there may not be a discernible difference in experience between the CCP courses and the high school courses. In fact, multiple studies have found that the academic outcomes of DE students completing the course at their high school do not differ significantly from students not enrolled in DE (Alsup & Depenhart, 2023; Columbia University, 2012; Kasturiarachi, 2022; Witkowsky et al., 2020). Furthermore, D' Amico (2013) found that, overall, DE students completing the courses at their high schools tend to matriculate to any postsecondary institution at a lower rate than those who completed the courses on campus.

This study contradicts previous research by Alsup and Depenhart (2023), who stated that even though online courses offer flexibility, the absence of a physical presence on campus hinders DE students from fully engaging in the college atmosphere. This study suggests otherwise, with students taking most of their CCP courses online exhibiting the second-highest matriculation rates. Online courses may resemble college courses more than courses taught at a high school because online courses are taught by college faculty, which in significantly different than courses taught by high school teachers (Kasturiarachi, 2022; Witkowsky et al., 2020). This results in a course that more closely resembles college than high school, which may contribute to students feeling more confident regarding future college enrollment and success.

Research Question 2: Geographical Proximity

There was a significant association between the student's high schools' mileage to the CCP host institution and matriculation to that same institution, but it was a small effect size (.033), meaning there are other factors that have a larger role in student matriculation. The mean for high school mileage from the host institution is 16.42 miles with a standard deviation of 24.416, whereas the mean mileage for those who did not matriculate is more than double at 34.62 miles, with an even larger standard deviation of 43.903. This indicates that those students who do matriculate tend to live in a closer cluster to their host institution. This data set contained a number of outliers; fewer outliers would reduce the standard deviation, making the mean a more reliable measurement.

Regarding prior research, these analyses align well with students who wish to remain near home or commute to college as a means to save money and have continued familial and peer support (Damrow, 2017; Jagesic et al., 2022; Moore & Williams, 2022; Perna, 2006). Furthermore, institutions located closer to one another have a significant advantage over those located further apart because there is greater potential for consistent communication, dissemination of information, advising, high school and campus visits, and course options (An & Taylor, 2019). Additionally, the proximity of the institution to the student's home assumes critical importance in shaping college decisions according to prior qualitative research (Damrow, 2017; Moore & Williams, 2022).

Research Question 3: Course Load

When examining the means, students who do matriculate to the host institution complete a greater number of credits (19.11) compared to those who do not matriculate

(12.69). However, the standard deviations are inverse, meaning that those who do matriculate have a larger standard deviation (16.534) from the mean compared to those who do not matriculate (12.135). Consequently, students who do matriculate have a larger range, and the number of completed credits is more spread out than those who do not matriculate. A significant outlier in the number of credits for matriculated students affects these numbers, resulting in a higher mean and larger standard deviation. Like high school mileage from the host institution, the number of CCP credits completed has a small effect size (.038), meaning other factors affect matriculation more than the number of credits completed.

According to An (2013) and An and Taylor (2019), most DE participants enter college with an average of 8-12 credits earned. This research shows a greater mean of credits earned as a CCP student, ranging from approximately 12 credits to 19 credits. As shown in the box plots, a number of students earned well above the average range, potentially allowing them to skip multiple semesters of an undergraduate degree (Witkowsky et al., 2020). A problem that can stem from too much credit earned as a CCP student is the possibility that a student completes courses that cannot be used for their degree, which forces them to take additional classes, negating the financial and faster completion advantages (Dever, 2017; Witkowsky et al., 2020).

Multiple studies state that students need to be better prepared for the rigors of a college education (An & Taylor, 2019; Arnold et al., 2017; Spencer & Maldonado, 2021). With prior research also finding that only a modest number of credits need to be completed as a CCP students to experience the positive effects of participation on future enrollment and persistence (An & Taylor, 2019; Lee et al., 2022), postsecondary

institutions need to consider the financial implications of students competing for a large number of courses. In Ohio, postsecondary institutions receive the most funding for on-campus CCP courses and the least amount of funding for courses taught at high schools by high school teachers.

Research Question 4: Grade Point Average

Welch's ANOVA found that the mean GPAs of students who matriculate (3.182) versus those who do not (3.104) are not significant (P = .008, effect size = .001). This indicates that there is no strong evidence to suggest that GPA has a substantial impact on whether or not students matriculate to the host institution.

Determining the effect of CCP GPA on matriculation is multi-faceted, as students with higher GPAs (3.0+) are already more likely to participate in DE than students with lower GPAs (Spencer & Maldonado, 2021). Furthermore, college students who participated in a DE program tend to have higher college GPAs than college students who did not participate in DE. Given the insignificance, it raises the following question: Does GPA influence matriculation, or were the students already planning to attend after high school regardless of their GPA while enrolled as CCP students? What factors are more significant than achievement, as measured by GPA? Examples of greater impacts may include socioeconomic status, parental influence, and school resources.

Despite an insignificant association between GPA and future matriculation to the host institution in this study, it is important to recognize that CCP courses do yield transcripted college credit, and subpar grades and immaturity may have repercussions on cumulative college GPAs, access to scholarships, and high school academic standing, and possibly even post-college outcomes. Advisors and CCP personnel need to be wary of

students who may not be adequately prepared for or are struggling with college coursework so as not to set them up for failure in the future.

DE participants consistently exhibit higher college GPAs compared to non-participants, demonstrating the positive academic outcomes of DE engagement (An & Taylor, 2019; Coleman & Latta, 2022; Field, 2021; Jagesic et al., 2022; Martinez, 2018). This suggests that while GPA differences at the point of matriculation may not be significant, the long-term academic benefits of DE programs are substantial. While GPA may not be a decisive factor in whether students matriculate to the host institution, DE programs play a crucial role in preparing students for higher education and enhancing their academic outcomes.

Implications for Theory

The results of this research relate back to Perna's (2006) College Choice Model with the factors that influence matriculation to the host CCP host institution after high school graduation. By examining Perna's four layers, this research can make connections to an individual's habitus, the context of the school and community, the context of the higher education institutions, and the social, economic, and policy context.

Layer 1: Habitus

Layer one of Perna's (2006) model examines a student's individual characteristics, such as cultural capital, social capital, and demographic characteristics. Cultural capital includes a person's knowledge of his or her own culture and others, as well as their opinions regarding the value of higher education. Social capital includes the amount of information and assistance that a person has regarding college and associated processes. Couple that with demographic information, such as gender and race, academic

achievements, personal dispositions, and perceptions, a student's habitus can influence a student's preferences for course modalities, chosen courses, and achievement in those courses.

The strong association between dominant course modality and matriculation supports this model. Students who have had a more immersive college experience through on-campus and online courses were more likely to matriculate, suggesting that firsthand exposure not only creates a sense of belonging and commitment but also increases the emotional, social, and cultural capital necessary for transitioning from the structure of high school to the less-structured postsecondary environment.

Layer 2: School & Community Context

The school and community context layer emphasizes the role of local factors, such as geographic proximity, available resources, and structural supports and barriers (Perna, 2006). This layer not only encompasses course modality but also the location of the student's high school compared to the host institution. The results show a significant association between the distance to the host institution from the high school and future matriculation, but the effect size is small. This shows that students may prefer institutions closer to them; however, other factors must also be considered in this layer, such as cost, familiarity, and the school and community perception of college.

Course modality is a factor when considering layer two, as it reflects proximity, available resources, and support systems. Students may complete on campus courses due to their proximity and also a lack of availability of courses at their high school. Online courses may be completed as a reflection of the high school's distance from the campus and the availability of preferred courses at the high school. Courses at the high school

may be completed as a factor of convenience or proximity; however, this may also be related to available supports, as the accessibility and effectiveness of the DE program are influenced by school characteristics, such as demographics, location, levels of poverty, and staffing capabilities (Field, 2021; Gagnon et al., 2021).

Layer 3: Higher Education Context

Institutional characteristics, academic offerings, and recruitment efforts are discussed in the higher education context layer (Perna, 2006). The association between the number of credits completed by students and modality related to matriculation relates to this layer. Institutions that are able to offer more robust course offerings within their DE programs may be more successful in retaining CCP participants as this also relates to students' preferred majors and other institutional resources. The course load of CCP students and its association with matriculation did have a small effect size, so other institutional characteristics, such as financial aid, location, marketing, and amenities, likely play a part in matriculation as well.

Layer 4: Social, Economic, and Policy Context

Layer 4 of Perna's (2006) model, the social, economic, and policy content, is highly relevant to the issue of access and equity in DE programs. This layer consists of the societal, economic, and policy factors that shape our educational opportunities and choices (Perna, 2006). Elements of this layer pertain to disparities already seen in DE program participation among underrepresented groups (Dever, 2017; Field, 2021; Gagnon et al., 2021; Holten & Pierson, 2016; Hooper & Harrington, 2022; Rivera et al., 2019; Spencer & Maldonado, 2021).

Prior research suggests that high-achieving White students from affluent backgrounds tend to dominate DE participation, suggesting that certain social and cultural factors may encourage or hinder access to DE programs. Furthermore, economic factors can further exacerbate these disparities as students from low-income and disadvantaged backgrounds may lack the necessary resources needed for participation in DE programs, such as their background knowledge of and orientation towards college. Lastly, school characteristics, such as racial/ethnic composition, poverty levels, and the availability of qualified teachers, can influence the effectiveness and accessibility of these programs (Spencer & Maldonado, 2021).

Table 8 displays the demographic composition of this study compared with data from the 2020 census of Ohio. Consistent with prior literature (Holten & Pierson, 2016; Rivera et al., 2019; Spencer & Maldonado, 2021), female students participated significantly more in these CCP programs than male students. Prior research does not suggest a reason for this disparity, as more research is needed.

Table 8

Population Sample Demographic Data Compared to State of Ohio Data

	Study Participants	Percent of Total	Ohio 2020 Census
Male	2,175	39%	48.9%
Female	3,431	61%	51.1%
White	4,249	76%	61.6%
Black	334	6%	12.4%
Hispanic	259	5%	18.7%
Asian or Pacific Islander	177	3%	6%
Two or more Races	254	5%	10.2%

Table 2 Continued

Unknown or Other	122	2%	8.4%
American Indian or Alaska Native	5	0.001%	1.1%

Furthermore, disparities are also seen across race and ethnic groups. As shown in the table, White students make up 76% of CCP participants in this study but only 61.6% of Ohio's total population (Ohio Department of Development, 2020). Additionally, every racial or ethnic group shown has a smaller proportion of participants than what would be expected based on the state's population. Although this is only a sample of the CCP participation for three high school cohorts at three institutions in Ohio, prior research has also found that gaps persist for underrepresented populations, such as Black and Latinx students (Hooper & Harrington, 2022). Scholars should continue to examine factors contributing to these disparities.

This research study sought to expand the usage of Perna's (2006) College Choice Model to DE matriculation trends. Although significant associations were found in variables related to three of the model's four layers, further research is needed to encompass additional attributes defining college choice comprehensively. This study provides descriptive statistics for the sample's demographics, which may be related to layer four via economic and education policy, further research could further define the role of policy in addressing inequities. Ultimately, this research study expanded the understanding of factors affecting college matriculation and can help inform more effective strategies for supporting diverse student populations in the college choice process.

Implications for Leadership

The results of this study offer valuable insights and implications for university leaders and other stakeholders involved in the implementation and administration of DE in Ohio. As DE continues to grow in the state as a strategy for promoting college access, readiness, and success, it is crucial for leaders to understand factors that influence students' college choices after high school.

This study's exploration of the relationships between course modality, high school proximity to the host institution, course load, and academic performance, measured by GPA, in DE programs and subsequent matriculation to the host institution, provides a foundation for developing strategies to optimize these programs as a recruitment tool. By examining the strengths and limitations of various DE models, university leaders can make informed decisions about resource allocation, course offerings, and outreach efforts to enhance the effectiveness of their DE programs in attracting and retaining students.

Furthermore, the findings related to disparities in DE participation among underrepresented groups highlight the need for policymakers to address issues of equity and access. Ensuring equitable opportunities for all students to benefit from DE programs is essential for promoting social mobility and reducing achievement gaps in higher education.

University Leadership

The results of this study provide valuable insights for university leaders seeking to optimize their DE programs as a strategic tool for increasing matriculation rates. By understanding the factors that influence students' decisions to enroll at the host institution

after high school graduation, leaders can make informed decisions about program design, resource allocation, and recruitment efforts.

Course Modality

The significant association and moderate effect size between course modality and matriculation rates highlights the need to offer CCP courses both on-campus and online. The authentic experience of courses taught by university faculty and with college-age peers can foster a sense of belonging and familiarity with the institution, encouraging matriculation. Expanding on-campus and online opportunities for dually enrolled students should be prioritized over the expansion of credentialed high school teachers. This ensures a high-quality campus experience managed by the higher education system rather than the postsecondary schools.

Higher education institutions need to be diligent in communication with schools, students, and families regarding on-campus and online courses and resources to ward off uncertainties in a new environment. Campus visits and meetings with advisors and faculty can ease this transition. Faculty and advisors need to be equipped with strategies for mentoring a younger population while also treating them as college students (Alsup & Depenhart, 2023; An & Taylor, 2019; Dever, 2017; Moore & Williams, 2022).

Geographical Proximity

The study's results suggest that students within closer proximity to the host institution are more likely to matriculate after high school graduation. University leaders should leverage this information by strengthening outreach efforts and partnerships with secondary schools closest to the institution. Collaborative relationships can increase awareness of DE opportunities, facilitate campus visits, and provide comprehensive,

college-level advising to prospective CCP students. Maintaining DE opportunities at local high schools can serve as an effective recruitment strategy for students who may face logical and financial barriers to attending courses on campus. Aligning CCP recruitment and outreach with the undergraduate enrollment plan can result in a comprehensive enrollment strategy, creating an enrollment pipeline for prospective students at an early age.

Course Load and Academic Advising

While the number of DE credits had a rather small effect size on matriculation, university leaders should consider the implications of students accruing excessive credits. Proper academic advising and guidance are critical for ensuring that these students complete courses that align with their intended majors and degree requirements. This approach can prevent unnecessary credit accumulation and financial burdens on both students and institutions (An & Taylor, 2019; Lee et al., 2022; Witkowsky et al., 2020).

Prior research cites that college decisions are shaped by the availability of majors and transfer options (Damrow, 2017; Moore & Williams, 2022). Advisors should monitor and note students' interests and intended majors even if they are not offered by the university. This can provide a valuable source of data for informing institutional growth and change. By responding proactively to student interests and workforce needs, the university can strategically expand its academic program offerings, positioning itself as a responsive and student-centric institution. This approach not only enhances the university's ability to attract and retain DE students but also demonstrates a commitment to meeting the evolving demands of the job market and the local community. By leveraging data from DE programs, universities can make informed decisions about

curricular development, resource allocation, and strategic planning, ensuring their long-term relevance and competitiveness in the higher education landscape.

Grade Point Average (GPA)

While this study found no significant difference in GPAs between DE students who matriculated versus those who did not, GPA and academic performance remain critical considerations for university leaders in regard to DE students. Prior research indicates that DE participants consistently exhibit higher college GPAs compared to non-participants (An & Taylor, 2019; Coleman & Latta, 2022; Field, 2021; Jagesic et al., 2022; Martinez, 2018). Therefore, it is crucial for university leaders to acknowledge that DE courses yield transcripted college credit, and subpar grades or immaturity during this critical phase may have lasting repercussions on cumulative college GPAs, access to scholarships, high school academic standing, and potentially even post-college outcomes (Hooper & Harrington, 2022; Kasturiarachi, 2022).

Postsecondary institutions need to carefully monitor students' progress, identify potential academic struggles early on, and provide targeted support and interventions to ensure successful course completion and maintain high academic standards. By developing comprehensive preparatory resources, such as study skills workshops, time management training, and college readiness programs, these institutions can help equip DE students with the necessary skills and a mindset to excel in college-level coursework while mitigating potential risks associated with subpar academic performance in these critical college-level courses.

Recommendations for Other Stakeholders

Although many postsecondary leaders see DE as a potential pipeline for undergraduate enrollment to their institution (Hemelt et al., 2019; Ison & Nguyen, 2021; Jagesic et al., 2022, 2022; Kasturiarachi, 2022; Martinez, 2018), secondary school leaders can also support students' futures by collaborating with nearby institutions offering DE to strengthen communication between institutions and share the advising and scheduling burden of the university personnel. Secondary schools can provide guidance and counseling on the benefits, requirements, and potential implications of DE participation, particularly regarding course modalities, credit accumulation, and academic performance. Secondary schools can also support universities in early identification and support systems for participants who may benefit from DE participation, with a focus on underrepresented populations. By providing encouragement and guidance and promoting campus visits, secondary leaders can help foster a sense of belonging and familiarity with the college community.

Teachers of DE courses offered at the high school can be conscious of aligning their course expectations with those of the college syllabi and faculty, methodologies, academic rigor, and learning experiences. These teachers can participate in professional development to enhance their understanding of the college-level curricula and community. By providing mentorship to students competing in DE courses at the high school, teachers can facilitate their transition to college-level academics and foster a mindset oriented towards college enrollment.

Limitations of the Study

Sample and Scope

This research is limited in scope, sample, and methodologies. This study aimed to provide a generalizable study of the matriculation trends of former CCP participants at the institution that hosted their CCP program in Ohio. However, this study was limited in the size of the sample and number of institutions. Although the sample did include institutions from three sectors of postsecondary education, private-4-year, public 4-year, and 2-year community colleges, it only included three institutions. Furthermore, the study only examined high school student cohorts for the previous three graduating years and did not include any high school cohorts prior to 2021 and the pandemic. This examination prevents the analysis of long-term trends and changes. The study also only examined data from Ohio, so results may not be generalizable to DE programs in other states.

A large sample size was included in this study; however, it was a small sample with respect to the total number of Ohio CCP participants being over 76,000 annually (Faber, 2022). Due to the research question assessing the proximity of students' high schools to their host institution, students who were homeschooled, enrolled at an online high school, or those whose high school was unknown were excluded from this study. Additionally, Ohio's CCP program follows a marketplace model (Faber, 2022), which allows students to complete CCP courses through more than one institution. This study did not account for student enrollment in more than the host institution, nor did it account for students who may have been enrolled in more than one of the institutions participating in this study.

Variables

The study examined a limited set of factors (course modality, proximity, course load, and GPA) that may influence matriculation to the host institution. There could be other important variables that were not considered, such as socioeconomic status, parental education levels, or institutional characteristics. According to Perna's (2006) Collee Choice Model, the following characteristics should also be considered when examining college choice.

Table 9

Variables Affecting College Choice

Gender	Race/Ethnicity	Cultural Capital	Attitudes/Beliefs
Marketing Tools	Financial Aid	Program/Majors	Public Policy
Support Systems	Expected Benefits	Expected Costs	Value of Education
Academic Preparation	Barriers to Access	Socioeconomic Status	Parents Education Attainment

In addition to assessing limited variables, this study did not account for confounding variables and selection bias, as students who choose to participate in DE programs may differ systematically from those who do not, which could influence the observed associations and achievement. By not examining matriculation to any institution, this study examines it from the lens of host institution matriculation only and not on overall college matriculation resulting from DE participation.

Methodologies

This dissertation employed a quantitative design, which may not provide a comprehensive understanding of the underlying factors and decision-making processes

that influence students' matriculation choices. Additional statistical measures could be used to look at each variable and its relationships to other variables on a deeper level. Furthermore, qualitative and mixed-method research could be used to capture information that is more difficult to see in a quantitative study. By using multiple types of research, a more nuanced understanding of DE matriculation can be developed. Moreover, the study acknowledged disparities in DE participation among underrepresented groups but did not investigate the underlying reasons or strategies to promote equitable access and participation.

Recommendations for Future Research

Sample and Scope

Future research should focus on qualitative and quantitative studies regarding factors influencing a dual-enrolled student's choice of postsecondary institution. Researchers should investigate the impact of DE course modality on matriculation to any institution, not just the host institution, and also examine if CCP course loads, credits earned, and proximity to the institution are significantly associated with matriculation to any institution versus not enrolling in college at all. These studies should also examine the influence of DE participation on college major selection and transfer patterns in addition to matriculation trends.

Although prior research does exist regarding the long-term effects of DE participation on college persistence, graduation rates, and post-college outcomes (An & Taylor, 2019), future studies could build on this research study by examining outcomes specific to Ohio and participants of other state-specific programs. Utilizing any of the previously existing variables, studies across multiple states could also provide insight into

the challenges and successes of other DE programs, as well as contribute to the development of generalizations across many DE programs (An & Taylor, 2019; Tipton, 2023).

Variables

Researchers need to investigate the relationships between DE experiences and other factors, such as available majors, transfer options, and proximity to home, in shaping college decisions (An & Taylor, 2019; Tipton, 2023). Additionally, more research is needed on the role of institutions in student matriculation. Future studies should examine the role of institutional characteristics, financial aid, and recruitment efforts in attracting dual-enrollment students to specific institutions. According to Perna's (2006) college choice model, a number of variables not evaluated in this dissertation affect matriculation. Those variables need research in the context of DE in order to extend Perna's (2006) model to DE situations.

Equity and Access

Although research exists regarding disparities in gender and racial ethnic groups, future research studies should focus on understanding the reasons behind the underrepresentation of certain demographic groups in DE programs. Moreover, researchers, higher education leaders, and policymakers need to investigate strategies to promote equitable access and participation in DE programs for underrepresented populations.

The intent of DE programs is often to ease the escalating cost of higher education and widen access (Coleman & Latta, 2022; Field, 2021; Zinth, 2014). By examining the impact of socioeconomic status, parental education levels, school resources, and culture

on DE participation and outcomes, researchers and policymakers can develop a comprehensive model for college degree attainment across all demographic groups.

Financial Implications

Prior research on the financial implications of DE is conflicting. While some studies show it may reduce the cost of a college education for participants (An, 2013; Dever, 2017; Faber, 2022; Jagesic et al., 2022; Kasturiarachi, 2022; Rivera et al., 2019; Witkowsky et al., 2020), other studies show that former DE participants have as much student loan debt as non-participants (Field, 2021; Hu & Ortagus, 2023). Research should explore the relationship between DE participation, credit accumulation, time-to-degree completion, and student debt accumulation, considering the financial implications for students and families.

If institutions are utilizing DE as a recruitment tool (Ison & Nguyen, 2021; Jagesic et al., 2022, 2022; Kasturiarachi, 2022; Kilgore & Taylor, 2016; Martinez, 2018), the cost-effectiveness of this model should be explored. Postsecondary institutions need to understand the financial implications of different DE course modalities (on-campus, online, high school-based) and determine the profit margins associated with each mode. As many institutions are operating on lean margins due to decreased traditional student enrollment (Kasturiarachi, 2022), cost-benefit analyses can assist in determining the optimal balance between DE course offerings, matriculation rates, and institutional resource allocation.

These institutions need to determine if the matriculation rates of CCP students are offsetting its administration costs through reduced tuition payments. Students taking CCP courses on campus bring in more funding for the institution, but is it enough to offset

instruction, advising, and other on-campus expenses? DE courses at the high school have lower instruction costs but less funding. Is the reduced funding enough to offset institutional and outreach expenses, considering there is also a lower matriculation rate for these students? Online courses generate a moderate amount of revenue for the institution, when compared to other modalities. Research should consider the expense of this mode in relation to its revenue and future matriculation to develop a full comparison across all modalities.

Methodologies

Future studies should employ mixed methods or qualitative approaches to gain a deeper understanding of students' decision-making processes and experiences with DE programs. Additionally, longitudinal studies can be used to track the long-term impact of DE participation on various academic and career outcomes.

Students can be surveyed and interviewed through phenomenological research to better understand beliefs, support structures, and overall orientation towards college in both DE participants and non-participants. Similar studies would also allow researchers to dig deeper into student preferences when choosing an institution for undergraduate enrollment in addition to variables that can be measured quantitatively. Overall, a significant amount of research is needed to understand the impact of DE on students, secondary schools, and postsecondary institutions.

Conclusion

The purpose of this dissertation was to expand Perna’s (2006) College Choice Model to better understand DE matriculation trends. Through quantitative statistical analyses, significant associations were found across three to four layers of the model,

encompassing students' dominant course modalities, CCP course load, and proximity to the higher education host institution. The integration of DE into this framework has illuminated various factors influencing students' choices, proving the multi-faceted nature of college choice decisions beyond this study.

It is evident that leadership, faculty, and advisors across both secondary and postsecondary institutions need to be wary of the implications associated with students' preferences and the availability of different course modalities. Furthermore, advisors need to have conversations with students and families related to student major preferences, credit accumulation, and cumulative GPA. Institutions need to be aware of the financial and matriculation implications associated with different course modalities and adjust their outreach efforts to maximize postsecondary budgets.

Despite significant associations, it is evident by the small effect sizes that more research is needed to fully capture the complexities of college choice after DE participation. This study has provided a foundation of descriptive statistics regarding gender and racial ethnic groups, suggesting that these factors are worthy of additional research concerning Perna's (2006) fourth layer, economic, social, and education policy. Future research should focus on exploring these connections in greater depth to elucidate how policies can mitigate or exacerbate inequities in college access.

Moreover, the findings highlight the importance of considering a holistic approach when addressing DE trends. By examining the interplay between individual, institutional, and policy-related factors, stakeholders can develop more targeted strategies to support diverse student populations. This comprehensive understanding is crucial for creating equitable opportunities and enhancing the overall effectiveness of DE programs.

This research contributes to the ongoing dialogue on college choice by extending the application of Perna's model to DE. The insights gained underscore the need for continued investigation and policy refinement to ensure that all students, regardless of their background, have the opportunity to pursue higher education successfully. As educational landscapes evolve, it is imperative that research adapts to reflect these changes and provide actionable recommendations for fostering equity and access in higher education.

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