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Matriculation through Dual Credit

Lorry Beth Wilson

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MATRICULATION THROUGH DUAL CREDIT

by

Lorry Beth Wilson

A DISSERTATION

Presented to the Faculty of

The College of Education and Human Services

Department of Educational Studies, Leadership, and Counseling

at Murray State University

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P-20 & Community Leadership

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Abstract

Earning college credit in high school has become a rising trend, while correlation of matriculation to credit hour accumulation, underrepresented minority population, and high school data is limited. State policies are redefining outdated rules and processes in order to provide access, affordability, and awareness to students throughout the United States. West Kentucky Community and Technical College, in partnership with area high schools, enroll students in dual credit courses, which assists with increasing college credential completion and the reduction of total college costs. Students must have guidance and planning before, during, and after earning dual credit. This helps the student to earn college credit related to an academic plan, which leads to intended career achievement. In order to reap the benefits from the resources poured into dual credit programs, postsecondary education institutions need dual credit students to matriculate for maximum benefits related to performance standards and degree completion. An important outcome of dual credit is for students to earn a postsecondary education credential or a skilled trade. Dual credit students have higher matriculation and completion rates than that of peers without dual credit experience. The dataset included 6,232 students enrolled in dual credit courses between 2012 and 2016, with 20 variables to examine. The outcome of a binary logistic regression model revealed statistical significance to matriculation. Three variables were determined to be of interest: underrepresented minority, credit hour attainment, and the student's home high school. Variables related to matriculation of dual credit students identified specific areas for future recruitment efforts and area where matriculation rates could be increased. Students earning dual credit need to integrative advising which will lead to credential attainment and not credit hour accumulation.

Key words: dual credit, matriculation, community college, guided academic plan, P-20

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Table of Contents

Title page	i
Abstract	ii
Acknowledgments.....	iii
Table of Contents	v
List of Tables	viii
Chapter 1 - Introduction.....	1
Context of the Study	2
State Policies.....	3
Kentucky.....	4
Purpose of the Study	5
Research Questions.....	6
Scope and Bounds.....	7
Significance of the Study.....	7
Key Terms.....	8
Summary.....	10
Chapter 2 - Literature Review.....	11
Historical Perspective of Community Colleges.....	11
High achieving students.....	12
Community Colleges in America.....	14
Theories Related to Dual Credit	16
Public policy theory	18
Punctuated equilibrium theory.....	18
Dual Credit Policies	19
State policies.....	19
Kentucky Dual Credit Policy	23
College readiness	24
Statewide policy changed for Kentucky	25
Target population	26
West Kentucky Community and Technical College.....	26
Types of Dual Credit Delivery.....	29
West Kentucky College Academy	30

Advanced Placement Program	32
Articulated Credit.....	33
College Level Examination Program.....	33
International Baccalaureate diploma.....	34
Benefits of Dual Credit Programs.....	34
National Alliance of Concurrent Enrollment Partnerships	41
Academic Advising.....	42
Theoretical Framework.....	44
Summary.....	46
Chapter 3 – Methodology	49
Research Design.....	49
Purpose of the Study	51
Research Questions	51
Description of Population	52
Data Collection Method.....	52
Variables in the Study.....	54
Procedures for Data Analysis.....	55
Summary.....	56
Chapter 4 – Results	58
Data.....	58
Analysis.....	59
Primary Research Question.....	59
Question 1	61
Question 2	62
Question 3	64
Summary.....	65
Chapter 5 – Conclusion.....	67
Summary of Literature Review.....	67
Summary of Methodology and Data Analysis.....	68
Summary of Findings.....	70
Question 1	70
Question 2	71

Question 3	72
Relationship of Conclusion to Other Research	72
Limitations of the Study.....	73
Practical Application.....	76
Research Recommendations	76
Summary	78
P-20 Implication.....	80
References	83
Appendices.....	96

LIST OF TABLES

Table	Page
1. Dependent and independent variables	50
2. Dual credit enrollment per year for all students.....	59
3. Variables in the equation	60
4. Enrollment, average credit hour attainment, and matriculation rate for seniors.....	62
5. Matriculation by high school	63
6. Five-year average matriculation rates, by high school, based on distance	64
7. Matriculation rate by ethnicity and gender	65

Chapter 1: Introduction

In 2001, Robertson, Chapman, and Gaskin (2001) identified dual credit as an emerging and powerful method of educational collaboration and reform. In that same year, 5,400 students earned dual credit through partnerships created by Kentucky secondary and postsecondary education institutions (Kentucky Department of Education [KDE], 2017). During the fall of 2016, dual credit enrollment had increased to 22,700 high school students earning college credit in Kentucky (KDE, 2017). Within 15 years, dual credit enrollment in Kentucky had increased by 320%. More high school students earned college credits, which increased overall student enrollment at postsecondary education institutions (An, 2013; Tobolowsky & Allen, 2016). , By identifying variables of dual credit students, the research will focus on transitioning the increased dual credit student enrollment to matriculated credential seeking students.

Participation in dual credit has seen significant increases throughout the United States since the turn of the century (Barnett, 2016; Mansell & Justice, 2014; Taylor, 2015). The dual credit student enrollment has grown to more than 700,000 students participating in community colleges throughout the United States. Overall, community colleges provide the majority of dual credit opportunities for students (Fink, Jenkins, & Yanagiura, 2017). Nationally, 82% of public high schools offer some form of dual credit (Zinth, 2015). There are, however, numerous options to earn college credit and not all require participating in the course at a college or university. As dual credit enrollment continues to increase, the potential for higher matriculation rates increase (Cassidy, Keating, & Young, 2011; Hodara, 2015; Karp, 2015; Kim, 2014).

Prior to dual credit student enrollment, personal aspects related to benefits and consequences related to enrollment need to be reviewed (An, 2013; Warne, 2017). High school students need information related to high school diploma courses and college academic pathways leading to intended academic goals (Barnett, 2016; Karp, 2015). Completing a college credential

needs to be a goal for students enrolled in dual credit (Taylor, 2015), but not necessarily the only goal. Students should not be earning college credit simply to accumulate college credit hours (Andrews & Barnett, 2001; Karp, 2015). Academic goals for students may include reviewing high school graduation standards, college choices, degree programs, college placement scores, and course requirements/prerequisites (Grites, 2013; KDE, 2018).

Context of the Study

Earning college credit for high school students has evolved and changed over time (Johnson, Jarrell, & Adkins, 2015; Karp, 2015). Program names, titles, outcomes, assessments, and course options are numerous (Godfrey, Matos-Elefonte, Ewing, & Patel, 2014). A few of the more commonly known programs are: dual enrollment, concurrent enrollment, concurrent credit, articulated credit, Advanced Placement (AP), International Baccalaureate (IB) diploma, and College Level Examination Program (CLEP). Each of these programs provide an opportunity for high school students to earn a form of college credit; however, earning credit through programmatic differences (Minnesota Department of Education, 2016; Tobolowsky & Allen, 2016).

Kentucky Senate Bill 1 (2009) encourages students to earn dual credit, while the Kentucky Dual Credit Policy and Kentucky Dual Credit Scholarship help to remove the barriers associated with the cost of dual credit. Through the work of this statewide change, Kentucky has increased the number of students participating in dual credit programs and the total number of credit hours earned. In 2016, an Executive Order No. 2016-0378 established the statewide dual credit scholarship program. The Kentucky Dual Credit Scholarship program assisted with the alignment of secondary and postsecondary educational dual credit processes, which allowed expansion of dual credit offerings throughout the state.

High school students have taken advantage of college credit offerings for the past three decades at West Kentucky Community and Technical College (WKCTC) (Stephenson, 2014; West

Kentucky Community and Technical College [WKCTC], 2016). However, barriers existed which eliminated the possibility of enrollment for some students. These barriers, as identified by Kentucky Senate Bill 1 (2009) are: a) access, b) affordability, and c) college readiness (Blessing, 2016). The Kentucky Dual Credit Scholarship program has significantly reduced barriers of accessibility and affordability. The program has proven to increase the number of students enrolling in and earning college credit throughout Kentucky (KDE, 2017).

State policies. The total number of college credit hours a high school student may earn differs among all 50 states. The Education Commission of the States (ECS) reports on state policies and lists 26 states without a statewide policy that addresses the number of dual credit hours a high school student can earn (Education Commission of the States [ECS], 2017). Prior to 2016, Kentucky was one of those 26 states. However, high school students may earn an unlimited number of college credit hours since the Executive Order No. 2016-0378 (2016) passed. Only seven states cap the number of credit hours a student can obtain, which ranges from two courses per semester up to 30 credit hours (ECS, 2017).

All states reported educational policies through ECS (2017). Then, ECS created a report, related to dual credit, which describes the variety of processes (Carey, 2015; ECS, 2017). Three states, Minnesota, Ohio, and Illinois have reported statistically significant increases in dual credit enrollment since the early 2000's (Andrews & Barnett, 2001; Lochmiller, Sugimoto, Muller, Mosier, & Williamson, 2016; Minnesota Department of Education, 2016; Ohio Department of Higher Education, 2016). As changes have occurred, state educational policies have attempted to revised and updated. Dual credit processes have differed from educational institutions and partnership, where state policies were non-existent.

Kentucky. Kentucky initiated significant changes in the dual credit policy, with the intent to benefit the individual student (Kentucky Senate Bill 1, 2009; ECS, 2017). Kentucky Senate Bill 1

(2009) Section 21, focuses on college/career readiness for students. The bill mandates the creation of educational initiatives targeting the reduction of college remediation while increasing college and career preparation (Kentucky Senate Bill 1, 2009). The alignment of course content with either an industry certification or the postsecondary education course is one of the mandates (Phelps & Chan, 2016; Rodriguez, Hughes, & Belfield, 2012). To continue alignment with business and industry, the learning outcomes of each course should be reviewed periodically (Phelps & Chan, 2016). An advisory council, consisting of educators, parents, and partners from business and industry, assist with course preparation by creating course content related to college and career (Kentucky Senate Bill 1, 2009). The partnership, created through the advisory council, assists in developing and creating specific and immediate needs for the workforce (Rodriguez et al., 2012; Smith, 2013).

Language and research of the Kentucky Senate Bill 1 (2009) provided the basis for the Kentucky Dual Credit Policy. The policy promoted initiatives to reduce college remediation rates of high school graduates and increase college completion rates for Kentucky students (Kentucky Council on Postsecondary Education [KCPE] & Kentucky Department of Education [KDE], 2016). Kentucky Senate Bill 1 (2009) implemented a college and career readiness plan which focused on building the proficiency level of high school students and preparedness for entry to postsecondary education institutions and the workforce (Kentucky Senate Bill 1, 2009). With both the Kentucky Dual Credit Policy and Kentucky Senate Bill 1 (2009) in place, lawmakers provided guidance to improve and align dual credit programs while increasing the college completion rates (Blessing, 2016).

High school juniors and seniors are the target enrollment population of dual credit programs in Kentucky (Karp, 2015; Mansell & Justice, 2014). Through the Kentucky Dual Credit Scholarship, students may earn college credit at a reduced tuition rate and may apply for a scholarship to have the reduced tuition waived for some courses (KCPE & KDE, 2016). The

Kentucky Higher Education Assistance Authority Eligibility initiated the requirements for the dual credit scholarship and reduced tuition rate (KHEAA) per the Kentucky Dual Credit Policy. For the 2016-2017 school year, dual credit tuition rate was one-third of the tuition rate at the Kentucky Community and Technical College System (KCTCS), or \$52 per credit hour (Kentucky Community and Technical College System [KCTCS], 2016). Increasing college readiness and completion rates, while decreasing college costs for students are intended outcome of the statewide policy (Blessings, 2016).

Purpose of the Study

The focus for WKCTC is to assist students earning dual credit with high school diploma completion through enrollment of dual credit courses leading to a college credential attainment. Student enrollment in dual credit at WKCTC has remained relatively consistent for the five-year dataset; however, credential-seeking student enrollment has been declining. The transition rate to WKCTC from dual credit students averaged 40.4% from the five-year dataset (DSS, 2017), well above the 15% national average for dual credit (Fink et al., 2017). The outcome of the research will aid in filling gaps related to dual credit student matriculation. Research addressed the relationship of dual credit offerings and programs in connection with how these programs support college and career readiness standards as defined in Kentucky Senate Bill 1 (2009). The administration of WKCTC has expressed the need to increase credential-seeking enrollment through matriculation of dual credit students. Therefore, the purpose of this study was to research relationship and correlation of student characteristics and attributes as they relate to matriculation at WKCTC.

Research Questions

The following primary research question provided overall guidance for this study:
Primary research question: What are characteristics of students who matriculated from dual credit coursework in high school to WKCTC?

The following research questions and hypotheses were developed to answer the primary research question and focus on possible correlations of specific independent variables to matriculation.

Question 1. Is there a relationship between total number of dual credit hours earned and matriculation to WKCTC during the fall semester immediately following high school graduation?

H₀ Credit hour attainment has no correlation to matriculation.

Question 2. Is there a relationship related to the high school a student attends for those who matriculate to WKCTC?

H₀ Matriculation rates are not correlated to the high school from which a student attends.

Question 3. Is there a relationship between underrepresented minorities, as defined by gender and ethnicity, and those who matriculated to WKCTC during the fall semester immediately following high school graduation?

H₀ Underrepresented minority population, defined by gender and ethnicity, does not correlate to matriculation.

Scope and Bounds

The study site for this research was WKCTC in Paducah, Kentucky, who has offered dual credit to public and private high schools in its ten-county service region since the 1980's. The ten-county service area includes Ballard, Calloway, Carlisle, Fulton, Graves, Hickman, Livingston, Lyon, Marshall, and McCracken counties. Typical fall enrollment averages around 5,800 to 6,200 students with approximately 1,100 to 1,300 of those students being non-credential high school students, otherwise referred to as dual credit students. The population for this study included students enrolled at WKCTC during the fall semester as first time, full-time freshmen, immediately after high school graduation, during the years of 2013, 2014, 2015, and 2016. The collegiate category for dual credit students is defined as non-credential, non-degree seeking students while in high school. Student population from 10 counties in the WKCTC service area are in the dataset.

Significance of the Study

Students, parents, and the community benefit from dual credit programs (Mansell & Justice, 2014). Review of the operational status and continuous evaluation of outcomes assists in the continuation of effective dual credit programs. This is evident as students achieve college ready benchmarks, reducing the total cost of completing a college credential, and skilled workers emerge in a shorter period (Jones, 2014; Kim, 2014). Presently, the quantitative data related to dual credit is limited to student participation and enrollment (Karp, 2015). Outcomes for this research will provide information regarding variables for dual credit students, which correlate to increased matriculation rates to WKCTC. Specifically, the data will be used to inform others of the correlation between the variables of gender, total number of dual credit hours, and high school to matriculation to WKCTC.

The American Association of Community Colleges (AACC) reported 42% of students who begin at a community college and transfer to a university complete a bachelor's degree (Jenkins &

Fink, 2016, pp. 7). Nevertheless, state policies, program updates, credit hour accumulation, and total college costs all have an impact on student enrollment in and completion of college credentials (Fink et al., 2017). An effective dual credit program should be based on data which incorporates individualized student advising and guided pathways leading to college credentials (Hurman, 2014; Phelps & Chan, 2016), rigor of course content, authenticity, and student perspective (An, 2013; Farrell & Seifert, 2007; Karp, 2015).

Key Terms

Dual credit programs and initiatives use terminology, which may not have the same definition in all settings. The following is a list of terms and definitions used in the current research project.

Career pathway – a coherent, articulated sequence of rigorous academic and career/technical courses, including dual credit opportunities, leading to postsecondary education degrees and industry recognized certifications and licensures (KCPE & KDE, 2016).

College/Career Ready – an initiative to maximize the number of students who are ready for college or ready for a career by high school graduation. Dual credit has become a unified strategy to reduce college remediation rates of recent high school graduates by at least 50 percent. Furthermore, the initiative intent builds on the increase of college completion rates for students enrolled in one or more remedial courses by three percent annually (Blessing, 2016).

Completion rate – the rate of student persistence in an educational program area. The total number of credit hours attempted divided by the total credit hours earned. Students must earn a “D” or higher in the course, under standard grading methods, to earn credit hours. Students may also earn a “P” in pass/fail courses, which counts toward credit hours earned. Students who earn an “E” or “F” in any course will not earn credit hours (Allen, Tilghman, & Whitaker, 2010).

Credential attainment – progressing through a program plan that leads to the completion of a specific skill set related to job or career. “Credentials” often refer to academic or educational qualifications, such as degrees or diplomas that have been completed or partially completed. “Credentials” can also refer to occupational qualifications, such as professional certificates or work experience (Enders, debater, & Weyer, 2013).

General education courses – college courses that focus on basic transfer coursework in English, history, math, science, foreign language, and liberal arts (Jones, 2014, Rothschild, 1999).

High achieving student – a student who excels in academics and learns new content with ease (Novak, 2017, Radcliffe & Hatch, 1961, Schneider, 2009).

Matriculation – the process of being enrolled in a college, university, or to attain the academic standard required for admittance at an educational institution (Karp, 2015).

National Alliance of Concurrent Enrollment Partnerships (NACEP) – professional organization for state education agencies, secondary, and postsecondary educational institutions that fosters and supports rigorous concurrent enrollment courses throughout the country. NACEP serves as a national accrediting body and supports members by providing standards of excellence, research, communication, and advocacy (NACEP, 2017).

Technical education courses – college courses, which focus primarily on a specific profession, career, or trade leading to a certificate and transferring to the workforce (Harbour & Wolgemuth, 2015; Phelps & Chan, 2016).

Summary

Students in Kentucky have the option to enroll in dual credit coursework while in high school. There are various dual credit programs for students to choose with various paths to follow, but with a similar end goal of earning college credit. Guidance is needed prior to dual credit enrollment which requires awareness of opportunities available. Terminology may create unexpected barriers for students, parents, and high school partners in understanding dual credit benefits and risks. Work is needed to help those involved with dual credit recognize the opportunity dual credit affords high school students in Kentucky. Building upon partnerships with secondary and postsecondary educational institutions provide a mean of harnessing the benefits of dual credit. Data reviewed associated to credit hour attainment, student high school, and underrepresented minority population as it is related to matriculation to WKCTC provides a framework of dual credit and benefits for those involved.

Statewide policies have been created throughout the United States (ECS, 2017), which provide a multitude of direction, guidance, policies, and procedures throughout. The modality of dual credit programs range from location, content, and faculty members. Dual credit programs and statewide policies provide students with an ability to earn college credit while offering variations to courses, costs, and attainment. Chapter 1 introduces the reader to the historical journey of dual credit while sharing relative information related to policies and program offerings. Chapter 2 will provide a review of literature related to dual credit programs, collegiate pathways, and matriculation. Research based on student variables, such as gender and ethnicity will be provided to deepen knowledge base of strategies for transitioning dual credit students to matriculated students.

Chapter 2: Literature Review

The purpose of this study was to increase understanding of students earning dual credit and matriculating to West Kentucky Community and Technical College (WKCTC). In particular, the researcher sought to reveal specific variables related to dual credit students who matriculate to WKCTC. These variables were credit hour attainment, high school attended, and underrepresented minority. WKCTC will utilize information garnered to help increase the enrollment of credential-seeking students from current dual credit program. Chapter 2 will provide a review of pertinent literature, framed within historical context of two-year institutions, along with regional, state, and WKCTC relationships to higher education and dual credit as they affect matriculation.

Historical Perspective of Community Colleges

Joliet Junior College (JJC), founded in 1901, is the first and oldest public two-year college in the United States (Brown, 1901; Phillippe & Sullivan, 2005). JJC became an extended high school with the first two years of postsecondary education available for high school juniors and seniors (Brown, 1901). The existence of junior colleges assisted in providing a transition period to the four-year universities, an alternative to the university setting, and technical training (Boggs, 2012; Drury, 2003; Stern, 2016). Not all students want to pursue higher education in the liberal arts, and the universities did not provide an education with a focus for skilled workers in areas such as electrical, carpentry, mechanics, and other trades (Boggs, 2012; Harbour & Wolgemuth, 2015). A growing population needed to be trained for the skilled labor workforce, and the junior college model fulfilled that need (Drury, 2003). The Morrill Acts of 1862 and 1890 (Drury, 2003) were created and amended to provide grants of land sales to finance higher education. This provided a funding structure, which assisted in boosting community colleges and universities (Phillippe & Sullivan, 2005; Stern, 2016).

By the 1930s, with California, Missouri, and Minnesota taking the lead, more than 200 public and 300 private two-year colleges were assisting the public obtain an education, especially the unemployed, during the Depression (Vaughan, 2006). A national organization for community colleges was formed, the American Association for Junior Colleges (AAJC), which is currently known as the American Association for Community Colleges (AACC). The AAJC allowed a venue for the college presidents to “exchange ideas, formulate policy, and build leadership skills” (Phillippe & Sullivan, 2005, pp. 2).

Academically advanced or high achieving students began enrolling in and earning college credit, as the community college model was developing and changing to meet the community needs (Drury, 2003; Farrell & Seifert, 2007). In many situations, similar to Joliet Junior College, students simply walked up a flight of stairs to take college courses (Boggs, 2012). Throughout history, there have been several names associated with two-year colleges such as technical college, vocational school, city college, county college, adult education center, and more (Harbour & Wolgemuth, 2015). The term community college became associated with general education courses needed for the first two years of a four-year university degree (Drury, 2003). During the 1950s and 1960s, junior colleges became known as a lesser form of postsecondary education (Farrell & Seifert, 2007). The junior college trained students for specific business and training needs, and they served as adult education centers (Boggs, 2012; Vaughan, 2006). In order to provide a distinct understanding of the two-year college, the AAJC became the AACC (Vaughan, 2006).

High achieving students. In the 1950s, Godfrey, Matos-Elefonte, Ewing, and Patel (2014) conducted research related to advanced coursework for high achieving high school students. Through additional course offerings and guided programs, selected students were given the opportunity to earn college credit at the high school, as the high school faculty member provided the curriculum and instruction (Radcliffe & Hatch, 1961). The School and College Study of

Admission with Advanced Standings began its research in 1953 related to college courses in high school (Novak, 2017; Radcliffe & Hatch, 1961). Seven high schools and 12 colleges participated in the school and college study to promote the academic success of high achieving students. Instead of the usual four years of high school enrollment and four years of college enrollment, earning a bachelor's degree, the research group created a model where students finished in seven years (The College Board, 2016). This program consisted of students learning college content, most commonly taught during the first year of college, through a specific curriculum, which replaced the high school course (Novak, 2017; Rothschild, 1999; Schneider, 2009; The College Board, 2016). The program was renamed the Advanced Placement Program, or AP, as the program is now commonly referred.

During the 1990s, dual credit enrollment increased at a substantial rate (Bailey, Jaggars, & Jenkins, 2015). The ability to offer challenging curriculum for high achieving students launched the dual credit initiative in the United States (Novak, 2017; Rothschild, 1999). School systems, students, and parents realized the senior year of high school had become less productive (National Commission on the High School Senior Year, 2001). Students often sought out academic challenges through college coursework, and the high schools offered empty classrooms to local community colleges who sent faculty members to teach at night or on weekends (Karp, 2015; Kim, 2014). High schools offered AP curriculum to students, which provided the opportunity to increase academic rigor and the ability to earn college credit (Novak, 2017). These occurrences evolved into additional dual credit opportunities for students. Dual credit became available for students who met collegiate benchmarks, instead of only being offered to an elite group of high achieving students (Balfanz, Bridgeland, Fox, DePaoli, Ingram, & Maushard, 2014). **Community Colleges in America**

Community colleges were built out of public need to fill a gap created by the development of public and private universities (Bailey et al., 2015; Phillippe & Sullivan, 2005). All people did not need nor desire an education from a university (Vaughan, 2006). Additionally, the resources required for a university education were not available to everyone (Drury, 2003). Attending a university usually meant that the student must leave the area and family behind until a degree was conferred (Vaughan, 2006). The choice to pursue a university education could have consequences related to the community and families if no one was able or willing to stay behind and continue to work (Crisp & Delgado, 2014; Jaggars, 2014).

Public policy related to higher education was reviewed and revised to adjust to the change occurring during this era (Boggs, 2012; Enders, deBoer, & Weyer, 2013; Fowles, 2014). President Roosevelt's New Deal developed a response to the Great Depression through relief, recovery, and reform based on the public need (Boggs, 2012). He also helped to strengthen secondary and postsecondary education with the authorization of additional policies to secure continuous governmental funding (Drury, 2003). The movement continued with President Truman solidifying the importance of postsecondary education and vocational training (Gilbert & Heller, 2013). This mission of community colleges targeted these needs through the change and adaptation of new policy creation at local, state, and national levels (Boggs, 2012). The community and political purpose for a two-year college created an opportunity to provide education to people who wanted to pursue that path.

The first brick and mortar location for a two-year college was in Joliet, Illinois, on the second floor of Joliet Township High School (Brown, 1901; Drury, 2003). In 1901, Superintendent J. Stanley Brown and William Rainey Harper combined efforts to open an experimental pre-baccalaureate program (Phillippe & Sullivan, 2005). Brown and Harper realized the first two years of a bachelor's degree consisted of the basic general education courses, which the junior college

could provide. The multipurpose vision of the community college provides strength and perseverance (Harbour, 2015).

Illinois and California led the nation in the trend toward the junior college system by building and expanding existing educational partners (Drury, 2003). California state legislation financially assisted in opening Modesto Junior College as the first two-year college in the state during 1921 (Harbour, 2015). However, financial support stopped as the state enacted legislation to halt expansion of building additional junior colleges (Drury, 2003; Gilbert & Heller, 2013). Monetary support was not provided to this higher education system again until the 1940s (Vaughan, 2006). Legislation did not provide full financial funding to public junior colleges until 1943, when the Illinois legislature created public policy for junior colleges (Harbour, 2015). However, that did not hinder the progress on building and enhancing junior college programs. Without legislative support and governmental financial backing, California continued the expansion of the community college system and led the nation for the next 80 years in higher education (Gilbert & Heller, 2013; Harbour, 2015).

Universities raised concern regarding enrollment pressures and supported the junior college movement as one solution to reduce this problem (Gilbert & Heller, 2013). The two-year college also addressed the problem of university overcrowding due to the increased demand for higher education (Harbour, 2015; Vaughan, 2006). The initial need and principle belief of the community college mission was educating everyone everywhere (Harbour, 2015). The realization of inequitable access throughout the universities prompted legislative action (Gilbert & Heller, 2013; Vance, 2018). Public awareness of insufficient seats available for the growing demand in higher education led the junior colleges to become a system for students not yet ready for the universities (Harbour, 2015; Vaughan, 2006).

Community colleges began to expand as the demand for skilled workers grew in the 1940s (Gilbert & Heller, 2013; Vaughan, 2006). During a time when America needed skilled workers to fill immediate job openings, the community college emerged as the leading training facility (Phillippe & Sullivan, 2005). This increased need to train new workers and re-train existing workers continued through the 20th century (Harbour, 2015). Community colleges have shown steady growth since the 1960s (Drury, 2003). Approximately 1,100 community colleges exist throughout the United States and have enrolled over 100 million students from the time when the first community college opened its doors in 1901 (Phillippe & Sullivan, 2005).

Assisting, building, and helping provide an educated and trained workforce is the foundation on which community colleges were built (Harbour, 2015; Vaughan, 2006). The rudimentary focus of the community college is to serve sectors of the community through the open-access format (Harbour, 2015), which provides the opportunity for students to gain admission to the college and access to services (Vaughan, 2006). The success of community colleges requires the cooperation of other educational institutions, businesses, and industry partners, and the communities they serve (Harbour, 2015). Historically, community colleges have responded quickly to community needs and helped to build or re-build a skilled workforce (Boggs, 2012). The same vision and mission for community colleges have extended to the 21st century (Farrell & Seifert, 2007).

Theories Related to Dual Credit

Public policy theory, as well as Astin's (1984) theory of involvement yields valuable information related to dual credit. These theories provide data, which influenced the creation and modification of dual credit programs and statewide policies. Dual credit programs are changed and updated through multi-faceted actions: public policy, statewide policies, institutional parameters, and partnership agreements. Public policy changes whether intentional action is taken or no action is taken (Cairney, 2012; Givel, 2010). Statewide policies created are the outcomes of actions taken.

The support of public policy theory reflects in voting and election outcomes of the candidates, specifically associated with political party agendas (Cairney, 2012). Policymakers create a plan with goals and an outline of programs, but changes derive from many outside sources (Cairney, 2012). Finality and binding outcome of a policy cause the fluctuations and differences to the intent of policy, as it progressed (Jones & Baumgartner, 2012).

As educational policies are introduced or reviewed, legislators are aware of the challenge and difficulties, which directly affect students at the forefront of the decision (Shah, 2012). Emotions are high when a child's future becomes the face of a policy, and the public's perception will form the outcome (Cairney, 2012; Shah, 2012). Public policy can be directed through policy diffusion, a fad spreading from state to state (Boushey, 2012), as seen with a multitude of related educational policies. Relying on this process lends itself to the mindset, "If it is good for one, it must be good for all." Regrettably, this mindset will increase the promotion of mediocrity within educational settings by focusing attention to the middle and not the outliers (Gilbert & Heller, 2013).

Policies, procedures, and guidelines have varied significantly throughout the history of dual credit, with advantages and disadvantages (Mansell & Justice, 2014). A primary advantage of dual credit is to save time and money for the parent and student (Kim, 2014). For example, if a student earns college credit in high school, there are opportunities for reduced or discounted tuition, or tuition waivers, and some earn college credit with zero tuition (Tobolowsky & Allen, 2016). While earning college credit in high school may save future tuition cost, reducing the number of courses needed to complete a college credential after high school graduation is an additional benefit (Zinth, 2015).

Dual credit programs also assist in alleviating anxiety related to the college unknowns, increasing the matriculation rate for students and decreasing the need for remediation courses

(Carey, 2015; Farrell & Seifert, 2007). Risks are associated with dual credit if the student does not take the course seriously or is unable to complete the course successfully (Cassidy, Keating, & Young, 2011). If a student is unsuccessful in the college course, both the high school and college GPA are affected (Lochmiller, Sugimoto, Muller, Moiser, & Williamson, 2016). In addition, the student may not meet high school graduation requirements and be mandated to complete additional work to meet missing requirements (Karp, Calcagno, Hughes, Jeong, & Bailey, 2005). Dual credit has been highlighted as a program strategy that can assist with increasing college and career readiness benchmarks (Lichtenberger, Witt, Blankenberger, & Franklin, 2014; Zinth, 2015).

Public policy theory. This theory emphasizes stability, rules, incremental adjustment, and gridlock (Jones & Baumgartner, 2012). Policy change is triggered by changes in the political party preferences of policymakers, and by the voice of the constituents (Shah, 2012). In addition, the changes occur as public support builds for one initiative over another (Givel, 2010). Theories of policy change emphasize the correspondence between the direction of preferences among legislators and the interest of the public related to the policy (Jones & Baumgartner, 2012). Public policy changes often follow efforts of disjointed, episodic, and unpredictable occurrences, which was evident through punctuated equilibrium theory (Cairney, 2012).

Punctuated equilibrium theory. A unifying framework for understating three mechanisms leading to the diffusion of innovations is embedded in punctuated equilibrium theory: incremental policy development drives gradual policy flow; policy imitation drives rapid state-to-state change and mimicking; and nearly immediate policy updates are driven by state-level responses to a common external influence (Cairney, 2012; Karp, 2015; Shah, 2012). The dual credit policy for Kentucky created through an Executive Order of Governor Matt Bevin is an example of diffusion of innovations (Blessing, 2016). Executive Order No. 2016-0378 (2016) helped to push through the Kentucky Council on Postsecondary Education and Kentucky Department of Education Dual Credit

Policy, which was led by an incremental policy development as pieces of the policies trickled down from the Every Student Succeeds Act (ESSA) (Tennessee Department of Education, 2018). Ohio, Tennessee, and Illinois, three of Kentucky's neighboring states has previously updated or developed statewide dual credit policies (Lochmiller et al., 2016).

The ripple effect from top-down initiatives creates changes to public policy (Jones & Baumgartner, 2012). Punctuated equilibrium theory measures and explains long periods of time with no change in specific public policy, which is disrupted by instability leading to short, intense changes (Boushey, 2012). Policymaking is based on emotion and allocation of attention, which builds the support leading to the final decision (Cairney, 2012; Givel, 2010). This is difficult when the good outweighs the bad, and politics often create blurred lines (Jones & Baumgartner, 2012; Shah, 2012).

As public policy is enacted, individual states form specific and targeted policies that focus on the topic as related to the needs of its constituents (Givel, 2010). Education is a leading predictor of an individual's success, and this is one of the unique factors, which brings forth universal agreement in changing public policy (Enders et al., 2013; Fowles, 2014). This type of proactive movement forms state policies, which highlight the punctuated equilibrium theory and trickle down method (Givel, 2010; Shah, 2012). For the past 20 years, policies related to dual credit have been changed, created, or updated (Karp, 2015).

Dual Credit Policies

State policies. The Education Commission of the States (ECS) reports that all U. S. states have developed some form of a statewide dual credit policy (Karp, 2015). Legislation and policies are not consistent throughout all states, even if dual credit is offered (Lichtenberger et al., 2014). The existing policies help to shape programs and create options for support services (Monaghan & Attewell, 2015). Variation in the policies include funding structure, participation, location, faculty

credentialing, course setup, and the number of courses offered (Shah, 2012; Taylor, Borden, & Park, 2015).

The inconsistency of policymakers creates a challenge in long-term planning within dual credit programs (Jones & Baumgartner, 2012; Lichtenberger et al., 2014). The push and pull from the political presence and desire to accommodate public needs and interests change the direction and focus on dual credit programs from one state leader to the next (Cairney, 2012; Cohen, 2008; Kentucky Council on Postsecondary Education [KCPE] & Kentucky Department of Education [KDE], 2016). Public demand and workforce needs create legislative change, through public policy theory, while building partnerships that withstand the variation in political party lines (An, 2013; Givel, 2010). During the past decade, legislators reviewed and updated policies to increase the trained, skilled, and educated workforce. In addition, decreasing the college remediation rate while increasing college readiness (Cohen, 2008; Taylor et al., 2015). Stakeholders, including parents, educational institutions, community leaders, and policymakers, have been reviewing options that may assist in re-aligning educational institutions to better prepare students who transition to the workforce (Givel, 2010; An, 2013).

Policies that exist focus on the eligibility of students and a funding structure to benefit socioeconomic groups (Karp et al., 2005; Taylor et al., 2015). Effective dual credit programs focus on the individual student's future goals, helping to create a plan the student can achieve (Smith, 2013; Taylor, 2015). Furthermore, there is a continuous need to provide guidance throughout the credential attainment process (Raia-Taylor, 2012). The U.S. Department of Education (2014) reported that programs needed to build a sequenced program of study, which leads students to the completion of a career pathway.

Educational Commission of States reports education policies, created for dual credit (ECS, 2017). The report, related to dual credit, describes the diverse academic strategies and

implementations for the partnerships between secondary and postsecondary education institutions (Carey, 2015; ECS, 2017). Three states, Minnesota, Ohio, and Illinois have reported statistically significant increases in dual credit enrollment since the early 2000s (Andrews & Barnett, 2001; Lochmiller et al., 2016; Minnesota Department of Education, 2016; Ohio Department of Higher Education, 2016). Georgia's "Move on When Ready" program and the "EXCELerate" program, implemented by Oklahoma, are two dual credit programs which challenge students to enroll in dual credit as soon as they have met college benchmark scores (Vargas, Roach, & David, 2014). Dual credit statewide programs are ever changing to reflect the needs of students, schools, and the community (Fink, Jenkins, & Yanagiura, 2017; Mansell & Justice, 2014). Increasingly, state governments are creating or enhancing policies to focus on college and career readiness in the secondary environment (ACT, 2015, ECS, 2017).

Assessment of the quality within the dual credit program and specific course offerings have not been addressed by most statewide policies (Karp et al., 2005; Zinth, 2015). Earning college credit has quickly expanded to a diverse and growing population of students (An, 2013). However, guidelines and regulations of the dual credit programs have had difficulty staying updated to accommodate the increases (Taylor et al., 2015). The creation of partnerships between secondary and postsecondary coincide with updates and formation of statewide policies and procedures (Farrell & Seifert, 2007). Therefore, differences in policies related to budgets, credential requirements, course offerings, location, student eligibility, and other variables are realized in the midst of student enrollment and earning of credits (Bailey et al., 2015).

The existing statewide dual credit policies can be bundled into two categories, comprehensive and limited policies (ECS, 2017). There are 21 states with a comprehensive policy that has limited restrictions, liberal credit granting restrictions, and tuition for students at no cost or low cost (Karp, 2015). Ohio, Texas, and California have enacted comprehensive statewide dual

credit policies (ECS, 2017). The 26 states identified in having limited policies offer almost no restrictions related to funding, credits, or student access (Zinth, 2015). The states with limited policies allow high school students to earn as many college credits as they can from first year through senior year (ECS, 2017). This focus is on the student and allows them to move forward as they are ready (Ganzert, 2014).

Possible factors to help increase high school graduation rates and reduce the total cost of college is student performance data and degree completion rates (White, Hopkins, & Shockley, 2014). Ohio and Tennessee have recently adopted statewide dual credit policies. As part of the ESSA, Tennessee implemented statewide dual credit to provide students with academically challenging courses aligned with postsecondary education standards (Tennessee Department of Education, 2016). In addition, the Tennessee Department of Education provides professional development for secondary faculty that covers the alignment of course content and learning objectives related to the challenge exam required for students (Tennessee Department of Education, 2016).

During the 1980s, the creation of statewide dual credit policies were on the rise (Harbour & Wolgemuth, 2015). The policies are designed to provide direction and guidance for high schools and postsecondary institutions that offered college credit to high school students (Taylor et al., 2015). However, many states went against the policies and allowed partnerships and regulations to be created on an individual basis (Bailey et al., 2015). In 1986, Minnesota created one of the first statewide dual credit policies, the Postsecondary Enrollment Options Program (PSEO). Minnesota immediately reported an interest in PSEO, as high school student enrollment reached 3,500 in the first year (Minnesota Department of Education, 2016). In 1986, courses were offered on the postsecondary education campus and online. The PSEO allowed students to earn college credit without the burden of paying for tuition, textbooks, or support services. In the 2007-2008 school

year, Minnesota added concurrent enrollment as an additional option to earning college credit. With the combination of PSEO and concurrent enrollment, participation increased to 37,000 in the 2015 school year (Minnesota Department of Education, 2016).

Strengthening the high school education attainment that leads to a successful transition in postsecondary education opportunities became a leading strategy for College Credit Plus in Ohio (Ohio Department of Higher Education, 2016). Policymakers wanted to provide students with relief from college tuition costs and impending college debt, an amendment to current policy occurred with the Ohio House Bill 487 of 2015 (Ohio Department of Higher Education, 2016). Due to a shift in educational funding structure, the policy highlighted college completion and performance instead of college enrollment and headcount.

Kentucky Dual Credit Policy. Policymakers in Kentucky have been concentrating efforts toward college and career readiness since the 2009 passage of Kentucky Senate Bill 1 (Blessing, 2016). The bill required an upgrade to the statewide assessment system, serving students from kindergarten through high school graduation, and implemented techniques needed for the student to be college and career ready. Strategies included increasing college preparedness, college completion rates, accelerated learning opportunities, and academic advising (Lochmiller et al., 2015). Dual credit helps the student and the educational institution. This occurs through the increase of education attainment and the achievement of college credentials, along with the Individual Learning Plan, job shadowing, internships, cooperative experiences, appreciative advising, and other educational strategies (Andrews & Barnett, 2001).

In 2010, the *Unbridled Learning-College Career Readiness Unified Plan* was implemented by KDE, KCPE, and the Educational Professional Standards Board (EPSB) to address educational strategies. The unified plan defined college and career readiness as a one or a combination of ACT benchmarks scores, college placement exams, and career assessment measures (Blessing, 2016).

KDE evaluates educational strategies along with the Kentucky Dual Credit Policy and Kentucky Senate Bill 1. The four main components of Kentucky Senate Bill 1 are: (a) accelerated learning opportunities; (b) secondary education intervention programs; (c) college and career readiness advising; and (d) postsecondary education persistence and degree completion (Blessing, 2016; Kentucky Senate Bill 1, 2009). Between 2010 and 2016, Kentucky redesigned statewide policy for secondary and postsecondary education institutions. Kentucky's dual credit policy will aid in leading more students toward college enrollment (KCPE & KDE, 2016) and completion (An, 2013).

College readiness. In 2009, only 15% of Kentucky high school students were meeting all four college benchmark scores in the American College Test (ACT) subject areas of English, reading, math, and science (ACT, 2013; ACT 2015). The ACT organization, recognized by educational institutions for its reliability on the assessments for college readiness, provides research related to student preparedness, college benchmark scores, and workplace skills (ACT, 2015; Aud et al., 2011; Novak, 2017). The ACT subject area scores provide a guide for students entering college. The research correlates that students meeting the ACT benchmark scores have achieved an academic ability similar to peers across the nation who are likely to be successful in entry-level college courses (ACT, 2013; Novak, 2017; Shaw, Marini, & Mattern, 2013). Entry-level college courses, which ACT aligns with, are English, math, reading, and science. According to ACT researchers, students have a 75% probability of earning a college grade of a "C" or higher in first semester general education courses if they have met ACT college benchmark scores (ACT, 2013; ACT, 2015). Furthermore, the ACT college benchmark scores reflect a 50% probability that students will earn a "B" or higher in college coursework (ACT, 2013).

Secondary education administrators have incorporated dual credit coursework and programs to assist with college readiness, in addition to or in place of AP programs throughout the state (Kim,

2014). The results of the increase in college coursework provides a new reason for students to achieve benchmark scores and become college ready. Dual credit has also assisted in career readiness for students who are interested in technical programs. Career readiness certificates and dual credit courses align in courses related to health sciences, information technology, welding, machining, and other areas (KCPE & KDE, 2016). As college and career readiness became a focus for secondary education, research results gave way to the benefits of dual credit for students, parents, educators, and the community (An, 2013; Karp, 2015; Mead, 2009).

Statewide policy changes for Kentucky. In June 2016, Kentucky Governor Matt Bevin signed an Executive Order No. 2016-0378 pertaining to dual credit opportunities for public high school students (KCPE & KDE, 2016). Executive Order No. 2016-0378 (2016) encourages public high school students to enroll in college courses through a dual credit model for the partners secondary and postsecondary education institutions. Research for the policy development correlated to the enrollment related to dual credit students and student matriculation, college retention rates, and college completion status (Blessing, 2016; Farrell & Seifert, 2007; Karp, 2015; Mead, 2009). During the following year, an update made to Executive Order No. 2016-0378 (2016) became the Kentucky Dual Credit Policy (KCPE & KDE, 2016). The Kentucky Dual Credit Policy signed in June 2016 created and established guidelines to provide dual credit coursework opportunities for Kentucky high school students who participate in the Kentucky Dual Credit Scholarship, without being assessed tuition or fees (Exec. Order, 2016).

Together KDE, Kentucky Higher Education Assistance Authority, Council on Postsecondary Education, and Kentucky Community and Technical College System have removed obstacles for students by creating a state-funded dual credit policy. Three main obstacles students face are accessibility, affordability, and college readiness (An, 2013; Cassidy et al., 2011; Karp,

2015). The Kentucky Dual Credit Policy identified a list of participating postsecondary institutions (PPI) who can collaborate with the local education agencies (LEA).

The policy defines the partnership between LEA and PPI, with specifications on roles, regulations, and procedures (KCPE & KDE, 2016). The PPI list updates each spring by KHEAA, to confirm each postsecondary institution's commitment to the program and the reduced tuition rate. The list includes two- and four-year institutions, both public and private. PPI and LEA agreements establish a dual credit plan for students to earn college credit, follow an academic pathway, and help students earn both a high school diploma and credits related to a college credential. To increase student knowledge and awareness of college credentials and academic pathways, KHEAA created a mandatory video for students who participate in the Kentucky Dual Credit Program (KCPE & KDE, 2016).

Target population. High school juniors and seniors are the target enrollment population of dual credit programs in Kentucky (Karp, 2015; Mansell & Justice, 2014). Through the Kentucky Dual Credit Scholarship, students may earn college credit at a reduced tuition rate and may apply for a scholarship to have the reduced tuition waived for some courses (KCPE & KDE, 2016). KHEAA manages the eligibility requirements for the dual credit scholarship and specific tuition rates, per the Kentucky Dual Credit Policy. For the 2016-2017 school year, the dual credit tuition rate was 1/3 of the tuition rate at the KCTCS, or \$52 per credit hour (KCTCS, 2016). Increasing college readiness and completion rates, while decreasing college costs for students, are intended outcomes of the statewide policy (Kim, 2014; Novak, 2017).

West Kentucky Community and Technical College. West Kentucky Community and Technical College (WKCTC), the community college the researcher focused on for this study, has had a varied history with several identities. What would become WKCTC has the following schools in its lineage: West Kentucky Industrial College, West Kentucky Vocational Training College,

West Kentucky Technical College, Paducah Junior College, and Paducah Community College (Blythe, 2008; Matheson, 1966). West Kentucky Industrial College was the first college established in western Kentucky through the vision of a hardworking businessman, Dennis Henry Anderson (Blythe, 2008; Dullrich, 2010). He built a college to provide a higher educational institution in western Kentucky (Dullrich, 2010). The institution was opened as a training school for African American teachers and became the second largest African American teacher college in the United States in 1909 (Blythe, 2008). Anderson spent years attempting to secure enough funding to build the college (Dullrich, 2010). Eventually, under the direction of Governor A.O. Stanley's administration, state funding assisted in the completion of the college (Dullrich, 2010; Murrell, 1969).

The first 30 years proved to be very successful under Anderson's guidance, with the enrollment and graduation of students at the college. West Kentucky Industrial College became one of the largest teacher-training programs in Kentucky. In 1938, the teacher-training program transferred to Frankfort and renamed Kentucky State College (Blythe, 2008). West Kentucky Industrial College was closed, and the school reopened as West Kentucky Vocational Training School. The Vocational Training School went through numerous name changes throughout its existence and ended its existence as West Kentucky Technical College.

Businessmen in western Kentucky were building interest in creating a two-year junior college to serve the regional population in far western Kentucky (Matheson, 1966). A committee was formed to secure community resources and commitment to the possibility of a second higher education institution in Paducah. The committee included local school superintendents, high school principals and faculty, businessmen, and elected officials to review the opportunities related to building a junior college. Paducah Junior College (PJC) is the second college within WKCTC history (Matheson, 1966). PJC was established to provide coursework needed to assist regional

students in the transition to a four-year university. Under the advisement of the University of Kentucky, admissions requirements were designed to align with the four-year universities (Dullrich, 2010).

Students enrolled and began coursework during the fall of 1932. The citizens of Paducah, foreseeing the impact that the college could have on the surrounding community, pledged to provide continuous support. However, during 1936, the college faced possible closure due to lack of funding. The city commission assumed control of the college as a municipal institution supported by a payroll tax to prevent closure (Dullrich, 2010; Murrell, 1969). In 1967, PJC became part of the University of Kentucky Community College System and was renamed Paducah Community College (PCC) (Murrell, 1969).

In 2003, PCC and West Kentucky Technical College consolidated to become West Kentucky Community and Technical College (Blythe, 2008). The consolidation proved to strengthen both technical education and general education programs. During the consolidation, a great deal of pushback occurred with individuals who did not realize that two educational programs could grow together and find unity (Dullrich, 2010). Not only did the two institutions become unified, but they also worked together to receive many accolades through the integration of projects, curriculum, and partnerships (Blythe, 2008). The Aspen Institute named WKCTC as one of the nation's top ten community colleges four consecutive award cycles 2011, 2013, 2015, and 2017 (The Aspen Institute, 2017; Hlinka, Mobelini, & Giltner, 2015).

Community colleges operate in a fluid environment, which magnifies the difficulties in pinpointing the exact changes connected to the fluctuation of data (Stephenson, 2014). The current community college outlook at WKCTC appears to have a strong mission and goal, which works to support the students and the surrounding communities (Blythe, 2008). As part of the community college mission, academic and career programs extend partnerships across educational and political

lines in order to provide needed and timely student learning outcomes for potential employers possible (Stephenson, 2014).

Types of Dual Credit Delivery

Barnett (2016) links college success to students who earn at least nine college credit hours before high school graduation. Despite insufficient research in the number of dual credit hours attained, student outcomes, and overall effectiveness, state legislatures advocate for dual credit as a promising structural reform to assist secondary institutions in academic rigor and curriculum (Taylor, 2015). In the past, students who were not high achieving may not have had the option to choose dual credit; however, many high schools have chosen to offer these as part of the high school curriculum (Mansell & Justice, 2014; National Commission on the High School Senior Year, 2001; Taylor, 2015).

Each eighth grade student should create a four-year plan, under the advisement of school counselors, parents, and others (Karp, 2015). There are a variety of examples for this process, including the Individual Learning Plan, Kentucky Career Clusters, and one-on-one advising sessions (Blessing, 2016; KDE, 2018). The four-year plan should include short- and long-term goals, course selection, and college and career interests. Awareness of the requirements for college coursework provides practical reasons for the student to work toward achieving college and career readiness status (Aud et al., 2011; Hurman, 2014). For example, students who intend to pursue a degree in the healthcare field should complete specific courses related to the program before entering the selective admissions pool of candidates.

The four-year plan needs to continuously updates and the student should review the information annually. The review should take place under the direction of high school and college counselors who can answer pertinent questions related to the completion of the academic plan (Karp, 2015). Students need to view current and future goals as benefits and challenges arise in

order to strengthen the intended results (Farrell & Seifert, 2007). Creating and monitoring an academic plan in high school assists the student in a guided career pathway (Burton & Wellington, 1998). Students have diverse goals, mature at various times, and learn at different levels (Hodara, 2015). Understanding college pathways begins with a high school counselor, college advisor, and the dual credit student.

West Kentucky College Academy. Dual credit programs, offering college courses at the high school, have been part of WKCTC course offerings since the 1980s (KCTCS, 2018). Dual credit courses are offered by WKCTC to high school juniors and seniors. The high school students follow eligibility requirements, as outlined by KCPE and KDE Dual Credit Policy, which include achieving college course benchmark scores on an approved assessment, ACT, Scholastic Assessment Test (SAT), Test of Adult Basic Education (TABE), (Kentucky Online Testing) KYOTE, etc., (2016). KDE publishes ACT benchmark scores as an 18 in English, a 20 in reading, and a 19 in math. Achieving the ACT benchmark scores qualifies the student as College Ready (Blessing, 2016). General education course benchmark scores align with the ACT benchmarks for course enrollment. WKCTC also offers additional placement assessments for students to meet course requirements. Technical education course benchmark scores vary by courses, departments, and divisions, as related to specific course content and curriculum (KCTCS, 2016).

ACT offers data for a typical student at a typical postsecondary education institution taking the basic first-year college courses. English composition, college algebra, and biology are identified through ACT as the most common credit-bearing courses in the first year of college (ACT, 2013). College benchmark scores summarize an overall ability in content assessed, and college placement scores focus on a specific skill set related directly to course content (Hurman, 2014; Martinez & Klopott, 2005).

A wide variety of dual credit programs allow students to earn college credit. Some programs require end-of-course assessment to meet national standards (Minnesota Department of Education, 2017). Others require completion of a set of courses related to higher education first year coursework, or enrolling in and completing the college course with a passing grade (Warne, 2017). One definition of dual credit states that students are building a college transcript and GPA, while simultaneously building a high school transcript and GPA (Ganzert, 2014; Lichtenberger et al., 2014). Historically, academia has sought course content and curriculum targeted for student individuality and ability levels (Godfrey et al., 2014).

Currently, there are at least five postsecondary education institutions who enroll students in dual credit within the WKCTC service area. Partnerships between the high schools and postsecondary education institutions help to alleviate any undue conflict or competition by setting guidelines and boundaries (ACT, 2015). If multiple postsecondary education institutions offer courses at the same high school, the administration of the high school will specify who offers courses, within the WKCTC service area. The postsecondary education institutions provide guidance in academic pathways. This helps to create a seamless transition from high school to the postsecondary education setting.

There is a gap in research related to credit hour attainment, specific course offerings, and the significance, if any, as related to matriculation. Data for dual credit at WKCTC can be traced back for 30 years, yet no research has been gathered on credit hour attainment or course offerings. Dual credit enrollment at WKCTC has seen a significant increase over the past ten years, with 316 dual credit students enrolled in fall 2006 and 1,319 enrolled in fall 2017 (KCTCS, 2018). WKCTC overall enrollment has increased through the enrollment and matriculation of dual credit students (WKCTC, 2015). Students earning dual credit have a substantial effect on college enrollment and college completion (ACT, 2015; Taylor, 2015). During the fall of 2015, WKCTC reported student

enrollment of 6,053; 1,175 were high school students (KCTCS, 2018). At that time, dual credit enrollment accounted for 19% of the total number of students enrolled (WKCTC, 2015).

Building a skilled, highly trained workforce helps to grow a vital economy and complete the transition to a productive, tax-paying citizen starting with the enrollment and matriculation of dual credit students (Boggs, 2012; Wang, Chan, Phelps, & Washbon, 2015). Dual credit enrollment increases overall enrollment at WKCTC (KCTCS, 2018; WKCTC, 2016). The enrollment also increases the transition population to postsecondary education at WKCTC and other institutions. In the fall of 2016, KCTCS reported dual credit enrollment made up 15.7% of the total KCTCS enrollment (KCTCS, 2018). Students who have earned dual credit and transition to a postsecondary education institution are more likely than peers to complete a college credential (Karp, 2015).

College credit achievement leads to college credential completion. Students need to plan the next steps in course selection and fulfillment of a program plan. College credit attainment must align with division/departmental semester outlook (Hurman, 2014; Martinez & Klopott, 2005). Achieving college sophomore or junior status by collecting multiple college hours may not be to the benefit of the student's intended program plan. Therefore, it is imperative to create a two- or four-year plan, which allows students the opportunity to work toward a goal of college credential attainment (Hurman, 2014; Martinez & Klopott, 2005).

Advanced Placement (AP) Program. The mission of the AP program was to reduce and remove duplicated course content between secondary and postsecondary education institutions (Godfrey et al., 2014; Sadler, Sonnert, Tai, & Klopfenstein, 2016). Students have the opportunity to earn college credit at the end of the course if they passed a nationally standardized assessment aligned with the college course (Warne, 2017). As a student progresses through the AP curriculum, the intention is to complete a high school diploma and a bachelor's degree within seven years instead of the normal eight (Godfrey et al., 2014; Sadler et al., 2016). The initiation, foundation,

and strong partnership existed based on a mutual concern in the high school and universities for the high achieving students (Novak, 2017; Rothschild, 1999). Continuous communication between the partners was required while maintaining specific curriculum alignment through the AP Program (The College Board, 2016). Students obtain academic instruction aligned with collegiate freshman course content (Rothschild, 1999; Schneider, 2009). To confirm student achievement of the learning outcomes, an exam administered at the end of the course (Rothschild, 1999; Schneider, 2009; The College Board, 2016).

Articulated Credit. Postsecondary education institutions may offer students the opportunity to earn college credit through articulated credit (Ganzert, 2014; Taylor, 2015). This credit transfer program requires an agreement between educational institutions to confirm that the specific course curriculum is in alignment with assessment and student learning outcomes (Monaghan & Attewell, 2015). After the student graduates and is ready to transfer to the next institution, the student can request the credit be recorded on the college transcript (Ganzert, 2014). Stipulations exist, as a student's eligibility in earning the college credit is dependent upon student enrollment in the corresponding program pathway (Monaghan & Attewell, 2015). Therefore, the student may or may not have earned the college credit as the grade is not recorded on a college transcript at the time of the course (Kim, 2014).

College Level Examination Program (CLEP). For the past 40 years, the CLEP exam is accepted in more than 2,900 colleges and universities (The College Board, 2017). This makes CLEP the most widely trusted credit by examination option to earn college credit. Exams were developed by CLEP to correspond with introductory college level courses. The exam is a way for students to demonstrate a mastery of the content knowledge (The College Board, 2017). There are 33 exams offered to students online, and CLEP provides a calculated score onscreen at the end of the testing session. In order to determine if student will receive college credit, scores are submitted

to the receiving college or university (The College Board, 2017). The college credit must come from the college or university based on the official scored exam (The College Board, 2017).

International Baccalaureate (IB) diploma. The IB diploma is a series of courses taught at an approved high school, in a specifically outlined path to create depth of knowledge and learning within the program (Conley, McGaughy, Davis-Molin, Farkas, & Fukuda, 2014; Hill & Saxton, 2014). High school students must complete the two-year education program to earn the IB diploma. International acceptance and improvement of learning in the higher education setting are advantages of achieving this secondary diploma (Conley et al., 2014). At the completion of the IB diploma, students may find that universities offer priority enrollment, advanced standing, course credit, as well as scholarship offers. These benefits are specifically based on university policy and standards (Conley et al., 2014; Hill & Saxton, 2014). The IB curriculum is designed to prepare students for higher-level academic work and becoming civic-minded individuals who use knowledge gained to think critically and solve problems (Martinez & Klopott, 2005).

Benefits of Dual Credit Programs

Dual credit programs may be challenging, but many other benefits are associated with decisions to earn college credit while enrolled in high school (ACT, 2014; Johnson, Jarrell, & Adkins, 2015; Taylor, Borden & Park, 2015). A major benefit is providing underrepresented minority students access to quality education through school and state collaboration (Martinez & Klopott, 2005). State policy, financial issues, and transportation problems affect traditional dual credit programs (Karp, 2015; Kim, 2014). However, with collaboration, these problems can be avoided. The results of the collaboration provided evidence when the state collaborates with secondary educational institutions and offer the underserved students a chance to access dual-enrollment programs, the students have a better chance of transitioning to college and completing a credential (Vargas et al., 2014). The results of this pilot demonstrated that at least 87% of the

juniors and seniors showed persistence over the semesters. Enrollment more than tripled among the African American and Latino students, who do not traditionally consider dual-enrollment programs (Vargas et al., 2014).

There are more benefits in dual credit programs revealed by the literature (ACT, 2014; Johnson et al., 2015). Dual credit programs have been found to improve high school graduation rates, postsecondary education preparedness, and postsecondary education enrollment (Karp, Calcagno, Hughes, Jeong, & Bailey, 2007; Lichtenberger et al., 2014; Taylor, 2015). The students who participated in dual credit have greater educational aspirations and higher degree attainment (Lichtenberger et al., 2014). Retrospective dual credit studies also led to findings that demonstrated positive outcomes of dual credit programs (Wang et al, 2015). In particular, Oakley (2015) found these programs improved high school and college graduation rates or have improved persistence of high school and college students. In addition, dual credit programs reported faster time to completion of postsecondary education programs, which most families found beneficial (Phelps & Chan, 2016). Studies also found higher first semester and second semester college GPAs among the students who experienced dual credit (An, 2013; Lichtenberger et al., 2014).

Kane et al., (2015) though an empirical quantitative research study, reported dual credit students to have increased student motivation and, eventually, higher student satisfaction ratings because the students were motivated to have better school and career aspirations. In addition to student-level benefits, dual credit programs have demonstrated critical system-level benefits (Robertson et al., 2001). Dual credit partnerships lead to a better and more frequent dialogue between districts (Kane et al., 2015; Smith, 2013). Achieving course alignment and closing transition gaps are realized through collaborative dual credit programs (Fink et al., 2017).

Shaw et al., (2013) found that high school students who earned college credit achieved higher four-year postsecondary education graduation rates than peers who did not earn college

credit in high school. The higher graduation rates were evident in non-traditional participants, such as first-generation families and underrepresented minority females. Shaw et al. (2013) revealed that students who take at least one AP class as well as the exam have an advantage over peers who did not take an AP class and exam. Shaw et al. (2013) found students who took at least one AP exam were more likely to graduate from college within four years.

Wang et al., (2015) found the same positive effects on the educational outcomes of two-year college students. Researchers also examined academic momentum and how dual credit serves as a mediating variable on the possible relationship between dual credit and academic performance. The data included 15,000 first-time postsecondary education students who enrolled and entered Wisconsin's two-year colleges from 2009 to 2010 (Wang et al., 2015). Data compared students who participated in dual credit and those who did not, and results showed the positive relationship between dual credit participation and college outcomes, even in two-year colleges. In particular, students who participated in dual credit found to be those who entered college immediately, enrolled in summer courses, and had stronger overall academic performance (Wang et al., 2015).

Non-cognitive student outcomes that are equally promising found with dual credit students (Phelps & Chan, 2016). Heath's (2008) comparison of 275 dual credit students to 258 traditional community college transfer students showed dual credit students had the advantage concerning college GPA, associate and bachelor degree completion rates, and length of degree completion. Heath (2008) found that dual credit students experienced greater satisfaction throughout the postsecondary education experience compared to the traditional non-dual credit students. Other studies (An, 2013; Jones, 2014; Shaw et al., 2013) claim dual credit participation increases academic outcomes in college if the variables of academic motivation and engagement are improved. Studies (Jones, 2014; Mead, 2009) have examined whether academic motivation and engagement account for a positive relationship between dual credit and academic performance.

Gathering data from the Wabash National Study of Liberal Arts Education, the researchers found a direct and positive relationship between dual credit and first-year college GPA (An, 2013). The positive relationship holds, even if pre-college variables are controlled. More importantly, An (2013) found that students who engaged in dual credit are more academically motivated than most non-dual credit students, which can explain higher academic performance. However, findings were not as strong as anticipated. For some students, An (2013) found that participation in dual credit leads to a stronger effect on first-year college GPA at colleges and universities, compared to highly selective institutions.

Relationships among business and industry, secondary schools, community organizations, and non-profit agencies are a vital part of a community college (Phillippe & Sullivan, 2005). Without strong partnerships, WKCTC's effectiveness in education preparation would be limited. The partnership provides anything from monetary support to volunteers folding letters and stuffing envelopes. The surrounding community shares in the success of the college and supports its mission (Robertson et al., 2001). Additionally, concurrent enrollment increases community college enrollment, as participating students become a larger proportion of the overall community college student body (Zinth, 2015). The National Center for Educational Statistics (NCES) reports college enrollment immediately following high school graduation increased 17% nationally from 2004 until 2014 (U.S. Department of Education, 2014).

Students are more likely to earn a bachelor's degree if they transfer from a community college than if they start and end their collegiate experience at a four-year institution (Boggs, 2012; Clawson et al., 2015). As the first-time freshman begins the process of obtaining a college degree, there are many options to pursue (Kim, 2014). Within a 100-mile radius of the WKCTC main campus, students may choose to attend one of 20 two- or four-year public or private institutions and for-profit options, based on count from Census data (U. S. Census Bureau, 2017). Through dual

credit, students are introduced to many of these options, which provides them with the experience of the different admissions and advising processes, as well as course offerings (Raia-Taylor, 2012).

Earning a college credential is more than the ability to take college classes (Martinez & Klopott, 2005). With the substantial enrollment numbers of dual credit students, colleges have obstacles with completing the next phase of doing more with the same resources (Raia-Taylor, 2012). High school students who take college courses need to be advised by individuals with knowledge of both the K12 environment and the secondary institution (Robertson, Chapman, & Gaskin, 2001). If a student does not obtain specific high school credits, they will be unable to graduate. Therefore, if the student does not follow the college program plan for course enrollment, they may add, instead of reduce time to credential completion (Karp, 2015).

Obstacles such as accessibility, affordability, and transferability continue to exist; however, continued efforts are helping to alleviate these obstacles (An, 2013; Mansell & Justice, 2014). Students must be proactive before they begin earning college credit (Raia-Taylor, 2012). Creation of an academic plan will empower the student with the knowledge of credential requirements (KDE, 2018). If the student plans to attend a college other than the one from which they are earning dual credit, they need to research about transferability (Crisp & Delgado, 2014; Stern, 2016). When dual credit is offered and accessible through the high school setting, students should not enroll in courses that do not align with the individual academic plan (KDE, 2018; Stern, 2016). Policies need to be in place to ensure the transferability of the college credit toward the student's desired academic plan (Karp, 2015) and advisement for proper course selection (O'Banion, 2013).

College success predictors consist of academic preparation, social support, access to information, parental involvement, and financial assistance (Carey, 2015; Farrell & Seifert, 2007; Ganzert, 2014; Jones, 2014; Karp, 2015; Oakley, 2015). Understanding college behavior, academic rigor, and social and academic support are predictors of enrollment and success in higher education

(Hodara, 2015; Martinez & Klopott, 2005). Students who earn college credit in high school have the ability to gain these skills earlier and adapt to the transition from secondary to postsecondary education more successfully than peers without prior college experience (Carey, 2015). Dual credit increases students' aspirations to attend college and offers positive psychological and motivational effects by providing higher education opportunities (Taylor, 2015). Prior preparation for the student results in a higher probability of success for the student (Mansell & Justice, 2014; Mead, 2009). Foundational support or knowledgeable mentors are effective in assisting in higher education enrollment (Hurman, 2014; Oakley, 2015). Students without support and guidance, especially underrepresented minority students, are less likely to understand and maneuver through the college processes and procedures (Martinez & Klopott, 2005).

Taylor (2015) states that early and continuous exposure to dual credit and college experiences are more likely to enhance college preparation and transition. Learning about potential careers in the student's field of interest can help narrow choices for a college major (Karp, 2015). Selecting a college major before taking college courses will help in earning a college credential in a shorter period (O'Banion, 2013). Taking advantage of dual credit opportunities increases the rate at which students will earn a college credential (An, 2013).

Using a variety of course models such as face-to-face and online learning can be helpful to students, as well as challenging (Mansell & Justice, 2014). Even through a collegiate model such as online courses, students need to have actual classroom expectations, which lead to authentic experiences (Clawson, Hartz, & Van Drimmelen, 2015). Online courses offer both positive and negative experiences for the students. Concerns arise when dual credit offerings are exclusively online, as the student is not exposed to the diverse collegiate experience (Allen, Tilghman, & Whitaker, 2010; Mansell & Justice, 2014). Student anxiety related to stepping onto the college campus and learning how to overcome the collegiate unknowns cannot be alleviated in online

courses (Clawson et al., 2015; Jones, 2014). Dual credit programs offer familiarities for students as they learn college process and procedures through multiple course modalities (Karp, 2015). The varied dual credit options provide students with an authentic college experience (Karp, 2015; Mansell & Justice, 2014).

Some dual credit programs offer courses on the college campus to facilitate high school schedules and ease transition anxiety (Stephenson, 2014; Taylor, 2015). However, this course setup does not provide students with the interaction of a diverse student population that commonly exists in a college classroom (Allen et al., 2010). Mingling high school students within an existing college course helps to provide a more realistic setting (Mansell & Justice, 2014; Stephenson, 2014). Addressing college coursework and course content created for college-aged students, prior to dual credit enrollment, may assist in unexpected outcomes for high school aged students (Kim, 2014; Oakley, 2015). Experiences, challenges, obstacles, and successes help to offer students a platform of true learning and understanding (Balfanz et al., 2014; Jones, 2014; Tobolowsky, & Allen, 2016).

National Alliance of Concurrent Enrollment Partnerships (NACEP)

As the momentum of dual credit enrollment emerged, policies and regulations were developed (Karp, 2015; Taylor et al., 2015). The regional collegiate accrediting agencies sought confirmation of quality within dual credit programs (Taylor, 2015; Vance, 2018). The American Association of Higher Education (AAHE) (Karp et al., 2007) was questioning content quality and student outcomes. A voluntary national accrediting organization, the National Alliance of Concurrent Enrollment Partnerships (NACEP), formed to provide secondary and postsecondary education partners accreditation status (NACEP, 2018). As dual credit enrollment grows and structural guidance is limited, NACEP accreditation is a path pursued to achieve confirmation in the alignment of coursework taught, faculty credentialing, assessments, student learning outcomes, and professional development within a set of national standards (Karp, 2015; NACEP, 2018; Taylor, 2015).

NACEP's standards of program quality are curriculum, faculty, students, assessments, and program evaluation. This is a voluntary accreditation process chosen by institutions to ensure quality alignment with the national organization (NACEP, 2018). As of 2018, NACEP membership had grown to 306 two-year college members, 155 four-year universities, 72 high schools and school districts, and 46 state agencies or system offices (NACEP, 2018). In order to ensure standards have been met, NACEP conducts a comprehensive review of participating institutions, after a self-study is complete (Karp et al., 2007; Taylor et al., 2015). Within the NACEP organization, 98 programs have earned accreditation through validation of peer reviewers, confirming that standards are achieved in five areas (Karp, 2015). In 2012, WKCTC applied for and achieved NACEP accreditation to be recognized as a program which meets national standards (WKCTC, 2015).

Academic Advising

Academic advising exists to assist students and is an essential tool that leads to the correct pathway and the intended career goal (O'Banion, 2013; Vance, 2018). Most institutions offer only one type of advising model and students must adapt to the option provided (Raia-Taylor, 2012). The process of advising is not to simply enroll students in courses for the upcoming semester (Burton & Wellington, 1998; Grites, 2013). Academic advisors discuss interests and program plans with the students (Bailey et al., 2015). Next, academic advisors help the student create a plan to achieve the goal (Raia-Taylor, 2012). Students who have definite plans and clear understanding of their goals will not need an intrusive advising model (O'Banion, 2013). Students may need to have questions answered and approval to add courses from the high school or parents (Raia-Taylor, 2012). Developing a clear path to a college credential moves students on track to increase both the retention rates and graduation rates (O'Banion, 2013).

A student who walks in to the advising session with little or no idea about future plans and goals will require additional resources in order to assist in providing the necessary guidance approach (O'Banion, 2013; Grites, 2013). These undecided students need access to academic planning materials before making an advising appointment (Bailey et al., 2015; Raia-Taylor, 2012). Astin (1984) explained the importance of a student choosing a college major early that helps in achievement of a college credential. Students who prolong the decision to choose a college major are most associated with lower attrition rates (Bailey et al., 2015).

There are many advising models that include (1) integrative advising, (2) appreciative advising, (3) central advising center, (4) instructor advising, and (5) a team approach. Integrative advising was the model used at the site from which the researcher chose to obtain data. Terry O'Banion developed the integrative advising model in 1972 (Burton & Wellington, 1998). O'Banion (2013) finds that a logical sequence model helps students to connect personal and

vocational goals to the selection of program and course offerings. A five-step process of (1) exploration of life goals, (2) exploration of vocational goals, (3) program choice, (4) course choice, and (5) scheduling classes creates a holistic decision making process for the advising model (O'Banion, 2013).

A developmental advising approach is based on a student-advisor relationship that is built through continuous conversations and information gained over time (Grites, 2013). This type of academic advising creates a meaningful pathway led by the student, enriched with collaboration from both the advisor and student services. The student takes the ultimate responsibility for the advising session. On the other end of the spectrum, prescriptive advising gives information to the student regarding course offerings and times available (Bailey et al., 2015; Grites, 2013). In this advising model, the advisor tells the student what is needed to build a schedule of classes (Grites, 2013).

Dual credit students need an advising experience with multiple layers to achieve the most effective experience and connection to the postsecondary educational environment (Grites, 2013). Through the advisement process, students enroll in courses to meet high school graduation requirements along with leading them to the completion of earning a college credential (Zinth, 2015). A combination of the developmental advising model and the logical sequence method created by O'Banion (2013) helps to lead high school students through a complex decision making process. This process puts the student in charge of seeking information related to individual interests and skill sets, which are realized with the assistance of a comprehensive academic advisor. The institution takes care of such items as coding students correctly, advising and enrolling students, following up throughout the semester to support student success and attempting to alleviate minor issues, while facilitating and troubleshooting obstacles, which may arise.

Student advising must occur throughout high school and be revisited multiple times (Hurman, 2014). Discussions, question/answer sessions, and research needs to be continuous between the student and a knowledgeable mentor (An, 2013). Dual credit advisors must have an understanding of both secondary and postsecondary education environments (Raia-Taylor, 2012). In addition, advisors must be knowledgeable in curriculum and requirements. This helps lead students toward credential attainment at both institutions (Stephenson, 2014). Advising of dual credit students for high school should be priority before enrolling in college credit courses (Raia-Taylor, 2012). Without advisement and guidance, students may take a course that will transfer but may not be used toward credential completion (Bailey et al., 2015). This can add to the time to earn a credential instead of shortening the time (Raia-Taylor, 2012).

Student involvement and understanding of the collegiate academic pathway not only assists in realizing the start to finish design but also gives the student a feeling of empowerment (Cassidy et al., 2011; Hurman, 2014). The relationship built through the advisor-student connection can play a monumental role in student retention and completion rates. The student needs to have reassurance of the academic information shared in order to obtain the college credential and have the ability to adapt wants and needs, which may produce the intentional outcome of completing the academic goal (Hurman, 2014; Martinez & Klopott, 2005). A comprehensive guidance plan, which is reviewed annually, is a tool that allows the student to research potential postsecondary plans related to college, workforce, military, or other options.

Theoretical Framework

The work of Alexander W. Astin (1984), a leader in the field of research on retention and student attrition, provides the basis of this study. Most of his research focused on variables that can have an impact on student persistence and retention, particularly on first-year programs. These programs intentionally focus on providing opportunities for student engagement. These variables

include active involvement in both academic and non-academic areas in the postsecondary education setting. Astin (1984; 1985) highlights psychosocial and physical energy in student participation of studying, activities, and interaction with faculty and other students.

Astin's (1984) theory of involvement provides insight and guidance for the basis of this study related to dual credit students. This theory states that the more involved a student is in the educational experience, both intellectually and socially, the more likely that the student will matriculate and persist to a postsecondary education institution. This theory added that the core curriculum related to student involvement is essential for student success (Astin, 1984; Astin, 1985).

Astin (1984) added that if students feel well connected, they will feel more prepared, and are more likely to remain enrolled. Making a connection is difficult for students who are part-time and have multiple responsibilities (Raia-Taylor, 2012). Dual credit students rarely take 12 or more credit hours per semester, which would classify them as a full-time college student. The majority of dual credit students at WKCTC divide time between the secondary and postsecondary education course. These students do not have opportunities to become involved in campus activities due to time constraints. However, connection happens on different levels for students. Researchers in examining the role of dual credit programs and student achievement (Flores, 2012; Kane, Shaw, Pang, Salley, & Snider, 2015) have used Astin's theory.

Encouraging increased student involvement of the dual credit students is aligned with Astin's theory of involvement within the CONNECT program at Oregon State University (Clawson et al., 2015). The CONNECT program is composed of more than 75 different activities wherein students, including dual credit students, are given a chance to meet peers, get connected to campus resources, and develop community partnerships (Clawson et al., 2015). Activities include athletic and academic events designed to assist students at the beginning of college life, as well as during

and after. Students who choose social isolation are less likely to complete a college credential than those who have a connection to the campus and environment (Astin, 1985).

The results from Oregon State University's CONNECT program exemplify Astin's (1984) involvement theory, in that by providing extensive opportunities for students to be more involved on campus, they can perform better academically (Clawson et al., 2015). Academic engagement, career exploration, and community connections are a few of the activities, which lead to enhanced collegiate engagement (Oregon State University, 2018). The CONNECT program reflected an increase in enrollment in courses during the subsequent semester.

Summary

The literature indicates a positive impact of properly obtained dual credit courses on the student's future college experience and credential attainment. However, students may not be ready to enroll in college coursework during high school and there are other issues, which may interfere. The high school student should want to be enrolled in courses, which are academically challenging and realize the additional constraints required in order to be successful. Achievement of college benchmark scores reveal significant increases in the achievement of a passing grade for first-year college level courses (ACT, 2015).

The offerings of dual credit courses come from the partnerships of two-year and four-year postsecondary education institutions with the secondary institutions (Karp, 2015; Taylor, 2015). Some states have comprehensive dual credit policies that provide guidelines for both institutions and liberal credit granting procedures. Other states have created policies, but they are limited to specifications in student access, requirements, and restrictions. Students throughout the United States are earning dual credit at an increasing rate, yet state lines may control course offerings, credit granting, and funding (Karp, 2015; Taylor, 2015).

The mission of a community college weaves the open access model into the needs of the high school setting by providing additional or missing academic opportunities (Bailey et al., 2015; Phillippe & Sullivan, 2005). Offering dual credit courses to high school students helps to serve the surrounding communities by integrating and aligning education strategies. Through the community college, students may earn a transfer diploma, technical education degree, and/or industry certificates. College credentials assist students in pursuing career goals through coursework achieved in high school and college (Bailey et al., 2015; Phillippe & Sullivan, 2005).

While enrollment in dual credit increases credential attainment, students need to understand the reality and expectations for the college coursework. Dual credit programs and individual institutions use methods such as benchmark scores, honors track, or other assessments to affirm student eligibility related to course enrollment (Karp, 2015; Taylor, 2015). College benchmark scores summarize an overall ability in content assessed (ACT, 2013), whereas college placement scores differ by focusing on a specific skill set related directly to course content (Taylor, 2015). Students who enroll in dual credit are more likely to transition to college after high school and earn a college credential. The decision to enroll in college courses, while a student is currently in high school, needs prior consideration related to intended outcome and student goals. By maintaining and continuing on a guided college/career pathway, earning college credit will benefit students by receiving a college credential in a shorter period (Johnson et al., 2015; Taylor et al., 2015).

Dual credit has evolved from simply earning college credit to better preparing students for future postsecondary education environments. Effective programs help to fulfill goals related to high school and educational reform (Martinez & Klopott, 2005). Through this effort, dual credit will assist in decreasing the need for high school graduates' enrollment in remediation coursework in college. Academic advising before dual credit enrollment provides students with choices to help make an informed decision regarding course selection and pathway completion. Choosing to take

dual credit courses can help acclimate the student to college content and rigor (Johnson et al., 2015; Taylor et al., 2015). Although state policy provides a guide for dual credit programs, strong partnerships create a thorough plan for students to follow. Guidance is needed, and accurate information is a necessity for students. Decisions made with knowledgeable and accurate content related to the outcomes for the individual student. Parents and students need to be proactive throughout the process of preparing for and enrolling in dual credit programs.

Chapter 2 shared the literature review of dual credit and dual credit programs. A historical perspective of community colleges leads to state policies and dual credit benefits. The next chapter will provide the methodology, which includes the research design. Research questions, along with the hypotheses and attributes of dual credit students will be presented. Additionally, methods of data collection and statistical analysis will be described.

Chapter 3: Methodology

This chapter provides a description of the research design and methodology, along with the research questions and hypotheses, which guide the research. Quantitative methods used to analyze historical data, representing students who earned dual credit at WKCTC. Student variables associated with dual credit student and the data collection process will be detailed in Chapter 3. The intent of the study examined specific variables related to dual credit students who matriculated to WKCTC. The outcomes used in assistance with future recruitment efforts to increase matriculation related to the dual credit student population.

Research Design

The researcher selected quantitative research models appropriate for reviewing large datasets. The enrollment data consisted of 6,232 unduplicated student entries. As an inquiry based model, quantitative research used to describe trends and relationships amidst the stated variables. The 20 variables tested with the dependent variable of matriculation to WKCTC to see if a relationship existed. The 20 variables categorized based on credit hour attainment, gender, ethnicity, high school enrollment, dual credit scholarship programs, and academic disciplines. The category referred to academic disciplines included courses associated with: allied health and nursing, business, communication, English, foreign language, heritage, humanities, introduction to college, mathematics, science, social behavioral science, technical, and workforce. The variables are listed and described in Table 1.

Table 1
Dependent and independent variables

Variable	Label	Description
Dependent	Matriculation	1= matriculated to WKCTC after earning dual credit 0= did not matriculate to WKCTC after earning dual credit
Independent	AHE	Students earned college credit in an allied health course, 1= yes; 0= no
	BUS	Students earned college credit in a business course, 1= yes; 0= no
	CMC	Students were participants of the Commonwealth Middle College, 1=yes; 0= no
	COM	Students earned college credit in a communications course, 1= yes; 0= no
	CRHRS	Number of credit hours a student earned: 1 = 1 credit hour, 2 = 2 credit hours, 3 = 3 credit hours... until 24 = 24 credit hours, 25 = 25 to 36 credit hours, and 37 = 37 to 73 credit hours
	ENG	Students earned college credit in an English course, 1= yes; 0= no
	ETHN	Ethnicity: 1= white; 2= African American; 3= Other (American Indian, Alaskan, Asian, Hispanic, two or more races, and non-specified)
	FORL	Students earned college credit in a Foreign Language course, 1= yes; 0= no
	GEN1	Students enrolled in only Introduction to College course, 1= yes; 0= no
	GEN2	Students enrolled in Introduction to College course and at least one additional course, 1= yes; 0= no
	GND	Gender, 1= male; 2= female
	HRT	Students earned college credit in a Heritage course, 1= yes; 0= no
	HS22	High school student attend, 1-22
	HUM	Students earned college credit in a Humanities course, 1= yes; 0= no
	MTH	Students earned college credit in a Mathematics course, 1= yes; 0= no
	SBS	Students earned college credit in a Social Behavioral Science course, 1= yes; 0= no
	SCI	Students earned college credit in a Science course, 1= yes; 0= no
TECH	Students earned college credit in a Technical course, 1= yes; 0= no	
TERM	Year the student enrolled in dual credit, 1= 2012, 2= 2013, 3= 2014, 4= 2015, 5= 2016	
WRF	Students earned college credit in a Workforce course, 1= yes; 0= no	

Seeking the statistical significance to matriculation from the independent variables describes whether a relationship exists and the strength of the relationship (e.g. strong, moderate, weak). Descriptive statistical analysis used to provide a frequency distribution of student enrollment by high school, gender and ethnicity to give an overview of data for the reader. Matriculation rates were calculated using central tendency of mean per year.

Purpose of the Study

The purpose of this study was to find if relationship exists between matriculation and a series of categorical independent variables, identified from student enrollment data. Growing the matriculation rates of the dual credit student population would help to increase the overall headcount at WKCTC and create a continuity bridge from secondary to postsecondary education. Transitioning the dual credit students to matriculation justifies resources expended to recruit and maintain the dual credit program. The results help WKCTC make data-driven decisions on how best to allocate fiscal and human resources for future recruitment efforts.

Research Questions

What are characteristics of students who matriculated to WKCTC after previously earning college credit as a dual credit student?

The following research questions and hypotheses developed to answer the primary research question and focus on possible correlations of specific independent variables to matriculation.

Question 1. Is there a relationship between total number of dual credit hours earned and matriculation to WKCTC during the fall semester immediately following high school graduation?

H_0 Credit hour attainment has no correlation to matriculation.

Question 2. Is there a relationship related to the high school a student attends for those who matriculate to WKCTC?

H_0 Matriculation rates are not correlated to the high school from which a student attends.

Question 3. Is there a relationship between underrepresented minorities, as defined by gender and ethnicity, and those who matriculated to WKCTC during the fall semester immediately following high school graduation?

H_0 Underrepresented minority population, defined by gender and ethnicity, does not correlate to matriculation.

Description of Population

The dataset focused on students who graduated from a high school within the WKCTC service area and earned dual credit from WKCTC. Partnerships for dual credit exists in the 10 county region, from 22 public and private high schools. The dataset includes 6,232 students who earned dual credit during 2012-2016 at WKCTC. Students from the WKCTC service area were included in the data. WKCTC service area consists of 10 counties: Ballard, Calloway, Carlisle, Fulton, Graves, Hickman, Livingston, Lyon, Marshall, and McCracken. Students must have graduated from one of the high schools within the service area and enrolled in a minimum of 12 college credit hours during the fall immediately following high school graduation to be considered matriculated, for this study.

Data Collection Method

Historical demographic data was requested from WKCTC Institutional, Planning, Research, and Effectiveness (IPRE) department. The data was compiled using the KCTCS database management system, Decision Support Services (DSS). This is a comprehensive database, which has the capability to run queries and reports from data located in the KCTCS Student Information Portal, PeopleSoft. The data was disaggregated for identifying variables, which correlate to matriculation. This quantitative research study analyzed data only from students who earned dual credit with WKCTC, during a five-year time of 2012-2016.

The researcher requested approval for data through the WKCTC IRPE department after obtaining IRB approval from Murray State University (MSU), KCTCS, and WKCTC, following institutional policies and procedures. Prior to receiving data, personal characteristics were removed from each record to ensure confidentiality and anonymity. Data was requested during the fall of 2017, after the official KCPE official enrollment date. Therefore, enrollment and matriculation numbers based on dual credit student at WKCTC during the five-year period and the matriculation data for the same students. Matriculation data provided information related to students who graduated from high school immediately enrolled in WKCTC during the subsequent fall semester.

The researcher received data in a spreadsheet format and utilized Microsoft Excel to perform disaggregation, analysis, and comparison for final reporting. Data collection consisted of editing data to inspect for complete, accurate, and consistent entries. Microsoft Excel was used to obtain descriptive statistical analysis of mode, mean, and median of each variable. This software also helped to remove duplicate records, sort for and remove dual credit enrollment in high schools outside of the WKCTC service area, and find incomplete or missing data in each record. If the data was missing more than two of the twenty variables, they were extracted from the dataset. The data was quantified for gender, ethnicity, and course enrollment to a numeric form. The additional variables were transformed to categorical numbers. The researcher performed statistical analyses using SPSS software. The software allowed the researcher to analyze data, review statistical significance, and authenticate correlation. The binary logistic regression model was chosen due to multiple independent variable comparison to one, dichotomous, dependent variable.

Data were stored on a password protected computer in a locked office on the WKCTC campus. A backed up copy was placed on a USB drive, and kept in a locked filing cabinet in the locked office. The dataset for the study will be erased from all storage devices at the end of three years.

Variables in the Study

Correlational research compares two or more variables and predicts outcomes related to data (Field, 2013). The data provided information related to student matriculation and 20 independent variables. The array of variables consisted of credit hour attainment, gender, ethnicity, high school enrollment, dual credit scholarship program, and academic disciplines. The researcher sought to examine the statistical significance and correlation of matriculation to WKCTC during the fall semester immediately following high school graduation and these variables.

The researcher used gender and ethnicity to identify underrepresented minorities in the dataset. Reviewing the underrepresented minorities will provide information to address any gaps that may arise in enrollment and matriculation (Hlinka, Mobelini, & Giltner, 2015; Jones, 2017). Gender and ethnicity were self-reported on the student's college application. Gender consisted of two options, male or female. Ethnicity categories on the application are white, black/African American, American Indian, Alaskan, Asian, Hispanic, two or more races, and non-specified. The researcher narrowed the ethnicity categories to three groups, for the purpose of this study white, black/African American, and other. The category, other, consisted of the remaining six ethnic groups. Next, the research addressed the high school from which a student earned a high school diploma. High schools were alphabetized and assigned an alphanumeric label to maintain anonymity. When matriculation rate fluctuates by high schools offering dual credit, data will be used to realize benefits and advantages or challenges and opportunities, which need to be addressed. Lastly, the researcher selected credit hour attainment in order to find if a specific number of credit hours earned increased matriculation (Oakley, 2015).

Procedures for Data Analysis

The researcher used quantitative analysis to identify possible relationships with the attributes of dual credit students and matriculation. Descriptive statistical analysis and binary logistic regression models used to find student total credit hours, underrepresented minority, and high school from which the student graduated. The dataset consisted of binary, continuous, and categorical data, which works best with logistic regression model due to its ability to analyze multiple variables. Other models, such as Pearson r, do not have the capability to deal with categorical variables (Creswell, 2012). Using the correlation matrix output, from the binary logistic regression model, the correlation of variables transpired.

A primary research question framed the study. With twenty independent variables and one dependent variable, matriculation, the study sought to find statistical significance to assist with increasing matriculation rates from dual credit students by focusing on outcomes. Using a binary logistic regression model, where $p < 0.050$ defines significance relationship between variables, researcher began searching for answers. Using the p-value, statistical significance emerged and the research questions were developed to focus on the three areas of significance.

The research questions specified three areas to be highlighted and discussed. First, credit hour attainment was obtained from the number of hours each dual credit student earned. Credit hours were listed as a categorical variable in the logistic regression model. Credit hour is conveyed by an interval/scale: 1 = 1 credit hour, 2 = 2 credit hours, 3 = 3 credit hours, through 24 = 24 credit hours, then 25 = 25 to 36 credit hours, and 37 = 37 to 73 credit hours. Credit hour data also defined as a continuous variable, ranging from one to 73 credits, yielded 8.37 as the average dual credit hours earned. Regarding the hypothesis, logistic regression and statistical numeric analysis models assisted in the outcome for credit hour attainment.

In the second question, students were categorized by the high school they attended seeking the p-value for statistical significance, if any. By reviewing individual high school data, the researcher obtains information to pinpoint areas that may need assistance and review or show strength and best practices. The third research question recognized underrepresented minority through gender and ethnicity to seek possible significance points related to matriculation by defining the p-value from the logistic regression model.

The dependent variable in this study was matriculation of dual credit students, which is dichotomous. Matriculation = 1, did not matriculate = 0. This includes students who completed dual credit, graduated from high school, and have the option of matriculation to WKCTC in the fall of the subsequent year. Matriculation being the process of enrollment in a college or university after high school graduation.

The researcher adhered to assumptions within the analyses to construct valid interpretations of outcome. The analyses disaggregated data for students who earned dual credit and matriculated to WKCTC, students who earned dual credit and did not matriculate to WKCTC, and the number of dual credit hours earned by dual credit students. Of the dual credit students who matriculated to WKCTC, data was disaggregated for percentage of males and females, ethnicities, high school from which student graduated, and number of credit hours attained.

Summary

Data provides the evidence, which has the potential to create change in matriculation of dual credit students to WKCTC. Numbers exist to explain trends, variations, and frequencies. They are used to obtain percentages, rates and measurements. The dataset and analyses results measure only numbers in an objective method. The researcher selected quantitative research to report facts and an intentional decision to circumvent bias from the study (Peshkin, 2000). The data provides facts and

figures, definitive answers to quantitative questions, and results obtained through statistical analyses.

The researcher reviewed statistical significance as it related to matriculation rates of WKCTC dual credit students. The outcome and results of the research will be shared with WKCTC Administration for the intent to assist in increasing matriculation of dual credit students. The researcher made continuous effort to remove any intentional and unintentional bias in order to maintain accuracy, credibility, and validity of the outcome. Chapter 3 provided the design and methodology used to disseminate data related to the research questions. Description of participants, population, and attributes related to dual credit were delineated. In Chapter 4, results from the quantitative research of binary logistic regression and statistical numeric analysis are provided to answer research questions, while accepting or rejecting the stated hypotheses.

Chapter 4: Results

This chapter provides the results of the analysis from the dataset used for the study. This dataset provided information collected over a five-year period from 2012-2016 of students who earned dual credit at WKCTC. The findings analyzed specific variables related to the dual credit students who matriculated to WKCTC during the fall immediately following high school graduation. The researcher examined variables, including underrepresented minority, gender, high school, and credit hour attainment. A quantitative research method was chosen, which provided the researcher the ability to calculate large amounts of data related to the 20 variables identified from the students who matriculated to WKCTC. The intent of the research is to assist in increasing the matriculation rate of dual credit students to WKCTC.

Data

A summary of the demographic variables, related to student enrollment, is reported in this section. The data included enrollment for all dual credit students from WKCTC per year. The total enrollment for the five-year data consisted of 6,232 unduplicated students. Gender and ethnicity were reported to reveal trends and review underrepresented minority population compared to peer dual credit students who earned dual credit. College credit hours earned, per student, ranged from one to 73. Within the five-year dataset, students earned a total of 45,811 college credit hours. The average student credit hour attainment was 8.37 (SD=11.3). Seniors accounted for 5,064 students of the reported 6,232 dual credit students. During the fall semester, subsequent to the student's high school graduation, 2,044 dual credit students matriculation to WKCTC. Table 2 provides the enrollment totals, per year, including gender and ethnicity.

Table 2

Dual credit enrollment per year for all students

Year enrolled	Number of students	Male	Female	White	African American	Other
Year 1	1,268	507	761	1,109	71	88
Year 2	1,416	588	828	1,168	121	127
Year 3	1,227	525	702	980	110	137
Year 4	1,146	461	685	929	90	127
Year 5	1,175	498	677	943	93	139
Total	6,232	2,579	3,653	5,129	485	618

Analysis

Primary research question. What are characteristics of students who matriculated from dual credit coursework in high school to WKCTC?

In order to address the primary research question, a binary logistic regression model was performed. The 20 variables were tested with the dependent variable of matriculation to WKCTC to find if a relationship existed. Statistical significance of the following variables were identified: allied health courses (AHE), Commonwealth Middle College (CMC), students who take the introduction to college class and an additional college class (GEN2), and high schools participating in dual credit with WKCTC (HS22). Table 3 reveals outcomes from the binary logistic regression model. Characteristics of dual credit student who have statistical significance to matriculation are students who participate in a defined program with additional supports in place. AHE, CMC, and GEN2 ($p < 0.05$) offer specific, built-in student supports to assist students in achieving a college credential.

Table 3

Variables in the equation

Variable	B	S. E.	Wald	df	Sig.	Exp(B)	95% C. I.	
							Lower	Upper
AHE	.455	.079	33.123	1	.000	1.576	1.350	1.840
BUS	.194	.084	5.370	1	.020	1.214	1.030	1.430
CMC	1.410	.236	35.708	1	.000	4.097	2.580	6.506
COM	.043	.112	.147	1	.701	1.044	.838	1.301
CRHRS	.003	.010	.121	1	.728	1.003	.984	1.023
ENG	-.002	.052	.001	1	.976	.998	.901	1.106
ETHN	-.110	.047	5.431	1	.020	.896	.817	.983
FORL	-.014	.125	.012	1	.913	.986	.773	1.260
GEN1	-.195	.091	4.555	1	.033	.823	.688	.984
GEN2	.509	.089	32.940	1	.000	1.664	1.398	1.980
GND	.267	.062	18.501	1	.000	1.307	1.157	1.476
HRT	-.118	.091	1.687	1	.194	.889	.744	1.062
HS22	-.039	.007	30.083	1	.000	.962	.949	.976
HUM	.192	.107	3.250	1	.071	1.212	.983	1.493
MTH	-.148	.062	5.727	1	.017	.863	.764	.974
SBS	-.025	.087	.086	1	.769	.975	.823	1.155
SCI	-.159	.076	4.345	1	.037	.853	.734	.974
TECH	-.027	.081	.111	1	.739	.973	.830	1.141
TERM	-.005	.022	.047	1	.828	.995	.953	1.039
WRF	-.352	.374	.886	1	.347	.703	.338	1.463

*Appendix 1 defines all variables listed in table.

Also shown in Table 3, the power (B) values of AHE (.455), CMC (1.410), and GEN2 (.509) indicates the strength of the variable as it should be interpreted within this model. Therefore, each unit increase in AHE, the researcher would expect a .455 increase in matriculation. GEN 2 would expect a .509 increase and a 1.410 increase for CMC. HS22 (-.039), however, is a variable that moves in opposite direction of matriculation. When HS22 increases by one-unit, matriculation

would expect to decrease by .039. The researcher used the information related to statistical significance to create the following research questions to provide clarity to the primary research question.

Question 1

Is there a relationship between total number of dual credit hours earned and matriculation to WKCTC during the fall semester immediately following high school graduation?

H_0 Credit hour attainment has no correlation to matriculation.

Credit hour attainment was one of the defined variables and classified as nominal data. The researcher categorized credit hour attainment as 1 to 24, as the actual number of credit hours earned, 25 = 25 to 36 credit hours earned, and 37 = 37 to 73 credit hours earned. In the dataset related to credit hours earned, 86.4% of the students earn 24 credit hours or less. Only 13.6% of the dual credit students earned more than 24 credit hours ($M = 8.37$, $SD = 11.3$). The outcome from the logistic regression model found no statistical significance of matriculation to credit hours $\chi^2(1, N = 20) = 40.83$, $p = .728$. And the logit was $\ln(.728/1-.728) = -1.121 + .003$. Therefore, this failed to reject the null hypothesis. Without statistical significance, additional information provided insight and practical significance. Student enrollment data for high school seniors in dual credit was calculated, along with average credit hour attainment and average matriculation rates. This information appears in Table 4, listed by year.

Table 4

Enrollment, average credit hour attainment, and matriculation rate for seniors

Year	Enrollment	Average credit hour	Matriculation rate
Year 1	944	9.18	52.8%
Year 2	1,075	8.82	39.0%
Year 3	1,038	8.16	37.4%
Year 4	990	7.92	38.1%
Year 5	1,017	7.75	35.6%
Total	5,064	8.37	40.4%

Question 2

Is there a relationship related to the high school a student attends for those who matriculate to WKCTC?

H_0 Matriculation rates are not correlated to the high school from which a student attends.

In the results, high school is statistically significant between high school and matriculation $\chi^2(1, N = 20) = 25.68, p = .000$. It can be concluded that high school attended is associated with changes in the probability of matriculation $\ln(.000/1-.000) = -1.121 + .039$. Therefore, the null hypothesis is rejected due to the evidence of statistical significance.

As shown in Table 5, the average matriculation rate for dual credit students over the five-year time frame was 40.4%. The matriculation rate by high school varied from 24.0% to 59.2. The high schools with a matriculation rate of 39% or higher are located within a 30 mile radius of WKCTC main campus. Table 5 displays the number of students matriculated to WKCTC and matriculation rates by high school for the five year dataset.

Table 5

Matriculation by high school

High school	Student enrollment	Seniors enrolled	Matriculated	Average matriculation rate
HSF13	142	104	25	24.0%
HSL23	39	37	9	24.3%
HSM12	218	210	57	27.1%
HSS31	189	167	46	27.5%
HSF23	252	176	51	29.0%
HSH23	260	228	69	30.3%
HSC23	94	44	14	31.8%
HSP11	719	688	227	33.0%
HSM13	5	3	1	33.3%
HSN32	24	22	8	36.4%
HSB22	589	439	164	37.4%
HSC31	8	8	3	37.5%
HSG22	869	723	310	42.9%
HSH31	71	53	24	45.3%
HSC22	238	174	79	45.4%
HSM21	1771	1469	688	46.8%
HSM22	509	343	166	48.4%
HSC32	34	34	19	55.9%
HSL22	202	142	84	59.2%
Total	6233	5064	2044	40.4%

In addition to correlation and matriculation rates, the researcher sought to define other variables which may affect matriculation as it relates to the student's high school. The distance from WKCTC main campus to the high school campuses, within the service area, ranges from one to 61 miles. Distance provides obstacles for dual credit students, which are overcome by offering online courses and credentialing faculty who teach college courses at the secondary site. Data was

calculated on the average matriculation rates based on the distance from WKCTC main campus. High schools located within the same county of WKCTC have an average matriculation rate of 41.7%. This is 1.3% above the average calculated for high schools in the WKCTC 10 county service area (40.4%). This data resulted in higher matriculation rates of students who graduate from high schools less than 26 miles from WKCTC main campus. Therefore, students are less likely to matriculate to WKCTC than peers who are required to travel a distance more than 35 miles from campus. Matriculation rates for area high schools categorized by distance from WKCTC main campus ranged from 24.0% (HSF13) to 59.2% (HSL22). Table 6 provides matriculation rates based on distance from WKCTC main campus.

Table 6

Five-year average matriculation rates, by high schools, based on distance

High Schools	Matriculation rate
High schools within 10 mile from WKCTC	49.1%
High schools less than 30 miles from WKCTC	42.3%
High schools more than 30 miles from WKCTC	8.6%

Question 3

Is there a relationship between underrepresented minorities, as defined by gender and ethnicity, and those who matriculated to WKCTC during the fall semester immediately following high school graduation?

H_0 Underrepresented minority population, defined by gender and ethnicity, does not correlate to matriculation.

The logistic regression table provides evidence of a statistically significant between gender $\chi^2(1, N = 20) = 37.78, p = .000$ and matriculation $\ln(.000/1-.000) = -1.121 + .267$. The Exp(B) or

Odds Ratio (1.307) tells us that females are 31% more likely to matriculate than males. Ethnicity $\chi^2(1, N = 20) = 5.247, p = .020$ is statistically significant to matriculation, $\ln(.000/1-.000) = -1.121 + .267$. The information listed below in Table 7 provides averages, translated into matriculation rates for gender and ethnicity.

Table 7

Matriculation rate by ethnicity and gender

Term	White	African American	Other	Male	Female
4124	54.2%	36.4%	48.6%	45.5%	58.1%
4134	39.7%	34.9%	36.7%	34.2%	42.8%
4144	40.6%	18.4%	32.0%	31.7%	41.7%
4154	39.7%	23.9%	37.8%	34.0%	41.2%
4164	35.7%	33.3%	36.8%	34.1%	36.8%

Summary

The study sought to fill a gap in the research literature related to specific variables, which influence dual credit matriculation rates at WKCTC. Dual credit matriculation rates have increased over the past ten years (ECS, 2017). Dual credit students, as Casey (2015) states, are more likely than peers to persist once they have matriculated to a postsecondary education institution. As reported, the researcher found statistical significance to matriculation with high school, gender, and ethnicity. Credit hour to matriculation was not statistically significant, as reported in the model.

As previously shown in the paragraph above, the findings provide a statistically significant relationship between matriculation and high school, with a correlation matrix of a positive, yet weak. Gender and ethnicity, in relationship to underrepresented minority, found statistical significance with matriculation. The positive, weak correlation suggests that an increase or decrease in these two variables is less likely to change the outcome of statistical significance. One of the variables studied that proved to have no statistical significance was credit hour attainment. The

correlation matrix was negative, moderate for credit hour attainment and matriculation. The descriptive statistics confirmed the results as credit hours earned increased the percentage of students who were less likely to matriculate.

Chapter 5: Conclusion

This chapter presents conclusions drawn from findings, as well as limitations, and recommendations for future studies. Information gleaned will be used at WKCTC for transitioning dual credit students to matriculation, justify resources expended to recruitment, and maintain the dual credit program. Understanding of variables used will provide answers for dual credit staff to share at informational sessions and provide tools for recruitment of future dual credit students. Ultimately, results will help WKCTC make data-driven decisions on how best to allocate resources for future dual credit recruitment and enrollment efforts.

Summary of Literature Review

Dual credit has changed dramatically over the past decade. With an increased awareness of dual credit and reduced tuition rates, more students are choosing to earn college credit while in high school. Aligned with the increase of dual credit student enrollment, postsecondary institutions are realizing a need to educate this student population on credit hour accumulation, program applicability, financial aid, college pathways, and credential achievement. Students, parents, and counselors must be informed of college processes and procedures related to dual credit students and the reality of how dual credit enrollment ultimately affects the students in the postsecondary journey. Creating and building partnerships assist to provide an environment for overall student success.

The historical perspective of community colleges provide insight and understanding of the connections tied directly to the surrounding community with the ability to adapt and meet immediate social and business needs. Community colleges created to fulfill an essential missing piece in communities without the resources to offer university courses or to retrain skilled workers. WKCTC is no different in its mission and goals driven by community and regional success, along with transitioning students from high school to career or universities. The open door policy of

community colleges was created to provide education for all, general education, technical, or training. The open door policy of community colleges has extended admission to high school students and must focus resources appropriately (Gilbert & Heller, 2013; Harbour, 2015). Dual credit course offerings can fit into all three categories and allows students to follow the pathway of their intended goal.

Summary of Methodology and Data Analysis

Dual credit has been offered in a variety of formats, programs, with fluctuating costs related to tuition in Kentucky. With Executive Order No. 2016-0378 (2016) and subsequent Kentucky Dual Credit Policy (2016), dual credit offerings in Kentucky have become more streamlined and barriers have been reduced. It is important to review the quality of dual credit programs, encourage accreditation, and evaluate processes to provide dual credit students with strong partnerships and courses offerings, which lead to postsecondary credentials and careers.

Enrollment and matriculation data was used to analyze variables from dual credit students resulting in information needed to increase future dual credit enrollment and matriculation rates of dual credit students. Without matriculation, colleges lose the investment from the dual credit programs. Currently, only 44% of the students who earn dual credit matriculate to a community college in KCTCS (KCTCS, 2018). WKCTC works with secondary partners to provide additional information regarding academic pathways and college credentials. Additional strategies will be developed at WKCTC based on outcomes of study.

The binary logistic regression model selected for analysis provided the ability to calculate a p-value from 20 binary, continuous, and categorical independent variables to a binary dichotomous dependent variable of matriculation. P-value provides statistical significance related to matriculation. The outcome of statistical significance is defined as a result being unlikely due to chance. Statistical numerical analysis provided mode, mean, and median for matriculation rates and

credit hour averages. This allows for additional information related to statistical significance, as well as solidifying practical significance in the hypothesis for credit hour accumulation.

The following primary research question provided overall guidance for this study:

Primary research question: What are characteristics of students who matriculated from dual credit coursework in high school to WKCTC?

The following research questions and hypotheses developed to answer the primary research question and focus on possible correlations of specific independent variables to matriculation.

Question 1. Is there a relationship between total number of dual credit hours earned and matriculation to WKCTC during the fall semester immediately following high school graduation?

H₀ Credit hour attainment has no correlation to matriculation.

Question 2. Is there a relationship related to the high school a student attends for those who matriculate to WKCTC?

H₀ Matriculation rates are not correlated to the high school from which a student attends.

Question 3. Is there a relationship between underrepresented minorities, as defined by gender and ethnicity, and those who matriculated to WKCTC during the fall semester immediately following high school graduation?

H₀ Underrepresented minority population, defined by gender and ethnicity, does not correlate to matriculation.

Earning college credit before high school graduation is an option for some students. Challenges and barriers continue to exist and all students are unable to enroll in college credit bearing courses. In Kentucky, for a college course to be considered dual credit, it must be recorded on the transcript for both high school and college. At WKCTC, students have a wide variety of course offerings from which to select. As a recommendation from WKCTC, the college course or

courses selected should follow an academic pathway leading to a high school diploma and shorten the pathway to a college credential.

Review of dual credit options should begin before the student enrolls in high school courses (Karp, 2015). Counselors should facilitate activities and exploration to provide guidance and awareness for students and parents. When this occurs, students are provided ample time to achieve high school and college benchmarks for enrollment to college courses. Students need to review and evaluate potential academic pathways, as additional options become available, student's interest change, and college credentials update. Prior planning will lead student toward achieving career goals and away from simply accumulating college credits. Earning college credit without following an academic pathway could create obstacles in the pursuit of credential completion.

Summary of Findings

Question 1. The study accepts the null hypothesis for research question that states credit hour attainment is not statistically significant to matriculation. The average dual credit hour attainment, 8.37 credit hours, was significant to the researcher in helping to define the targeted number of dual credit hour attainment. In the dataset, 40.4% of students matriculate to WKCTC who have previously earned dual credit. Of those students, 86% earned 24 credit hours or less prior to high school graduation. Statistically, it does not appear that credit hour attainment is significant to matriculation. However, the importance of the research and findings is to advise students to earn college credit, which will assist in the future, potential college credential achievement. Review of credit hour attainment is a potential improvement for the dual credit program at WKCTC, which has practical significance.

Postsecondary education institutions need dual credit students to matriculation and complete a college credential to reap the benefits of offering dual credit courses, especially when offering dual credit at a reduced tuition rate. Barnett (2016) shares that student who earn at least nine dual

credit hours have a higher success rates in college. Postsecondary education institutions should focus on credit hour attainment that will not only benefit the student, but also increase matriculation rates for the institution. Students who earn dual credit need to be advised and enrolled in courses that lead to credential attainment and not credit hour accumulation (Stephenson, 2014; Zinth, 2015). The goal of the dual credit program at WKCTC is to decrease the cost of college, increase college preparation, and shorten time to credential completion.

Questions 2. The research related to the statistical significance of matriculation to high school attended was found to have a statistical significance from the logistic regression model, $p < .05$. Therefore, the researcher accepted the hypothesis based on the results. In order to identify additional information related to the high schools partnered with WKCTC, matriculation rates were identified by individual high school. The researcher found that future studies are needed related to high school faculty credentialed to teach college courses, distance of high school from college campus, and course offerings which may reveal additional points of interest related to individual high school to matriculation.

Students who attend a high school closer to the WKCTC main campus have the advantage of taking a college class during the school day without having to miss more than one or two class periods at their high school. This helps to balance the time missed from the high school curriculum due to the drive time for the college course. Dual credit students who are more than 30 miles from campus are less likely to enroll in an on campus college class at WKCTC. However, this student may take an online college course, if the high school does not have credentialed faculty or if the course is not offered at the high school attended. Online course offerings allow students to earn college credit in through a different modality than in class. If a student take an online course, WKCTC encourages high schools to assign an online mentor to help build positive college habits

such as checking online platform and email several times per week, encourage reading and studying between deadlines, and prepare for assignments, quizzes, and exams.

Question 3. Student data from ethnicity and gender were included in the data used for this study. The researcher reviewed underrepresented minority population to find if any statistical significance existed between the variables and matriculation. Statistical significance was found in gender, $p < .05$ and ethnicity outcome was $p = .020$, which is not statistically significant but has practical significance to show relevance. Results show that females (61.4%) matriculate at a higher rate than males (38.6%); while ethnic results revealed white (84.1%) students matriculate at a significantly higher rate than African American (6.2%) and Other (9.6%) students. The matriculation rates reflect a significant difference for both gender and ethnicity. This information will be used at WKCTC to assist in the recruitment and enrollment efforts of dual credit students. In addition, this will provide data needed to focus on the specific groups who may be missing the opportunity to enroll in and earn a college credit. WKCTC's diversity and inclusion committee will be informed to assist with increasing enrollment of underrepresented minority groups.

Relationship of Conclusion to Other Research

Literature related to dual credit enrollment, college persistence and completion rates, grade point averages, as well as state policy implementations, changes, and updates, is abundant. However, there is limited research available related to dual credit matriculation rates in correlation with the postsecondary education institution offering the dual credit courses. The results of this study will add to the limited research of variables shown to have statistical significance to matriculation. Enrollment keeps the doors open at a college, but enrollment is only one part of the equation (Hlinka et al., 2015). Credential completion is the ultimate goal for college enrollment as is helping a student become a successful contributor to society (Karp et al., 2005). This study has the potential to add informative and data-driven results by adding to the literature on variables

leading to matriculation of dual credit students. Credit hour attainment needs to be individualized based on student, academic plan, and career goal.

Limitations of the Study

The researcher realized limitations of the study, as well as researcher bias and both will be shared in this section (Peshkin, 2000). The dual credit study originated as part of the researcher's interest as related to current employment with WKCTC. Enrollment and matriculation of dual credit students is the researcher's primary job responsibility. The researcher made every attempt to remove any bias from reporting of the results. The effort to remove intentional bias was aided by the quantitative nature of the study, through inputting of numerical data and calculating results as opposed to more subjective methods such as interviews, observations and surveys. Peshkin (1988) finds bias to be both a negative and positive limitation of research. Bias is prevalent from the selection of the topic and article reviewed.

A limitation of the study is the bias of the researcher. The researcher was the director of the WKCTC dual credit program before, during, and after the dataset was created. The researcher also led the implementations of policies and procedures, as well as applying and achieving NACEP accreditation. This includes the continuous communication with the 22 secondary partners, parent and community meetings, and dual credit enrollment. The researcher is an employee of WKCTC and works directly with dual credit students and partners. The researcher's direct connection with the WKCTC dual credit program creates an unintentional bias (Lauck, 2016, Peshkin, 1988). This relationship could also be considered beneficial in motivating the researcher to improve the program's contribution (Peshkin, 1988) to the WKCTC mission.

An additional limitation the researcher identified was two variables, which could possibly skew data for course enrollment and credit hour attainment. The two variables were, Community Scholarship Program (CSP) and Commonwealth Middle College (CMC). Community members

created CSP, a scholarship program for students from a designated county, to remove the burden of tuition costs. Students enroll during the 8th or 9th grade year for the initial eligibility in the CSP. During high school, students must maintain a 2.5 GPA, 95% attendance, and no major discipline issues to remain eligible for the CSP and earn the last dollar applied scholarship. An additional requirement to remain eligible requires students to enroll in GEN 100 – Introduction to College during the student’s senior year. Therefore, all students are encouraged to enroll and earn one hour of college credit prior to high school graduation. The course assists students with the transition from high school into the next path, whether it is postsecondary education, military, workforce, or other post-high school pathways. Each fall, approximately 500 to 700 students are enrolled in GEN 100.

The second variable, which may skew the dataset, were students enrolled in CMC. This early/middle college program created for students who enrolled in specific high schools, targeting first-generation college students. The intent of CMC began with the concept of facilitating and helping with the understanding of and achievement with to postsecondary education entrance and credential attainment. Students selected for CMC, through an application and interview process, are provided concentrated student support services, advisement, and enrollment in courses leading to an associate degree. Staff of CMC also provided assistance with study skills and tutoring. These high school students housed on the WKCTC main campus, where they enrolled in both high school and college courses. Students were advised to earn college credit focusing on the achievement of a high school diploma in addition to working towards completion of an associate degree. The data associated with credit hour accumulation consisted of 329 CMC students. The CMC program initially enrolled students for fall 2010 semester closed its doors at the end of the spring 2018 semester.

This study focused only on students who earned dual credit courses through and matriculated to WKCTC in the fall semester following high school graduation. Therefore, the

generalization of this study is limited to Western Kentucky and the high school students attending partnering schools within the WKCTC service area. This is compounded by the fact that WKCTC is located in a rural area without access to widespread public transportation or resources related to large businesses and industry. Additionally, WKCTC is a commuter campus and provides no on-campus housing for the students.

High schools within the WKCTC service area offer courses in AP, IB degree, and Cambridge Studies. Each of these programs offer students a choice of earning college credit. However, some of these options may be a requirement of the high school to achieve the status of honors, salutatorian, and valedictorian. The possibility exists that requirements of the high school, for these college bearing course programs, may restrict students' choices to earn dual credit.

Credit hour attainment is dramatically different for students. Some high schools allowed and encouraged students to accumulate as many credit hours possible. While other high schools allowed a limited option for earning college credit in high school. This is also consistent with the tuition rate students must pay for dual credit college credit. Before the Kentucky Dual Credit Scholarship, the total amount paid by the student for dual credit courses has ranged from full price to zero dollars. The varying amount for courses differed due to resources at the high school, including community supported grants, scholarships, and sponsorships. The tuition rates for the dual credit courses have fluctuated within the five years of the research data. The types and performance of area high schools is an additional limitation of the study. Five of the high schools included in the study are private high schools with a selective admissions policy. Four of the schools are area technology or career and technology centers which focus on career and industry certifications for students.

Quantitative data is limited, lacking insight into why the numbers show what they show. While data seems to provide accuracy and facts, numbers can only offer the quantitative reasoning. Numbers can answer questions. Data proves statistical significance, yet solely numbers cannot

measure students' performance and ability. Student choices and experiences are molded from environment and family. In order to reveal a complete understanding related to dual credit variables, qualitative research would be required to encompass additional variables including students, faculty, employers, and employees. This is not only a limitation of the study, by only providing numeric outcomes; it would also be considered possible future research.

Practical Application

While this study failed to provide a specific number of credit hours a dual credit student should earn, the best high school to reach out to in order to increase matriculation rates, or a target group of students to help to encourage dual credit enrollment of, there are practical implications that this study has found. Earning dual credit has consistently increased the probability of a student transitioning to postsecondary education institutions. While appreciative and integrative advising did not occur as a variable in the dataset, it was evident that programs with a clear, concise academic plan resulted in higher matriculation rates.

Barnett (2016) found that students who earn an average of nine dual credits achieve greater college success than peer. This study found WKCTC with an average of 8.37 dual credit hours earned within the five-year dataset. With this data, the average dual credit hour attainment at WKCTC will focus on helping students earn eight to nine college credit hours in high school. However, the focus will be individualized student advising to transition the student in a guided academic pathway.

Research Recommendations

Based on the results of this study, identifying the attributes of dual credit students within the WKCTC service area and students who matriculated immediately following high school graduation has potential to increase matriculation rates. Areas within statewide policies and procedures for dual

credit enrollment, transition, advising, and matriculation need to be expanded on by future researchers. Recommendations are listed below:

1. Specific course enrollment needs to be expanded. Students must have individualized advisement. Do students need to take specific courses leading to increased matriculation of the dual credit student and credential completion?
2. Future studies based on differences of online courses and courses taught at the high school by credentialed faculty need to be reviewed. High school faculty understand how to connect with the students while teaching the college content. Once the student is successful in one college course, the student gains confidence and understanding on how to continue to succeed in additional courses.
3. Students who earn dual credit have the ability to transfer to any number of postsecondary education institutions. Future studies need to review students who earn dual credit and reveal overall matriculation rates for students who attend any postsecondary education institution.
4. A mixed methods or qualitative study should be undertaken. Numbers can provide results, but through qualitative instruments an understanding of reasons, opinions, and motivations can be found.
5. Additional KCTCS institutions or KCTCS as a whole may want to review overall dual credit enrollment and credit hour attainment based on its structural and organizational differences.
6. A study related to schools in rural areas outside of Kentucky, schools in urban areas, and inner-city schools would have unique challenges and obstacles. This could provide outcomes that may assist in the variety of environmental settings.

Summary

This chapter provided an explanation of results and discussion of findings shared from the five-year dataset (2012-2017) of students who earned dual credit with WKCTC. Credit hour attainment provided results related to matriculation and an area that may be focused on for later use. Of the dual credit students who matriculated to WKCTC, 64.9% earned eight or less dual credit hours. The 6,232 students who earned dual credit averaged 8.37 dual credit hours. Additional research related to the credit hour attainment and course selection must be addressed.

The results of the study revealed both statistical significance and practical significance related to matriculation. Credit hour attainment did not have a statistical significance in predicting matriculation, 86.4% of students matriculated to WKCTC earned 24 credit hours or less. Student credit hour attainment ranged from one credit hour to 73 credit hours. High school attended offers statistical significance to matriculation, 91.4% of students matriculated attended a high school 30 miles from campus or less. Underrepresented minority students have a statistical significance to matriculation, gender, 61.4% females and ethnicity, 84.1% white.

Quantitative research provided evidence indicating significance of prior dual credit attainment to college transition and completion (Carey, 2015; Flores, 2012). Karp (2015) utilized quantitative research for dual credit students and outcomes related to credential attainment, which aligns with findings of this research. The researcher obtained results and findings through statistical analysis of a dataset provided by WKCTC IPRE, after gaining IRB approval from MSU, KCTCS, and WKCTC.

The dataset was comprised of 17,645 entries for dual credit students at WKCTC from 2012 until 2016. The researcher evaluated the data using Microsoft Excel data tools. Using the analysis tools in Microsoft Excel, duplicate records were removed from entries, as well as enrollment from

students in high schools outside of the WKCTC service area. The data used for the research included 11,885 non-duplicated, enrollment entries of students with home high schools located within the WKCTC service area. The unduplicated student headcount for the total data was 5,472 and earned a combined 26,402 college credits.

Based on the analysis of the data, the researcher highlighted several areas of interest and recorded statistical significance. WKCTC and the dual credit program to assist in increasing the matriculation rates of dual credit students in the future can use the results. Although some of the results created additional challenges, many of the outcomes identified will be accessible and implemented in the immediate academic year.

Underrepresented minority populations have the largest growth area for postsecondary education enrollment and dual credit. Dual credit enrollment of underrepresented minority for the five-year dataset was 15.8%. Additional work is needed to assist students in meeting college benchmark scores and enrolling in college courses, especially those from underrepresented minority population. Enrollment represents the primary purpose for a postsecondary educational institution to operate. Dual credit enrollment and matriculation is vital to the community colleges for current and future enrollment numbers. Without enrollment, there is no need for the college to exist, no one to educate, and no one to train. Cultivating student enrollment is only the beginning of the postsecondary education process. Academic guidance throughout the educational journey will increase the number of students who earn a postsecondary education credential and become a productive member of society. Building relationships and increasing partnership initiatives will help make a seamless transition and eventual completion of the college credential. These relationships help the community, postsecondary education, and secondary education by growing the skilled workforce. Ultimately, college credential completion provides skilled, trained people for the workforce. An additional part of this research is the daily interaction with students. The student is

not completely taken care of without a staff or faculty member offering one-on-one advising, listening to the students' needs and wants, and providing guidance while teaching self-efficacy. Being involved and meeting with student helps to relieve anxiety, reduce tension, and encourage the ability to achieve goals and work toward the career of choice.

P-20 Implications. P-20 councils, and the initiatives which followed, began with the awareness of educational deficiencies, which were magnified in the 1990's. State agencies were searching for strategies to increase the preparation and readiness of high school graduates for college and career opportunities. Large number of students were graduating high school and entering the first year of college needing to be enrolled in remediation courses. The students lacked first-year college preparation and readiness. Employers also reported applicants were missing crucial employability skills. P-20 initiatives sought alignment for early childhood, secondary, postsecondary, and employability skills to increase the level of student learning and outcomes.

Building a seamless system of education is a goal of P-20, which will prepare students to be college and career ready. Strategies include re-envision of academic interventions, curriculum alignment, and integrated collegiate experiences to help improve readiness and preparation. The understanding of collegiate expectations are imperative for K12 in order to prepare students for the next level. P-20 initiatives are designed to help close the gap between secondary and postsecondary education, with an emphasis on helping the student achieve a career goal. P-20 educational mission is an integrated system, which begins with preschool, extends through postsecondary education or training, and helps to eliminate unintended consequences, such as credit accumulation instead of guided pathways. While a standardized transition does not yet exist, dual credit can help to ease the anticipation of the unfamiliar college processes and procedures, degree attainment opportunities, and academic success.

Dual credit is a tool, if used properly, to assist the P-20 mission by leading to creating academic and career pathways. The pathways should be designed by members in secondary education, postsecondary education, businesses, and industry to provide students with information to seamlessly transition through the educational pathway and eventually to a career. Incorporating dual credit with the P-20 initiatives enhances and strengthens student success and learning outcomes while building a seamless pathway from preschool to career. Dual credit benefits high school students and families through decreasing college costs, easing transition from secondary to postsecondary, and builds positive college habits; and dual credit benefits employers by shortening time to degree. Dual credit opportunities have the ability to help grow the P20 partnerships through its innovation and interaction with K12 entities, postsecondary educational institutions, and business and industry.

While changes and updates are inevitable, the P-20 mission and Kentucky Dual Credit Policy increase opportunities for students with a focused and guided academic/career pathway. Utilizing the academic/career pathway, students are provided with information related to transition, credit hour attainment, and course options. Credit hour attainment can put students in future harm with financial aid and program applicability issues. Without a focus on credential attainment, students may be earning college credit without understanding potential future implications. In contrast, when a student earns one to eight credit hours, the student is more likely to matriculate to a community college and complete a credential (Karp, 2015; Lochmiller et al., 2016).

Programs related to dual credit are widespread and are supported by state and national legislators (Taylor et al., 2015). Community colleges embrace dual credit as a recruiting tool and enhancement to educational outcomes (Wang et al., 2015). Dual credit students need continued support and advising to help guide them on a pathway toward credential completion (Stephenson, 2014). With legislators encouraging dual credit initiatives and community colleges working to

assist students on an academic pathway, future generations will have an unlimited opportunity to pursue educational goals. If dual credit reaches one person who never thought college was possible and moves that individual to become an educated, trainable employee, then it is worth it.

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Appendix A

300 North Main Street
Versailles, KY 40383
Telephone: (859) 256-3100
Website: kctcs.edu

December 12, 2017

Lorry Beth Wilson
4810 Alben Barkley Drive
Paducah, KY 42001

RE: Matriculation through Dual Credit

Dear Lorry:

After careful consideration of your application to the KCTCS Human Subjects Review Board, I have determined that you are eligible for exemption from federal regulations regarding the protection of human subjects based on your research using a procedure that meets the exempt review criteria section 7 (2).

Thank you for your cooperation in meeting the federal requirements for conducting research that utilizes human subjects. We appreciate your notification to this board and we will keep your information on file.

Sincerely,



Rhonda R. Tracy, Ph.D.
KCTCS Chancellor



Pamela M. Duncan
Associate General Counsel
Chair, KCTCS Human Subjects Review Board

cc: Alicia Crouch
Vice Chancellor of Research & Policy Analysis

Appendix B



Institutional Review Board

328 Wells Hall
Murray, KY 40375-3318
270-809-2916 • msu/irb@murraystate.edu

TO: Randal Wilson
Educational Studies, Leadership, and Counseling

FROM: Institutional Review Board 
Jonathan Baskin, IRB Coordinator

DATE: November 3, 2017

RE: IRB # ODF 18-11

Determination: Individuals not identifiable - Activity does not involve human subjects as defined in 45 CFR 46.102(f)(2)

The MSU IRB has reviewed your student's application entitled, *Matriculation Through Dual Credit*. Based on the information supplied on this application, it has been determined that your student's project does not involve activities and/or subjects that would require IRB review and oversight. Your IRB application will be kept on file in the IRB office for a period of 3 years.

Please note that there may be other Federal, State, or local laws and/or regulations that may apply to your project and any changes to the subjects, intent, or methodology of your project could change this determination. You are responsible for informing the IRB of any such changes so that an updated determination can be made. If you have any questions or require guidance, please contact the IRB Coordinator for assistance.

Thank you for providing information concerning your student's project.

Opportunity
afforded

murraystate.edu

Appendix C

Abbreviation	Description
AHE	Allied Health Courses – AHS, NAA
BUS	Business Courses – BUS, CIT
CMC	Commonwealth Middle College (Middle college program)
COM	Communication Courses – COM
CRHRS	Credit Hours Earned – 1 to 73 credit hours
ENG	English Courses - ENG
ETHN	Ethnicity – White, African American, and Other
FORL	Foreign Language Courses – SPA, FRE
GEN1	Intro to College course – students only earned this one-hour credit
GEN2	Intro to College course – students earned GEN 100 and other course(s)
GND	Gender – Male or Female
HRT	Heritage Courses – HIS
HS22	High Schools in WKCTC service area
HUM	Humanities Courses – ART, ENG, HUM, MUS, PHI, REL, THA
MTH	Math Courses – MAT, STA
SBS	Social Behavioral Science Courses – ECO, GEO, POL, PSY, REL, SOC
SCI	Science Courses – AST, BIO, CHE, PHY
TECH	Technical Courses – ADX, AUT, CAR, CMM, EET, FRS, IMT, WLD
TERM	College Term, Fall of ... 2012, 2013, 2014, 2015, 2016
WRF	Workforce Courses - BIT, WRK, WRS, FRS