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MATRICULATION THROUGH DUAL CREDIT

by

Lorry Beth Wilson

A DISSERTATION

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By

Lorry Beth Wilson

for the degree of
Doctor of Education in P-20 and Community Leadership (Ed. D.)

Dr. Randall Wilson, Chair, Dissertation Review Committee

Dr. Ben Littlepage, Faculty Member, Dissertation Review Committee

Dr. David Heflin, External Partner, Dissertation Review Committee

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Abstract Page

Earning college credit while in high school has become a rising trend and does not appear to be slowing down anytime soon. State policies are redefining outdated rules and process in order to provide access, affordability, and awareness to all students throughout the United States. West Kentucky Community and Technical College enrolls students in dual credit courses which assists with increasing college credential completion and reduction of total cost of college. As students accumulate college credit, they must be advised and guided by academic plans from intended college choice. As resources are poured into dual credit programs, postsecondary institutions need the students to matriculate in order to achieve all-around benefits. However, it is most important for students to earn a postsecondary credential or a skilled trade to become productive citizens in society. The data set included 5,472 students enrolled in dual credit courses between 2012 and 2016, with 20 variables to examine. Statistical significance in the correlation to matriculation was reviewed and three variables were highlighted: underrepresented minority, credit hour attainment, and the student's home high school. The identified variables related to dual credit matriculation provide specific areas for future recruitment efforts assisting with increasing matriculation rates.

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Chapter 1 - Introduction

Dual credit opportunities have expanded significantly in the past ten years (Mansell & Justice, 2014; Taylor, 2015; Karp, 2015). Students and families have realized the valuable opportunity that dual credit offers and enrollment has grown to more than 700,000 in community colleges throughout the United States (Fink, Jenkins, & Yanagiura, 2017). High school students can earn as few as one college credit or enough credits to complete an associate's degree (Cassidy, Keating, & Young, n.d.; Raia-Taylor, 2012; Stephenson, 2014). Nationally, community colleges provide the majority of dual credit opportunities (Fink, Jenkins, & Yanagiura, 2017). Dual credit provides students a way to decrease the time to earn a college credential and reduce the total cost (Karp & Hughes, 2008; Fink, Jenkins, & Yanagiura, 2017).

Through dual credit, high schools enhance course offerings and diversity curriculum for all students. Rigorous coursework challenges students, while technical courses provide hands-on, work-based learning experiences (Rodriguez, Hughes, & Belfield, 2012; Carey, 2015; Farrell & Seifert, 2007). Student of every background, gender, socioeconomic status, etc., can take advantage of dual credit (Rodriguez, Hughes, & Belfield, 2012). As the potential population of students earning dual credit increases, this program also helps to increase college matriculation and completion rates (Karp & Hughes, 2008; Kim, 2014; Hodara, 2015; Cassidy, Keating, & Young, n.d.).

As high school students begin to amass a large number of college credits, the focus must be on a guided career pathway (ACT, 2015; Fink, Jenkins, & Yanagiura, 2017). In order for students to decrease time to credential completion, they must be advised by individuals who are knowledgeable in both high school and postsecondary degree completion (Balfanz et al., 2014). This process will assist students in completing high school and progress through a college

program plan leading to the achievement of desired credential attainment. Researchers, Mansell and Justice (2014) confirm that student who complete at least one dual credit course have significantly increase the change of completing college compared to students who have not enrolled in dual credit courses.

Students have diverse goals, mature at various times, and learn at different levels (Hodara, 2015). To address these needs, the dynamics of the American high school are changing to provide learning opportunities targeted to each student's individual needs. Balfanz et al. (2014) reveal examples of programs targeted to individualized student needs throughout the K12 environment. Dual credit programs provide the opportunity to earn college credit and high school credit simultaneously, while creating a postsecondary program plan leading to a college credential (Cassidy, Keating, & Young, n.d.; Raia-Taylor, 2012; Stephenson, 2014). Schools have realized a decrease in dropouts who participate in dual credit (Balfanz et al., 2014)

Participation in dual credit has increased throughout the United States since the turn of the century (Barnett & Hughes, 2009). Minnesota, Ohio, and Illinois have reported statistically significant increase in dual credit enrollment since the early 2000's (Andrews & Barnett, 2002; Lochmiller, Sugimoto, Muller, Mosier, & Williamson, 2016; Minnesota Department of Education, 2016; Ohio Department of Higher Education, 2016). As the U.S. has seen change in the educational model, Kentucky initiated significant changes in dual credit to benefit students.

Kentucky Senate Bill 1, 2009, Section 21, focuses on college/career readiness for all students. The bill mandates the creation of educational initiatives targeting the reduction college remediation while increasing college and career preparation (Kentucky Senate Bill 1, 2009). Dual credit programs, created by secondary and postsecondary partnerships address college readiness and career preparation by providing rigorous and challenging coursework through

college course offerings to secondary students (Karp & Hughes, 2008). Coursework is offered through both general education and technical education programs.

College/career readiness strategies are designed to move the student toward the workforce in a shorter amount of time. These strategies target the required skill sets needed for business and industry (Phelps & Chan, 2017). Course content is aligned with either an industry certification and/or the postsecondary course (Rodriquez, Hughes, & Belfield, 2012). The learning outcomes of each course are to be reviewed periodically. An advisory council, consisting of educators, parents, and partners from business and industry, assists with course preparation by creating course content related to college and/or career (Kentucky Senate Bill 1, 2009). The partnership assists in developing and creating specific and immediate needs for the workforce (Rodriquez, Hughes, & Belfield, 2012).

In 2010, the *Unbridled Learning-College Career Readiness Unified Plan* was implemented by KDE, Kentucky's Council on Postsecondary Education (CPE), and the Educational Professional Standards Board (EPSB) to address some of those strategies. The unified plan defines college/career readiness as the rate measured by ACT benchmarks, college placement tests, and career assessment measures (Blessing, 2016). Students who enroll in dual credit are more likely than peers to meet college/career readiness benchmarks, plus enter and enroll in college immediately after high school graduation (Zinth, 2015; Aud et al., 2011). Another strength of the dual credit programs is that the programs provide additional course offerings and alternate curriculum which might not otherwise be available (Karp, 2015).

The Education Commission of the States (ECS, 2017) reports on statewide policy and describes the diverse strategies and implementations related to dual credit. Georgia's "Move on When Ready" program challenges students to enroll in dual credit when eligible. The program

encourages student participation during the junior and/or senior year and earn as many college courses they qualify for (ECS, 2017). Statewide program and the lack of statewide programs related to dual credit are diverse and ever-changing (Fink, Jenkins, & Yanagiuara, 2017).

Within the past few years, Kentucky has redesigned statewide policy for secondary and postsecondary institutions. Increasingly, state governments are creating or enhancing policies to focus on college and career readiness in the secondary environment (ACT, 2015). Through the policy, this will aid in leading more students toward college enrollment and completion (An, 2013). High school juniors and seniors are the target enrollment population of dual credit programs in Kentucky and in most other states (Karp, 2015).

Dual credit programs allow students to participate in general education and technical education courses. Students can explore an intended career pathway while earning college credit toward a postsecondary credential (Lichtenberger, Witt, Blankenberger, & Franklin, 2014; Karp, 2015). Technical education courses help to increase diversity in the population of student enrollment. Many technical education course are linked to industry certifications, which proves the student has achieved desired skill set.

The senior year of high school has long been considered dismissive and lacking preparation for postsecondary or career transition (Mansell & Justice, 2014; National Commission on the High School Senior Year, 2001). Dual credit programs help to address this and offer academic rigor and pathways to credential completion, as well as assist in decreasing the total cost of college (Jones, 2014; U.S. Department of Education, 2014). 46% of students who earned dual credit completed a college credential within five years of high school graduation (Fink, Jenkins, & Yaniguara 2017).

In 2001 the Kentucky Department of Education (KDE) reported 5,400 students earned dual credit through partnerships created by Kentucky secondary and postsecondary institutions (KDE, 2017). In that same year, Robertson, Chapman, and Gaskin (2001) identified dual credit as an emerging and powerful form of educational collaboration and reform. The growth in participation is seen across the United States. In Kentucky, during the fall of 2016, KDE reported dual credit enrollment had increased to 22,700 high school students earning college credit (KDE, 2017). This is a substantial increase over the last fifteen years. Data has been gathered related to gender, race, and socioeconomic status; however, data related to credential attainment, matriculation, and specific transition information is lacking.

To provide maximum effectiveness for dual credit programs, students must be given information regarding the program before the junior and senior years. Ideally, information related to dual credit is introduced during the student's eighth grade school year (Farrell & Seifert, 2007). Providing dual credit information in combination with potential career pathway options increases the understanding of and interest in college and career planning opportunities (KDE, 2016).

Through the advisement of school counselors, parents, and others, a four-year plan will be created by each eighth grade student. There are a variety of examples to be used for this process (KDE, 2016). The four-year plan will include short- and long-term goals, course selection, and college/career interests. If the student wants to enroll in college courses, they must meet benchmark scores. Awareness of the requirements for college course work provides practical reasons for the student to work toward achieving college/career readiness status (Hurman, 2014). The four-year plan needs to be a continuously updated document and the

student reviews the information annually. Students need to view current and future goals as benefits and challenges in order to strengthen the intended results (Farrell & Seifert, 2007).

Factors related to benefits and consequences need to be considered before a student decides to enroll in a college course. Specifically, the student needs to have an intentional goal for enrollment in the courses. Completing a college credential is an end goal for students enrolled in dual credit (Taylor, 2015) but not necessarily the only goal. Students should not be earning college credit simply to collect numerous college hours. Without proper guidance, dual credit course increase the total cost of a college credential. Developing an academic pathway is the responsibility of the student, with help from parents, guidance counselor, and college advisor. Students must first be focused on completing a high school diploma.

An additional factor to consider is course offerings, along with the delivery method. Both of these vary according to the specific dual credit program. The delivery of dual credit coursework may include courses online, on the college campus, or at the high school campus (Smith, 2013). Dual credit courses taught by a qualified high school faculty member are designed and conducted the same as courses taught online or on the college campus. To ensure alignment of courses, the faculty member must be approved and certified by the partnering postsecondary institution, in accordance with the postsecondary accreditation standards (Karp, 2015). Academic freedom provides faculty members the opportunity to create differentiated teaching and learning styles in the classroom setting. Site visits and observations confirm academic rigor is maintained throughout all courses.

Dual credit courses are taught using the same content, curriculum, and student learning outcomes as other college courses (Ganzert, 2014). Secondary students enrolled in dual credit are considered college students, and have access to collegiate student support services, advising,

tutoring, library resources and services, mentoring, campus activities, and student organizations. Additionally, they have the option to achieve recognition in honor's programs and the Dean's List (Tobolowsky & Allen, 2016). Students enrolled in dual credit courses are college students, with the same rights and responsibilities. Dual credit students are building a college transcript while earning a college GPA, simultaneously with the high school transcript and GPA.

College credit has been available for specific groups of high school students. These programs have had various names, titles, and options. 82% of public high schools, nationally, offer some form of dual credit (Zinth, 2015). A few of the widely known programs are: dual enrollment, concurrent enrollment, concurrent credit, articulated credit, Advanced Placement (AP), International Baccalaureate (IB) diploma, and College Level Examination Program (CLEP). These programs will be discussed in more detail in the Literature Review. The similarities of these programs are limited. Each program provides an opportunity for high school students to earn some form of college credit through varied and diverse pathways (Minnesota Department of Education, 2016; Tobolowsky & Allen, 2016). Much of the terminology is used interchangeably for research and data collection revolving around high school students earning college credit (Karp, 2015). For the remainder of the research, all remarks related to earning college credit will be referred to as dual credit.

ACT, an organization recognized by educational institutions related to the assessment of college readiness, provides research related to student preparedness, college benchmark scores, and workplace skills (ACT, 2015). In 2009, ACT provided data for Kentucky high school students showing that only 15% were meeting all four college benchmark scores in English, reading, math, and science (ACT, 2013; ACT 2015). ACT subject area scores are designed to provide a guide for students who meet benchmark scores. Students are more likely to be

successful in entry level college courses if the benchmark scores have been met. Basic first semester general education 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 the first semester general education courses if they have met the ACT college benchmark scores. Further, the ACT college benchmark scores reflect a 50% probability that students will earn a “B” or higher in college coursework (ACT, 2013).

The fluidity of policymakers creates a challenge in long term planning within dual credit programs. However, public demand and workforce needs have helped to build partnership that withstand the variation in political party lines. Policymakers have been charged with increasing a skilled and educated workforce through a focus on college readiness, while decreasing the need for students to enroll in college remediation (Cohen, 2008; Taylor, Borden & Park, 2015). Stakeholders have been reviewing options that may assist in realigning educational institutions to better prepare students who transition to the workforce. Dual credit programs are designed to build specific skill sets needed through both technical and general education courses (Barnett, 2016; Harbour & Wolgemuth; 2015). Industry certifications, which may be aligned with dual credit coursework, provide documentation in specific career areas of the basic skill required for the workforce.

The Kentucky Dual Credit Policy was written based on the research and language of the Kentucky Senate Bill 1. This legislative document promoted initiatives to reduce college remediation rates of high school graduates and increase college completion rates for Kentucky students. Kentucky Senate Bill 1 also implemented a college and career readiness plan which focused on building the proficiency level of high school students and preparedness for entry to postsecondary institutions and the workforce (Kentucky Senate Bill 1, 2009).

Through the Kentucky Dual Credit Scholarship (DCS), all students can earn college credit in up to three courses without being charged any tuition or fees; plus, additional dual credit courses are billed at 1/3 the Kentucky Community and Technical College System (KCTCS) tuition rate (Kentucky Council on Postsecondary Education and Kentucky Department of Education, 2016). For the 2016-2017 school year, dual credit tuition is \$52 per credit hour (KCTCS, 2016). This is a significant savings over the current \$156 per credit hour at KCTCS, and even more compared to four-year university credit hour tuition rates.

KDE is evaluating and building strategies through 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 (Kentucky Senate Bill 1, 2009). The benefits of this structural reform in the educational environment have spread throughout secondary and postsecondary institutions, Kentucky (Jones, 2014).

An effective dual credit program is based on data which encompasses transferable coursework, pathways leading to college credentials (Hurman, 2014), rigor of course content, authenticity, and student perspective (Farrell & Seifert, 2007; Karp, 2015; An, 2013). Understanding transferability begins with a college advisor and the dual credit student. Academic advising provides answers to student questions throughout the secondary and postsecondary environment (Grites, 2013; Hurman, 2014; O'Banion 2013). Teaching students about requirements for high school graduation, as well as college credential pathways, must be a requirement for all academic advisors working with dual credit students (Martinez & Klopott,

2005). The student must have credible resources to assist in selecting an academic pathway, dual credit courses that fulfill the requirements.

Including dual credit courses in the high school setting can be challenging when the student's other coursework continues at the high school level. Mansell and Justice (2014) note the importance of creating an authentic college experience. Student perception of a dual credit course must align with college courses, even if the class is being taught in the high school setting (Karp, 2015). Differentiating between a high school course and a college course needs to be apparent through content, language, and the culture of the class environment (Cassidy et al., n.d.).

Issues and concerns arise when students earn online credit exclusively and are unable to experience the diverse collegiate environment (Mansell & Justice, 2014; Allen, Tilghman, & Whitaker, 2010). An exclusively online setting does not help ease student anxiety about stepping onto the college campus and learning how to overcome the collegiate unknowns (Jones, 2014). Some dual credit programs offer exclusive courses on the college campus to facilitate high school schedules and ease transition anxiety. However, that course setup does not provide the student with the experience of a diverse student population that commonly exists in a college class (Allen et al., 2010). Student maturity levels must be addressed since college coursework and content have been intended for an audience other than college aged students (Kim, 2014; Oakley, 2015).

Context of the Study

High school students are earning college credit from postsecondary institutions at an astounding rate (Karp, 2015). In Kentucky, specifically the WKCTC service area, multiple

postsecondary institutions are offering dual credit within the same high school (KDE, 2017).

West Kentucky College Academy program offers students an opportunity to achieve one to 60 college credit hours before earning a high school diploma. The researcher reviews data through DSS, each semester, to review course and credit hour attainment (DSS, 2017). Students earning upwards of 40 to 60 college credit hours are mostly represented within the Commonwealth Middle College program.

Kentucky Senate Bill 1 encourages students to earn dual credit, while the Kentucky Dual Credit Policy and Kentucky Dual Credit Scholarship helps to remove the barriers associated with the cost of dual credit courses. This has helped increase the number of students participating in dual credit programs and the total number of credit hours earned. Kentucky established the statewide dual credit scholarship program, by Executive Order (2016), providing secondary and postsecondary institutions processes to follow in order to expand dual credit offerings across the state. Public policy theory is highlighted through the dual credit scholarship program that was enacted by Executive Order. When the governor's dual credit initiative was voted down through the Kentucky legislation, he made a choice to push the document through the Executive Order, a decision believed to be in the best interest for all students.

Dual credit has been accessible throughout Kentucky and students have taken advantage of the college credit offerings for the past four decades (Stephenson, 2014). For some students, barriers exist and the possibility of enrollment and earning college credit is not within reach. Kentucky identified three main barriers: a) access, b) affordability, and c) college readiness (Kentucky Senate Bill 1, 2009; Blessing, 2016). Through the Kentucky DCS program, barriers of accessibility and affordability have been significantly reduced. The DCS program has proven

to increase the number of students enrolling in and earning college credit throughout Kentucky (KDE, 2017).

The total number of college credit hours a high school student may earn differs among all 50 states. ECS (2017) lists 26 states that do not have a state policy which addresses the number of dual credit hours a high school student can earn. Prior to 2016, Kentucky was one of those 26 states. However, since Executive Order No. 2016-0378 (2016) was enacted, high school students are allowed to earn an unlimited number of college credit hours. 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).

Postsecondary institutions have raised concerns related to academic rigor from the dual credit programs (Flores, 2012). Questions regarding proctored exams for students taking online courses have become a determining factor in the acceptance of the course by postsecondary institutions. Only 25 states require public two- and four-year institutions to accept college credit earned through dual credit programs (ECS, 2017). The integrity of the college coursework and dedication of the student is diminished when the dual credit course is not accepted by a transfer institution. This continues to enhance the debate of AP versus dual credit due to the end of course assessment and measurement of the content learned.

Purpose of the Study

The purpose of this study is to aid in filling gaps of the limited content research related to factors leading to the matriculation of dual credit students at WKCTC. Research will address the significance of dual credit programs and how these programs support college and career readiness standards as defined in Kentucky Senate Bill 1 (2009). While increasing the number of

students who earn dual credit assists with the increase of college completion rates, how can the WKCTC dual credit program increase matriculation to WKCTC.

Student enrollment in dual credit at WKCTC has held steady for the past five years; while credential seeking student enrollment has been declining. The transition rate to WKCTC from the dual credit students averages 33.8% over the past five years (DSS, 2017). While, the national average for dual credit transition rate is only 15% (Fink, Jenkins, & Yaniguara, 2017). WKCTC can use this study to identify factors leading to matriculation from dual credit, the outcome may help to increase the credential seeking enrollment. WKCTC Strategic Enrollment Management Plan provides a recruitment goal to improve the overall high school transition rate to increase from 25% to 30% by 2020 (WKCTC, 2016).

Corresponding to the components of Kentucky's Senate Bill 1 (2009), participation in dual credit is proven to assist in preparing students for the postsecondary environment (Oakley, 2015). When dual credit students leave high school with a basic understanding of the college environment, the probability of completing a college credential increases significantly (Mansell & Justice, 2014). An examination in the total number of college credit hours a student obtains depends on the academic program plan and maturity of the student.

Theoretical Framework

Through the research related to academic rigor, credit hours earned, and course alignment of career pathways the researcher determined the use of quantitative method will identify the most effective and useful outcomes. Quantitative methods will reduce researcher bias of the reporting of results. Decision Support System (DSS), the primary reporting system used by KCTCS, and Kentucky CPE data will provide the statistics needed to measure the number of

college credit hours earned from students who matriculated to WKCTC. Descriptive statistical analysis information will be reviewed related to gender, program plan, college and high school GPA, and course offerings in order to answer the research questions.

WKCTC has seen an increase in the number of students participating in dual credit and the total number of credit hours a student earns. Since 2013, course enrollment has shifted from technical to general education. In 2013, more dual credit students at WKCTC chose general education courses (84%) to technical courses (16%). This shift came at a time when the government was focused on increasing college and career readiness through attainment of industry certificates and technical careers in the high wage, high demand careers (Executive Order, 2016). As stated in the Kentucky Council on Postsecondary Education and Kentucky Department of Education Dual Credit Policy (2016), dually enrolled students who participate in academic courses were almost twice as likely to matriculate into postsecondary education as their peers who enrolled in technical or other types of courses for college credit in high school.

Research Questions

The research for this dissertation will focus on students who earned dual credit hours and matriculated to WKCTC during the 2013, 2014, 2015, and 2016 fall semester immediately following high school graduation. WKCTC administrators have expressed the need to increase credential seeking enrollment through matriculation of dual credit students. During the fall of 2016 only 31.1% of the dual credit students matriculated to WKCTC. This is an area that can be improved. Therefore this study will research attributes of dual credit students who have matriculated to WKCTC to determine where improvements can be made. This study addresses the following research questions:

The grand tour question related to this research is:

What attributes lead to matriculation of dual credit students at WKCTC during the fall semester, immediately following high school graduation?

RQ1. How do the total number of dual credit hours earned correlate to matriculation rates for WKCTC during the fall semester immediately following high school graduation?

RH1 Credit hour attainment has no correlation to matriculation.

RQ2. Does the high school from which a student graduates correlate to the dual credit matriculation rate?

RH2 Matriculation rates are not correlated to the high school from which a student graduates from.

RQ3. What are the matriculation rates specific of underrepresented minority (defined by gender and ethnicity) with dual credit compared to peers who earn dual credit?

RH3 Underrepresented minority population, defined by gender and ethnicity, do not correlate to matriculation.

Scope and Bounds

The study site for this research is West Kentucky Community and Technical College (WKCTC) in Paducah, Kentucky, which for three decades has offered dual credit to all public and private high schools in a ten-county region: Ballard, Calloway, Carlisle, Fulton, Graves, Hickman, Livingston, Lyon, Marshall, and McCracken. Typical fall enrollment averages 6,000

students with approximately 1,100 of those students are non-credential high school students, otherwise referred to as dual credit students.

Numerous funding structures have existed over the years related to the cost of tuition (WKCTC, 2015). Cost for dual credit courses have ranged from full price, half price, and zero tuition charged to the student. The cost of each course is dependent upon school district assistance, community college waivers, and state policy mandates (Kentucky Council on Postsecondary Education and Kentucky Department of Education, 2016).

WKCTC offers dual credit courses in 22 high schools, career and technical centers, and area technology centers within the service area. Secondary partners allow students to enroll in dual credit courses that align with high school graduation requirements and other elective courses. Enrollment in dual credit courses requires students to meet benchmark or placement scores related to the course.

The population for this study will include students enrolled in WKCTC during the fall semester (immediately after high school graduation) as first-time, full-time freshmen during the years of 2013, 2014, 2015, and 2016. Dual credit students are categorized as a non-credential, non-degree seeking student while in high school. Student population from all ten counties in the WKCTC service area will be utilized. Data will be collected through the KCTCS institutional database systems *PeopleSoft* and *Decision Student Support* (DSS) after Institute Research Board (IRB) has been approved by the community college. Final data and outcomes will be compared to state and national dual credit hour attainment and matriculation.

An important consideration for dual credit students is individual career goals and college choices before dual credit enrollment. Planning for a future career pathway will aid in selecting

courses that lead to program degree completion. Prior to enrollment, students need to consider course transferability which will increase the likelihood of course selection that will apply toward a specific credential. In addition, student awareness of the effects of future scholarship and financial aid dollars related to the GPA for both high school and college is crucial.

Significance of the Study

In order to continue effective dual credit programs, the operational status and continuous evaluation of effectiveness must be reviewed. Students, parents, and the community all benefit from dual credit programs (Mansell & Justice, 2014). This is evident as students are achieving college ready benchmarks, total cost of completing a college credential is decreased, and skilled workers are created in a shorter time-frame (Kim, 2014; Jones, 2014). Presently, quantitative data related to dual credit course hour attainment is limited to participation and enrollment, this research project will seek to provide information to the current data.

Outcomes for this research will provide information regarding factors for dual credit students which correlate to increased matriculation rates. Specifically, the researcher will use data to inform others of the correlation between the factors of gender, total number of dual credit hours, and specific high school and matriculation to a community college. The researcher will gather historical data about the Western Kentucky area through WKCTC, which serves all public and private high schools in its service area.

Small, rural community colleges and secondary institutions may benefit from this study through the knowledge of quantitative data gleaned through hours earned that correlate with college matriculation and completion rates, as well as factors related to gender, high school, and underrepresented minority population.

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 pathways – a coherent, articulated sequence of rigorous academic and career/technical courses, including dual credit opportunities, leading to postsecondary degrees and/or industry recognized certifications and/or licensures (Kentucky Council on Postsecondary Education and Kentucky Department of Education, 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. Also, the initiative is intended to increase college completion rates of students enrolled in one or more remedial course 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.

Concurrent enrollment – courses or programs offered at a secondary education campus allowing students to earn both high school and college credit by completing a course.

Credential attainment – progressing through a program plan that leads to the completion of specific skill set related to job or career. "Credentials" often refer to academic or educational

qualifications, such as degrees or diplomas that you have completed or partially-completed.

"Credentials" can also refer to occupational qualifications, such as professional certificates or work experience.

Dual credit – concurrent enrollment whereby a high school student may earn both high school and college credit for the same course upon completion of course requirements.

Dual enrollment – students enrolled in postsecondary credit courses on the college campus while simultaneously enrolled in a secondary institution, which may lead to earned credit at each level.

Four-year college – a college or university that typically offers bachelor's, master's, and other professional degrees. An educational institution offering college credit opportunities for high school students.

General education courses – college courses which focus on basic transfer coursework in English, history, math, science, foreign language, and liberal arts.

Grade point average (GPA) – an indication of a student's academic achievement, calculated as the total number of grade points received over a given period divided by the total number of credits awarded.

High achieving student – a student who excels in academics and learns new content with ease.

Individual Learning Plan (ILP) – a plan that incorporates assessment results, education plans, outcomes, student needs, academic and career interests, supports for successful transition and readiness for postsecondary learning opportunities and work.

Matriculation – the process of being enrolled in a college or university or to attain the academic standard required for admittance at an institution.

National Alliance of Concurrent Enrollment Partnerships (NACEP) – professional organization for high schools and colleges that fosters and supports rigorous concurrent enrollment courses throughout the country. NACEP serves as a national accrediting body and supports all members by providing standards of excellence, research, communication, and advocacy.

Technical education courses – college courses which focus primarily on a specific profession, career, or trade leading to a certificate and transferring to the workforce.

Two-year college – a community college or technical college that typically offers certificates, diplomas, and associate degrees. An educational institution offering college credit opportunities for high school students.

Summary

Students have the options 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 similar end goal, earn college credit. Guidance is needed prior to dual credit enrollment which requires prior awareness of opportunities available. Terminology may create unexpected barriers for students, parents, and high school partners. Work is needed to unveil transparency throughout the transition from secondary to postsecondary education.

Chapter 2 – Literature Review

The purpose of this study is to assist in increasing matriculation at West Kentucky Community and Technical College (WKCTC) through dual credit students. In particular, the researcher seeks to reveal specific factors related to dual credit students who matriculate to WKCTC. Data obtained will be utilized to help increase the enrollment of credential seeking students from the current dual credit program. The research will support and enhance college retention and completion rates.

Theories Related to Dual Credit

Public policy theory, as well as Astin's theory of involvement will be discussed in relation to dual credit. Each of these theories have has significant impact related to dual credit. These theories provide data that lead the charge in the creation and modification of dual credit programs and statewide policies. Dual credit programs are changed and updated through public policy, whether intentional action is taken or no action is taken. As a driving force of the government, public policy is a plan implemented for the good of the public as a whole (Jones & Baumgartner, 2012). The support of public policy theory is reflected in voting and election outcomes of the candidates, and 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. Development of public policy related to dual credit has been changed and updated through different policy theories. Jones and Baumgartner (2012) highlight the attention allocation method and how this impacts public policy. Finality and binding outcome of a policy cause struggle between balance and equilibrium (Jones & Baumgartner, 2012).

Policymakers also realize that emotions are unstable and many times unsound, which may direct support for or against the final decision (Givel, 2010). 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 which will be made. Emotions are high when a child's future becomes the face of a policy, and the public's perception will form the outcome. 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.

The policy process models and emphasizes stability, rules, incremental adjustment, and gridlock. Public policy changes often follow efforts of disjointed, episodic, and unpredictable occurrences, as found through punctuated equilibrium theory. Policy change is triggered by changes in the political party preferences of policymakers, and by the voice of the constituents. Also, the changes occur as public support builds for one initiative over another. Many theories of policy change emphasize the correspondence between the direction of preferences among legislators and the interest of the public related to the policy.

Punctuated equilibrium theory provides a unifying framework for understating three mechanisms leading to the diffusion of innovations: 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 factor. The dual credit policy for Kentucky created through an Executive Order of Governor Matt Bevin is an example of diffusion of innovations. The Executive Order helped to push through the

Kentucky CPE, and KDE dual credit policy, which was led by an incremental policy development as pieces of the policies trickled down from the Every Student Succeeds Act (Tennessee Department of Education, n.d.). Three of Kentucky's neighboring states, Ohio, Tennessee, and Illinois, already updated or developed statewide dual credit policies (Lochmiller et al., 2016).

The ripple effect from top-down initiatives create 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 then disruption by instability leading to short, intense changes (Boushey, 2012). Policy making is based on emotion and allocation of attention, which builds the support leading to the final decision. This is difficult when the good outweighs the bad, and politics often create blurred lines (Jones & Baumgartner, 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. 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, De Boer, & Weyer, 2013; Fowles, 2014). This type of proactive movement forms state policies which highlight the punctuated equilibrium theory and trickle down method. Policies related to dual credit have been increasingly created and updated throughout the past twenty years (Karp, 2015).

State Policies. The ECS reports all but three states in the United States have enacted some form of statewide dual credit policy (2016; Karp, 2015). Even if dual credit is offered, legislation or policies do not necessarily exist throughout. The existing policies help to shape programs and create options for support services. Variation in the policies include funding

structure, participation, location, faculty credentialing, course setup, and the number of courses offered.

Policies that exist are focused on the eligibility of students and a funding structure to benefit all 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 which the student can achieve. Also, there is a continuous need to provide guidance throughout the credential attainment process. U.S. Department of Education (2014) reported that all programs need to build a sequenced program of study which leads students to the completion of a career pathways.

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. However, guidelines and regulations of the dual credit programs have had difficulty staying up-to-date to accommodate the increases (Taylor et al., 2015). Multiple partnerships have been created while policies and procedures were being written and put in motion. Therefore, differences in policies are realized that relate to budgets, credential requirements, course offerings, location, student eligibility, and other factors (Bailey et al., 2015).

The existing statewide dual credit policies can be bundled into two categories, comprehensive and limited policies. 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. Limited policies are identified in 26 states, with 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 obtain from freshman year through senior year. This focus is on the student and allows them to move forward as they are ready.

Student performance data and degree completion rates are reviewed by policymakers to assist in increasing graduation rates and reducing the cost of college (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 standards (Tennessee Department of Education, 2016). Also, the Tennessee Department of Education provides professional development for secondary faculty that covers the alignments of course content and learning objectives related to the challenge exam required for students (Tennessee Department of Education, 2016).

Strengthening the high school education attainment that leads to a successful transition in postsecondary 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, and an Ohio House Bill 487 was presented in 2015 to amend current policy (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. In Iowa, students have access to rigorous, college-level coursework at little to no cost due to the availability of dual credit options.

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. The bill required an upgrade to the statewide assessment system, serving all students from

kindergarten through 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. Earning dual credit helps the student and the educational institution increase education attainment, along with other strategies (Andrews & Barnett, 2002; Ohio Department of Higher Education, 2016).

Secondary education administrators have incorporated dual credit coursework and programs to assist with college readiness, in addition of or in place of AP programs throughout the state. 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 are aligned in courses related to health sciences, information technology, welding, machining, and other areas (Kentucky Council on Postsecondary Education and Kentucky Department of Education, 2016). As college and career readiness become a focus for secondary education, research results gave way to the benefits of dual credit for students, parents, educators, and community (Karp, 2015; An 2013; Mead, 2009).

In June 2016, Kentucky Governor Matt Bevin signed an Executive Order pertaining to dual credit opportunities for public high school students (Kentucky Council on Postsecondary Education and Kentucky Department of Education, 2016). The document encourages public high school students to enroll in college courses through a dual credit model that partners secondary and postsecondary institutions. Research correlates enrollment in dual credit to student matriculation, college retention rates, and college completion status (Karp, 2015; Farrell & Seifert, 2007; Mead, 2009).

KDE, Kentucky Higher Education Assistance Authority (KHEAA), CPE, KCTCS, and state government joined efforts in an attempt to remove certain obstacles for students by creating a state funded dual credit policy. Three main obstacles students face are accessibility, affordability, and college-readiness (Cassidy et al., n.d.; Karp, 2015; An, 2013). The Kentucky Dual Credit Policy has identified a list of participating postsecondary institutions (PPI) who can partner with the local education agencies (LEA). A LEA is another term for a board of education at the secondary level.

Dual credit delivery methods include being taught at the college site, the local high school, another site not on the high school or college campus (i.e. area technology center, local technology center), in a virtual environment, or in a delivery method that utilizes a combination of these delivery methods. KHEAA created a video intended to answer outlying questions, increase knowledge of career pathways, and share an awareness of college credentials, as mandatory viewing by all students who participate in dual credit programs (Kentucky Council on Postsecondary Education and Kentucky Department of Education, 2016).

The Kentucky Council on Postsecondary Education Dual Credit Policy signed in June 2016 was created and established for the purpose of providing dual credit coursework opportunities for all Kentucky high school students who participate in the Kentucky Dual Credit Scholarship, without being assessed tuition or fees (Exec. Order, 2016). The policy defines the partnership within the Executive Order, any college in the KCTCS, Kentucky four-year public or private postsecondary institutions accredited by the Southern Association of Colleges and Schools Commissions on Colleges (SACSCOC) as a PPI. The PPI and LEA establish a dual credit plan for students to earn college credit based on the Dual Credit Tuition Rate Ceiling (DCTRC), which is equal to one-third of the KCTCS in-state hourly tuition rate.

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. 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 successfully complete the course (Cassidy et al., n.d.). If a student is unsuccessful in the college course, both the high school and college GPA are affected. Plus, the student may not meet high school graduation requirements and be required to complete additional work to meet missing requirement (Karp et al., 2005). Dual credit has been highlighted as a program strategy that can assist with increasing college and career readiness benchmarks (Zinth, 2015; Lichtenberger et al., 2014).

Theoretical Framework

The work of Alexander W. Astin (1984), a leader in the field of research on retention as well as student attrition, lends support to this study. Most of his research focused on factors that can have an impact on student persistence and retention, particularly on the first year programs. These factors include active involvement in both academic and non-academic areas in the postsecondary setting. Astin highlights psychosocial and physical energy in student participation of studying, activities, and interaction with faculty and other students (Astin, 1984, 1985).

Astin's (1984) theory of involvement provides guidance and resource to highlight this study of dual credit students. Astin's theory of involvement states that the more involved a student is both in the educational experience, both intellectually and socially, the more likely that the student will matriculate and persist to a postsecondary institution. This theory added that the core curriculum's role behind students' involvement cannot be denied (Astin, 1984, 1985). A common curriculum can certainly help students achieve a sense of belonging.

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. Dual credit students rarely take 12 or more credit hours per semester to be considered a full-time college student. The majority of dual credit students at WKCTC divide time between the secondary and postsecondary setting. These students have opportunities to become involved in campus activities due to time constraints (Astin, 1984). However, connection happens on different levels for all students. Astin's theory has been used by researchers in examining the role of dual credit programs and student achievement (Flores, 2012; Kane, Shaw, Pang, Salley, & Snider, 2015).

Encouraging increased student involvement of the dual credit students is aligned with Astin's Theory of Involvement within the CONNECT program Oregon State University (OSU) (Clawson, Hartz, & Van Dimmelen, 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 find community partnerships (Clawson, Hartz, & Van Drimmelen, 2015). Activities include athletic and academic events designed to assist students at the beginning of college life, 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 (Deil-Amen, 2011).

Academic engagement, career exploration, and book community are a few of the activities which lead to enhanced engagement and connectivity through involvement (Oregon State University, 2014). The results from OSU's CONNECT program exemplifies 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) and has shown to increase enrollment in courses during the subsequent semester. Students who participate in college activities are more likely to complete a college credential than peers (Astin, 1984).

Historical Perspective

Joliet Junior College (JJC), founded in 1901, is the first and oldest public two-year college in the United States (Phillippe & Sullivan, 2005). JJC became an extended high school with the first two years of postsecondary education available for high school juniors and seniors. The existence of junior colleges assisted in providing a transition period to the 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, etc. A growing population needed to be trained for the skilled labor workforce and the junior college model fulfilled that need. The Morrill Acts of 1862 and 1890 (Drury, 2003) were created and amended to bridge the gap between high schools and universities, providing a funding structure designed to build community colleges (Stern, 2016; Phillippe & Sullivan, 2005).

Dual credit began in the 1900s and has evolved by way of program setup, name, design, and guidelines, and through state policies (Brown, 1901; Drury, 2003; Taylor et al., 2015; Karp, 2015). In the first half of the 1900s, high school students were earning college credit, but only

the superior students were given this opportunity. These students accepted the challenges of rigorous curriculum with intentional study habits and motivation to excel (Radcliffe & Hatch, 1961). The intent was to broaden the student outlook and appreciation in earning a higher academic degree. Throughout the United States, dual credit opportunities have opened doors for students to earn college credit and begin a career pathway (Bailey et al., 2015; Taylor et al., 2015).

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, 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). As the community college model was developing and changing, high school students were allowed to enroll and earn college credit if they were academically advanced or were high achieving students. In many situations, similar to Joliet High School, students simply walked up a flight of stairs to take college courses (Boggs, 2012).

Junior colleges developed curriculum specific to the immediate needs of the community. This curriculum rarely included both general education courses alongside the vocational training. Therefore, a credential earned from the junior college may not be transferable to universities due to the lack of general education courses. The junior college course content did not align with corresponding coursework required of the first two years in the university setting.

The term community college became associated with general education courses needed as the first two years of a four year university degree. During the 1950's and 1960's, junior

colleges became known as a lesser form of the postsecondary education. The junior college trained students for specific business and training needs, plus adult education centers.

Throughout history, there are several names associated with two-year colleges such as technical college, vocational school, city college, county college, adult education centers, and more. In order to provide a more clear understanding of the two-year college, the AAJC became the AACC.

In the 1950s, research was conducted 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 Admissions with Advanced Standings began its research in 1953 related to college courses in high school. Within this research, seven high schools and 12 colleges were chosen 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, 2003).

With the data obtained from the School and College Study of Admission with Advanced Standings, a new program was created and the model was promoted to high achieving students throughout the United States (Novak, 2017; Rothschild, 1999). The program was renamed the Advanced Placement Program, or AP, as the program is commonly referred to. This program consisted of students learning college content, most commonly taught during the freshman year of college, through a specific curriculum which replaced the high school course (Novak, 2017; Rothschild, 1999; Schneider, 2009; and The College Board, 2016).

The foundation and strong partnership created was based on a mutual concern, in the high school and universities, for the high achieving students. 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. To confirm student achievement of the learning outcomes, an exam is administered at the end of the course (Rothschild, 1999; Schneider, 2009; and The College Board, 2016).

During the 1980s, the creation of statewide dual credit policies was on the rise. The policies were designed to provide direction and guidance for high schools and postsecondary institutions who offered college credit to high school students (Taylor, Borden, & Park, 2015). However, many states went against the policies and allowed partnerships and regulations to be created on an individual basis (Bailey, Jaggars, & Jenkins, 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 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).

Dual credit was offered at an increased rate during the 1990's (Bailey et al., 2015). The presence of dual credit in the United States was significantly promoted for high achieving

students to provide challenging curriculum. School systems, students, and parents realized the senior year of high school had become less productive. Students often sought out academic challenges through college course work and the high schools offer empty classrooms to local community colleges who sent faculty members to teach at night or on weekends (Karp, 2015). The Advanced Placement program was offered in many high schools to increased academic rigor for students (Novak, 2017). These occurrences evolved into more dual credit opportunities for students. Dual credit has become available for all students who meet collegiate benchmarks, instead of only being offered to an elite group of high achieving students.

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. Plus, the resources required for a university education were not available to everyone. Attending a university usually meant that the student must leave the area and family behind until a degree was conferred. The choice to pursue a university education could have dire consequences if no one were able or willing to stay behind and continue to work (Crisp & Delgado, 2014; Jaggars, 2014).

After World War II, communities realized an immediate need for a trained and skilled workforce throughout the United States (Boggs, 2012). The gap which existed in higher education led to public response and political movement. Educators, legislators, and businessmen realized that the need existed and responded by creating a structured learning environment specific to the student and community needs (Phillippe & Sullivan, 2005).

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 was developed based on public need as a response to the Great Depression through relief, recovery, and reform. He also helped to strengthen secondary and postsecondary education with the authorization of additional policies to secure continuous governmental funding (Drury, 2003). The movement was continued with President Truman solidifying the importance of postsecondary education and vocational training. This mission of community colleges targeted these needs through the change and adaptation of new policy creation from local, state, and national levels (Boggs, 2012).

Drury (2003) finds the initiative related to junior colleges or two-year colleges dates back to the Morrill Act of 1862 and the second Morrill Act of 1890. The Morrill Act created land grants which provided specific amounts of acreage for each state to establish for funding higher education. The first brick and mortar location for a two-year college was in Joliet, Illinois, on the second floor of Joliet Township High School (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 were the basic general education course and could be taught in a junior college setting. The junior college model assisted students wanting a college education, but unable to leave the community (Drury, 2003).

The multipurpose vision of the community college provides strength and perseverance. The community and political purpose for a two-year college was to provide education to anyone who wanted to pursue that path. The two-year college addressed the problem of university overcrowding due to the increased demand for higher education (Vaughan, 2006; Harbour,

2015). The mission of educating everyone everywhere was developed through the initial need and principle belief of the community college (Harbour, 2015). The realization of unequitable access throughout the universities prompted legislative action (Gilbert & Heller, 2013; Vance, 2017). Public awareness of insufficient seats available for the growing demand in higher education led the community colleges to become a clearing-house 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. 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. Community colleges have shown steady growth since the 1960s (Drury, 2003). Today, over 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).

Legislation did not provide full financial funding to public junior colleges until 1943 when the Illinois legislation created public policy for junior colleges (Harbour, 2015). However, that did not hinder the progress on building and enhancing junior college programs. Universities raised concern regarding enrollment pressures and supported the junior college movement as one solution to reduce this problem (Gilbert & Heller, 2013).

Illinois and California led the nation in the trend toward the junior college system by building and expanding existing educational partners. 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 (Gilbert & Heller, 2013). Monetary support was not provided to this higher education system again until the 1940s (Vaughan, 2006). 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 (Harbour, 2015).

Assisting, building, and helping provide an educated and trained workforce is the foundation on which community colleges were built. The rudimentary focus of the community college is to serve all sectors of the community through the open-access format (Harbour, 2015), which provides the opportunity for any student to gain admission to the college and full access to all 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 has extended to the 21st century.

West Kentucky Community and Technical College (WKCTC). WKCTC, the community college the researcher will focus on and obtain data from is highlighted through a historical review. WKCTC is a consolidated community college built from West Kentucky Industrial College, West Kentucky Technical College, Paducah Junior College, and Paducah Community College. The first college within WKCTC begins through the visionary, hardworking, businessman Dennis Henry Anderson. 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 reached its heights as the second largest African American teacher college in the United States in 1909 (Blythe, 2008, p. 12). Anderson

spent years attempting to secure enough funding to build the college. 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 was transferred to Frankfort and renamed Kentucky State College (Blythe, 2008). West Kentucky Industrial College was closed, and the school was reopened as West Kentucky Vocational Training School. The Vocational Training School was renamed 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. 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. 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. In 1967, Paducah Junior College became part of the University of Kentucky Community College System and was renamed Paducah Community College (Murrell, 1969).

In 2003, Paducah Community College 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 sides become unified, but they also worked together to receive many accolades through the integration of projects, curriculum, and partnerships (Blythe, 2008). The college has been named one of the nation's top ten community colleges by the Aspen Institute, four consecutive awards (The Aspen Institute, 2017; Hlinka, Mobelini, & Giltner, 2015).

Dual credit programs have been part of WKCTC course offerings since the 1980s. Community colleges operate in a fluid environment, which creates difficulties to pinpoint the exact changes connected to the fluctuation of data (Stephenson, 2014). However, the fluidity of the current community college outlook at WKCTC appears to have a strong mission and goal, which works to support the students and surrounding community. As part of the community college mission, programs extend partnerships across education and political lines in order to provide the most effective goal achievement process possible.

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 support group 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. Additionally, concurrent enrollment increases community college enrollment, as participating students become an ever 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 peers who start and end their collegiate experience at a four-year institution (Boggs, 2012). As the first-time freshman begins the process of obtaining a college degree, there are many options to pursue. 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 researched count from Census data. Through dual credit, students are introduced to many of these options which provides the student with experience of the different admissions and advising processes, as well as course offerings.

National Alliance of Concurrent Enrollment Partnerships (NACEP)

As the momentum of dual credit enrollment emerged, policies and regulations were developed. The regional collegiate accrediting agencies sought confirmation of quality within dual credit programs (Taylor, 2015). Content quality and student outcomes were being questioned by the American Association of Higher Education (AAHE). A voluntary national accrediting organization, the National Alliance of Concurrent Enrollment Partnerships (NACEP), was formed to provide secondary and postsecondary partners accreditation status. 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; Taylor, 2015).

As of 2016, NACEP membership has grown to 241 two-year college members, 117 four-year universities, 41 high schools and school districts, and 22 state agencies or system offices (National Alliance of Concurrent Enrollment Partnerships, 2017). A comprehensive review is conducted after the institution completes a self-study to ensure all standards are being met (Taylor et al., 2015). Within the NACEP organization, 98 programs have earned accreditation through validation of peer reviewers, confirming that standards have been achieved in all five areas (Karp, 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 (National Alliance of Concurrent Enrollment Partnerships, 2017).

Academic Advising.

Academic advising exists to assist students and is an essential tool that leads to the correct pathway and the intended career goal. Most institutions offer only one type of advising model and students must adapt to the option provided. The process of advising is not to simply enroll students in courses for the upcoming semester. Academic advisors discuss interests and program plans with the students. Then the academic advisors helps the student create a plan to achieve the goal. Students who have definite plans and clear understanding of their goals will not need an intrusive advising model. They may need to have questions answered and approval to add courses. Developing a clear path to a college credential move students on track to increase both the retention rates and graduation rates.

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 holistic guidance approach. These undecided students need access to academic planning materials before making an advising appointment. Astin (1984) explained the importance of a student choosing a college major early which helps in achievement of a college credential. Students who prolong the decision to choose a college major are most associated with lower attrition rates.

There are many advising models which include (1) integrative advising, (2) appreciative advising, (3) central advising center, (4) instructor advising, and (5) a team approach. Integrative advising was the advising model used at the site which the researcher chose to obtain data from. The integrative advising model was developed by Terry O'Banion developed 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. In this advising model the advisor tells the student what is needed to build a schedule of classes (Grites, 2013).

Dual credit students need a holistic advising approach to achieve the most effective experience and connection to the postsecondary educational environment. Through the advisement process, students must be enrolled in courses that 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. Postsecondary institutions offering dual credit are responsible for many administrative processes. 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 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 environments. Also, advisors must be knowledgeable in curriculum and requirements to successfully lead students toward credential attainment at both institutions (Stephenson, 2014). Dual credit students need intrusive advising before enrolling in college credit courses. Without advisement and guidance, students may take a course that will transfer but may not be used toward credential completion. This adds, instead of shortens, time to earn a credential (Raia-Taylor, 2012).

Student involvement and understanding of the college pathway not only assists in realizing the start to finish design but also gives the student a feeling of empowerment (Hurman, 2014; Cassidy et al., n.d.). The relationship built through the advisor-student connection can play a monumental role in student retention and completion. The student needs to have confidence in the information shared and the ability to adapt wants/needs into the completion goal (Martinez & Klopott, 2005; Hurman, 2014).

Dual Credit Programs

The dual credit programs link college success to students who earn at least nine college credit hours before high school graduation (Barnett, 2016). 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, all students have not had the opportunity to choose dual credit options even though many high schools have chosen to offer these as part of the high school curriculum (National Commission on the High School Senior Year, 2001; Taylor, 2015).

A wide variety of dual credit options allows students to earn college credit. Some programs require end of course assessment to meet national standards, 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. 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.

After World War II, educators and political leaders believed that high-achieving students needed to be challenged with increased academic rigor (Schneider, 2009). Gaining an advantage in education ensures that the United States would continue leading the world in economic and political stamina (Rothschild, 1999). Soon after Sputnik was launched, the mindset and goal to educate the best with the best was of extreme importance. A high quality academic curriculum targeted high achieving students in the most prestigious high schools was started, the Advanced Placement (AP) program (Godfrey, Matos-Elefonte, Ewing, & Patel, 2014; Sadler, Sonnert, Tai, & Klopfenstein, 2016).

The mission of the AP program was to reduce and remove duplicated course content between secondary and postsecondary institutions (Godfrey et al., 2014; Sadler et al., 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. 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).

Advanced Placement (AP) Program. AP is a division of The College Board (2016). The AP program was formed by connecting secondary and postsecondary educational institutions to provide rigorous and innovative course options for high achieving students. The AP program assists high schools by providing teacher training that leads to certification required to offer content and curriculum of each of the AP courses (Warne, 2017; Novak, 2017; Schneider, 2009). This secondary and postsecondary partnership was built on the foundation of mutual concern for the gifted students and consisted of continuous communication (Rothschild, 1999; Allen et al., 2010).

The AP Program assists with professional development for high school faculty and provides them access to content and curriculum. A high school faculty member must attend AP professional development, including a two-week training session, to be qualified in teaching content specific courses (The College Board, 2016; Warne, 2017; Sadler et al., 2016). Student requirements to enroll in the AP program vary by high school. The majority of AP students are white males on the honors track with superior academic ability (Sadler et al., 2016; Rothschild, 1999; Schneider, 2009). AP courses are offered at numerous high schools to high achieving students who seek to increase academic rigor. Initially, the prestige of having an AP course on a high school transcript was enough to increase odds of achieving admission to elite colleges and universities (Schneider, 2009). AP courses may be more intensive and require additional study time than entry-level college courses (Sadler et al, 2016).

The College Board (2016) research shows a strong correlation between the success of one or more AP exams and college completion. The research provides additional evidence of academic rigor as a strong predictor of success in higher education (Hodara, 2015; Martinez & Klopott, 2005). The AP program is helping to remove barriers to achieving a college degree. However, being an elite program to promote students from prestigious high schools to Ivy League colleges is no longer its primary mission (Schneider, 2009). Providing high quality academic curriculum and teacher professional development has helped to prepare students for college coursework.

Articulated Credit. Postsecondary 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. 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). CLEP does not provide college credit, only a scored exam. The college credit must come from the college or university based on the official scored exam (The College Board, 2017). For the past 40 years, the CLEP exam has been used 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. CLEP developed exams 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. Scores must be submitted directly to a college or university in order to determine if credit is awarded.

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. 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, McGaughy, Davis-Molin, Farkas, & Fukuda, 2014; Hill & Saxton, 2014).

The literature has established IB as having aligned content with college curriculum and expectations throughout the entire series of courses. The content and grading criteria are based on criterion referenced standards met throughout the world (Conley et al., 2014; Hill & Saxton, 2014). Students are being prepared for higher-level academic work and becoming to civic-minded individuals who use knowledge gained to think critically and solve problems (Martinez & Klopott, 2005). Currently, 905 high schools in the United States offer the IB diploma, with four of those high schools located in Kentucky: Atherton High School, Holmes High School, Sacred Heart Academy, and Tates Creek High School (Conley, McGaughy, Davis-Molin, Farkas, & Fukuda, 2014; Hill & Saxton, 2014).

At present, high schools are not required to offer specific programs which allow students to earn college credit and high school credit at the same time. Many states have dual credit policies in place which require secondary and postsecondary institutions to provide these opportunities to students (Lichtenberger et al., 2014; Tennessee Department of Education, n.d.; Zinth, 2015). These educational institutions may offer any or all of the dual credit courses through the programs (Taylor et al., 2015). In general, state policies do not have a restriction in total credit hours earned. Less than 10% of the states with dual credit policies limit total credit hours earned by a high school student (Zinth, 2015).

West Kentucky College Academy. WKCTC offers dual credit courses to high school juniors and seniors who achieve college course benchmark scores on an approved assessment, as outlined by the Kentucky Council on Postsecondary Education and Kentucky Department of Education Dual Credit Policy (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 (Kentucky Community and Technical College System, 2016).

Benefits of Dual Credit Programs

Dual credit programs may be challenging, but many other benefits are associated with decisions to enroll (Johnson, Jarrell, & Adkins, 2015; Taylor et al., 2015; ACT, 2014). A major benefit is providing underrepresented minority students access to quality education through school and state collaboration. Vargas, Roach, and David (2014) conducted a study of a five-semester dual credit pilot program called EXCELeRATE. The researchers worked with Tulsa Community College (TCC) in Oklahoma in a collaborative effort with the Oklahoma State Regents for Higher Education as well as two local public school districts. A total of 990 high school juniors and 1,618 seniors were involved. Before this pilot study, the potential TCC dual credit students faced strict admissions guidelines.

High school juniors were required by the State of Oklahoma to have a GPA of 3.5 or higher and obtain a composite score of 21 on the ACT before they were able to access dual credit courses offered by universities and colleges, while seniors needed only to obtain a 3.0 GPA or higher and a composite score of 19 on the ACT (Vargas et al., 2014). In this pilot program, the state removed GPA and ACT requirements for juniors and seniors to enroll in dual credit courses and found promising results. Providing additional access to dual credit by removing barriers allowed a diverse population of students to earn college credit. The traditional dual credit

student, in this pilot program, was white with middle to upper class socio-economic status. The pilot program increased the number of high school students who earned dual credit, as well as students who belonged to first generation immigrant families with lower socioeconomic backgrounds.

Traditional dual credit programs are affected by state policy, financial issues, and transportation problems. However, with collaboration, these problems can be avoided. The results showed that if the state collaborates with schools and give the underserved students a chance to access dual-enrollment programs, the students have a better chance of transitioning to college and complete a credential. 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 entertain dual-enrollment programs (Vargas et al., 2014).

There are more benefits revealed by the literature (Johnson et al., 2015; Taylor et al., 2015; ACT, 2014). Dual credit programs have been found to improve high school graduation rates, postsecondary preparedness, and postsecondary enrollment. In relation to these, students who participate in dual credit were found to 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. In particular, these programs were found to improve high school and college graduation rates or have improved persistence of high school and college students. These programs also presented faster time to completion of postsecondary programs, which most families found beneficial. Studies also found higher first semester and second semester college GPAs among the students who have experienced dual credit (An, 2013; Lichtenberger et al., 2014).

Through empirical quantitative research studies, dual credit was also found 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. For one, dual credit partnerships led to a better and more frequent dialogue between districts. Course alignment can be achieved and transition gaps can be closed with collaborative dual credit programs. It has been found that dual credits offer greater promise in making the students more college ready with enhanced high school curriculum (Andrews, 2013).

In addition, Shaw, Marini, and Mattern (2013) found that students who earned dual credit achieved higher four-year postsecondary graduation rates than peers without prior dual credit. The higher graduation rates were evident in non-traditional dual credit participants, such as first-generation families and underrepresented minority females. Shaw et al. (2013) revealed that students who take at least one AP class and the exam, have an advantage over peers who did not take an AP class and exam. Students who took at least one AP exam were more likely to graduate from college within four years (Novak, 2017).

In another study, the data set encompassed of AP scores for 250,974 students from 129 colleges revealed AP scores are predictive of college graduation propensity (Shaw et al, 2013). The researchers found that students' average AP scores, the number of AP exams where they got scores of at least 3, and proportion of AP courses taken out of all the AP courses offered can all serve as good predictors of students' first-year college performance. In particular, scores and performance during the first year of college were higher for those who took a higher proportion of AP exams in relation to the school's total offering. Shaw et al. (2013) conferred that dual credit programs, including AP, have significant benefits.

Wang, Chan, Phelps, and Washbon (2015) found the same positive effects on the educational outcomes of two-year college students. A substantial body of literature has been devoted to the outcomes of students in four-year colleges, and the researchers' findings on the outcomes of students in two-year colleges solidified the effectiveness of dual credit programs. Researchers also examined academic momentum and how dual credit serves as a mediating variable on the possible relationship between dual credit and academic performance. Data was gathered from 15,000 first-time postsecondary students who enrolled and entered Wisconsin's two-year colleges from 2009 to 2010. 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 were found to be those who entered college without delay, enrolled in summer courses, and had stronger overall academic performance.

Non-cognitive student outcomes that are equally promising and positive have been found of dual credit students (Phelps & Chan, 2017). Heath's (2008) comparison of 275 dual credit students to 258 traditional community college transfer students showed in dual credit students had the advantage in regard to college GPA, associate and bachelor degree completion rates, and length of degree completion. Heath found that dual credit students experienced greater satisfaction throughout the postsecondary education experience compared to the traditional non dual credit students.

Other studies claim dual credit participation improved academic outcomes in college if the variables of academic motivation and engagement are high (An, 2013). Studies 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. The positive relationship holds, even if pre-college variables have been controlled. More importantly, they 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.

Earning College Credit

Students earning dual credit have a substantial effect on college enrollment and college completion (Taylor, 2015; ACT, 2015). At WKCTC in the fall of 2015, 6,053 students were enrolled, and 1,175 were high school students. Dual credit enrollment accounts for 19% of the total number of students enrolled (WKCTC, 2015), which is significant to the college administrators and board of directors.

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 are challenged with the next step to do more with the same resources. High school students who take college courses need to be advised by individuals with knowledge of both the K12 environment and the secondary institution. 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, additional time to credential completion (Karp, 2015).

Obstacles exist through accessibility, affordability, and transferability (Mansell & Justice, 2014; An, 2013). Students must be proactive before they begin earning college credit. Creation of an academic plan will empower the student with the knowledge of credential requirements. If the student plans to attend a college other than the one they are earning dual credit from, they need to research about transferability. When dual credit is offered and accessible through the high school setting, students must not enroll in courses that do not align with the individual academic plan. 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.

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). College going behavior, academic rigor, and social and academic support are the most crucial predictors of enrollment in higher education (Hodara, 2015; Martinez & Klopott, 2005). 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 the success of the student (Mead, 2009; Mansell & Justice, 2014). Foundational support or knowledgeable mentors are effective in assisting in higher education enrollment (Oakley, 2015; Hurman, 2014). Students without access to this, especially underrepresented minority students, are less likely to have access to this support (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; Watt-Malcom, 2011). The result of selecting a college major before taking college courses will help in earning a college credential in a shorter timeframe (O'Banion, 2013). Taking advantage of dual credit opportunities increases the rate at which students will earn a college credential (An, 2013).

Summary

The literature shows that dual credit is an opportunity for high school students to take college courses, therefore adding choices for course offerings and increased rigor of the curriculum. Not all students are ready to enroll in college coursework during high school. There are several factors which may interfere with dual credit enrollment. First, the high school student must want to be enrolled in courses which are academically challenging and must realize the additional constraints required in order to be successful. Achievement of college benchmark scores has been shown to significantly increase the achievement of a passing grade for first-year college level courses (ACT, 2015).

The offerings of dual credit courses come from the partnership of two-year and four-year postsecondary institutions (Karp, 2015; Taylor, 2015). The majority of dual credit offerings are provided through the community colleges (Fink, Jenkins, & Yanagiuara, 2017). Some states have comprehensive dual credit policies which 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. By reaching a diverse population, dual credit assists students in earning various credentials. Through the community college, students may earn a transfer diploma, technical education degree, or industry certificates. Each of these options create a pathway leading to business and industry, workforce, or transfer requirements for additional postsecondary training (Bailey et al., 2015; Phillippe & Sullivan, 2005).

While enrollment in dual credit increases credential attainment, students must be prepared for college coursework before enrollment may take place. 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, whereas college placement scores differ by focusing on a specific skill set related directly to course content.

Students earning dual credit have a substantial effect on college enrollment and college completion. The decision to enroll in college courses, while 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 student by receiving a college credential in a shorter timeframe (Johnson et al., 2015; Taylor et al., 2015).

Dual credit has evolved from simply earning college credit to better preparing students for future postsecondary environments. Effective programs help to fulfill goals related to high school and educational reform. Through this effort, dual credit will assist in decreasing the need

for high school graduates enrollment in remediation coursework in college. Intrusive advising before dual credit enrollment provides students with information and 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).

The problem is, even with this research and the fact that WKCTC has been enrolling high school students in college courses for the past 30 years, the credit hours and courses that most likely lead to matriculation in dual credit programs are unknown. Dual credit enrollment has seen a significant increase over the past ten years, 316 students enrolled in fall 2006 for dual credit and 1319 students enrolled in fall 2017 for dual credit (WKCTC, 2015). WKCTC enrollment has increased through dual credit students and in the matriculation of dual credit students.

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

Academic advising is part of a holistic approach to the student understanding how to achieve a personal college and career goal. The student will need to be actively involved in the selection of the course and understand how to achieve completion of the college credential intended. Initially, the student may need a prescriptive advising session. This type of advising is

a strategy that leads a developmental method of learning and knowledge building. As students create a plan, they take ownership of achieving the goal that is within reach.

ACT offers data for a typical student at a typical postsecondary 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 (Martinez & Klopott, 2005; Hurman, 2014).

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

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 to be provided for all students. Decisions can be 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.

In this study, research will investigate student data for enrollment at WKCTC during the fall semester (immediately after high school graduation). The student must be enrolled as a full-

time, enrollment in twelve credit hours or more entitles student full-time status, during the academic years of 2013, 2014, 2015, and 2016. Dual credit students are categorized as non-credential, non-degree seeking students in the college database. When a student transitions to WKCTC after high school graduation, the college application is updated to reflect an academic program plan chosen by the student. This action removes the non-credential, non-degree seeking program plan and transitions the student to credential seeking pathway.

Chapter 3 – Methodology

Research Design

The data collected focused on students who earned dual credit from WKCTC and graduated from high school. Of those students, tests were run related to matriculation with WKCTC immediately following high school graduation. Descriptive statistics provided the mean, median, and mode of the twenty variables, to find correlation to matriculation.

WKCTC service area consists of ten rural counties, with high schools ranging from a distance of one mile to 61 miles of the community college main campus. The researcher seeks to reveal specific attributes of dual credit students in order to assist in increasing the enrollment of credential seeking students from the dual credit population. Outcomes will be shared with and reviewed by WKCTC administration for future student enrollment purposes.

Defining the attributes of dual credit students who have graduated from a high school in the WKCTC service area and matriculate to WKCTC is the first step in the analysis. Of the dual credit students, is there a correlation to the attributes (ethnicity, gender, high school, and credit hours) of the students who matriculate to WKCTC? Research will analyze the statistics to provide definitive attributes significantly correlating to matriculation to WKCTC. The outcome will reveal a correlation, if any, between the attributes of gender, high school, and total dual credit hours earned to matriculation.

Students will have earned dual credit during the junior or senior years of high school. Recommendation for student enrollment is no more than six hours first semester of junior year and no more than that twelve credit hours per semester during the senior year. Credit hour attainment may increase with permission of the VP of Academic Affairs. Students may earn as few as one college credit through the Introduction to College class, which is offered to students

within the individual scholarship programs through WKCTC. Other dual credit programs allow students to earn as many as 73 college credit hours by the time the student graduates from high school. Therefore, data will reflect student credit hour attainment of one or more credit hours per student.

Purpose of the Study

The purpose of this research is to analyze specific attributes related to the dual credit students who matriculate to WKCTC during the fall immediately following high school graduation. The attributes which will be examined are underrepresented minority, gender, high school, and credit hour attainment. The reason for choosing a quantitative study is to obtain data of the attributes of the students who matriculate to WKCTC with future plans to help increase the transition rate to WKCTC.

An analysis of the WKCTC service region dual credit population will offer valuable information to the community college and other postsecondary institutions offering dual credit. Earning and offering dual credit in Kentucky has been impacted by an Executive Order in 2016 and a new statewide policy in 2017. Kentucky Dual Credit Policy has initiated changes within the dual credit environment, through enhancements to the preceding statewide policy, a scholarship program, and the dual credit advisory council. Changes include increasing graduation and matriculation rate, while reducing the need for remediation at the postsecondary level.

This study was designed as a quantitative research study. Quantitative research is generalized, empirical, and verifiable truths about behavior that are waiting to be found (Creswell, 2012). The researcher decided to utilize quantitative research with the historical data

in order to find specifics and truth to assist in leading students toward completion of college credential. In quantitative research, the data provides the outcome and helps to remove bias or other influences related to the results as this type of data can provide definitive answer. Through the statistical analysis and numeric data of the sample population a quantitative researcher gleans results that will accept or reject stated hypotheses. Quantitative research is an inquiry method used to describe trends and explain relationships amidst variables found in the literature (Creswell, 2012).

Data analysis will be completed through the use of statistical analysis tools, Microsoft Excel and IBM SPSS, then interpreted and reported. Quantitative research fits this research study because the researcher will rely on statistical analysis to report the results. Using means, standard deviation, and percentages were disseminated through the descriptive analysis method.

Role of the researcher. The researcher is in this study is an employee of WKCTC and works directly with dual credit students and partners. In effort to remove intentional or unintentional bias, quantitative research method was chosen to present results of data gleaned from a systematic approach (Creswell, 2012). This method relies on data and produces results which are much less subjective than other methods such as qualitative or mixed methods. Lauck (2016) explains subjectivity is similar to human judgement and often reflects personal ideas and opinions.

Researcher's bias due to direct connection with the WKCTC dual credit program creates an unintentional bias. Both positive and negative influences throughout the research are reflected in subjective data and reporting of results (Babad, Peer, & Benayoun, 2012). The selection of the research topic is a type of bias in that it reveals an interest of the researcher (Lauck, 2016).

In order to minimize potential bias and increase credibility of the research, data was compared to system-wide data and reviewed by college level employees to confirm accuracy.

Research Questions

The grand tour question related to this research is:

What factors lead to matriculation of dual credit students at WKCTC during the fall semester, immediately following high school graduation?

RQ1. How do the total number of dual credit hours earned correlate to matriculation rates for WKCTC during the fall semester immediately following high school graduation?

RH1 Credit hour attainment has no correlation to matriculation.

RQ2. Does the high school from which a student graduates correlate to the dual credit matriculation rate?

RH2 Matriculation rates are not correlated to the high school from which a student graduates from.

RQ3. What are the matriculation rates specific of underrepresented minority (defined by gender and ethnicity) with dual credit compared to peers who earn dual credit?

RH3 Underrepresented minority population, defined by gender and ethnicity, do not correlate to matriculation.

Description of Population

The sample data will be extracted from historical data obtained from the WKCTC Institutional, Planning, Research, and Effectiveness (IPRE) department through the KCTCS database management system, Decision Support System (DSS). This is a comprehensive database which has the capability to quickly create queries and reports through information located in the KCTCS Student Information Portal, PeopleSoft. Only KCTCS students who earned dual credit within the WKCTC 10 county service region will be requested for this study.

The data reflects high school student population who graduated from a high school within the WKCTC service region. Two factors which could skew the data for course enrollment and credit hour attainment were identified. Community Scholarship Program (CSP) and Commonwealth Middle College (CMC) students earn dual credit and are calculated in the total enrollment numbers, which may skew enrollment data. Students enrolled in CSP enroll in GEN 100 – Introduction to College during the student’s senior year. GEN 100 is a one hour college course designed to assist the student with transition from high school into the next path, whether it is postsecondary, military, workforce, etc. CMC enroll students through a grant funded program, targeting first generation college students, helping to open doors to a postsecondary option through concentrated student support services, advisement and enrollment in courses leading to a degree, and assistance with study skills and tutoring. These students have the opportunity to earn an associate’s degree and the data may skew credit hour attainment.

Dual credit student information will be analyzed from matriculation data specific to fall of 2013, 2014, 2015, 2016, and 2017. With the matriculation data, 5,472 participant data will be disaggregated. The vast number of participant data helps to confirm validity of the research and the outcomes (Creswell, 2012). According to the data, 43.97% are male and 56.03% are female.

There are 18.6% of underrepresented minority students enrolled in one or more dual credit courses.

The study represents all students in the WKCTC service area who earned dual credit from 2012 through 2016. Western Kentucky is a rural area offering many benefits educationally with a four-time national Aspen Prize for Community College Excellence (The Aspen Institute, 2017) to the ten counties within the WKCTC service area. US Census Bureau (2017) reports this Western Kentucky service area with an 18% average poverty level and predominately white middle class families. The focus for the research is to identify specific attributes of dual credit students who matriculate to WKCTC which will result in increased enrollment numbers.

Description of Research Instrumentation

The data will be requested through the WKCTC IPRE department after obtaining an IRB approval from Murray State University, KCTCS, and WKCTC. All policies will be followed to comply with each institution. The data will be analyzed for researcher to answer questions related to this study. Request for data will be fall of 2017 to ensure availability of official enrollment data, which is submitted to CPE. Specific data will be requested through the IPRE department and confirmed by the WKCTC K-12 department to ensure accuracy of information received.

This study will utilize demographic and academic data for full-time students, those enrolling in more than 12 credit hours per semester, and matriculated to WKCTC during fall of 2013, 2014, 2015, 2016, and 2017 immediately following high school graduation. Student must have graduated and earned dual credit from a high school within the WKCTC service area. Data will be received in a spreadsheet format and Microsoft Excel will be utilized to perform

disaggregation, analysis, and comparison for final reporting. Microsoft Excel was used to create results for the descriptive statistics in each of the variables. This software program also helps to remove duplicate records, sort for dual credit enrollment in high schools outside of the WKCTC service area, and find incomplete or missing data in each record. Statistical analyses were created using SPSS. The SPSS software allows the researcher to analyze data, review statistical significance, and authenticate correlation, if any exists. Plus, data will be examined through a binary logistic regression model in SPSS.

The central question will analyze data related to the matriculation of dual credit students in the WKCTC service area. Specifically the data will be reviewed and disaggregated by number of credit hours earned, high school, gender, and ethnicity. Student anonymity will be maintained throughout the research due to items requested will have no identifying factors. Credit hours earned as defined within KCTCS must receive a grade of A, B, C, or D. Grades of E, W, or I are not calculated in credit hour attainment. Actual high school names were removed and replaced with an assigned alpha-numeric character.

Variables in the Study

Correlational research compares two or more variables and predicts outcomes related to data (Field, 2013). The correlational data will provide information related to student matriculation and 20 independent variables. The array of variables consists of credit hours attainment, gender, ethnicity, high schools, dual credit scholarship programs, and course enrollment to find correlation with matriculation to WKCTC during the fall semester immediately following high school graduation.

Gender and ethnicity will be used to identify underrepresented minority in the data set. High school was selected to defined area that may have unknown challenges for dual credit enrollment and how to better serve the population. Lastly, the researcher selected credit hour attainment in order to find if a specific number of credit hours earned increased matriculation. Reasons stated for enrollment in dual credit and college vary significantly due to variables in hobbies and interests, parent recommendations and suggestions, recruitment initiatives, and connections between intended majors (Rayfield, Murphey, Skaggs, & Shafer, 2013). The many variables which exist make it difficult to set a target on only one specific area. In order to be successful, increasing matriculation will demand a multi-faceted approach.

Enrollment represents the primary purpose for a postsecondary institution to operate. 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 process. Academic guidance throughout the educational journey will increase the number of students who earn a postsecondary credential and become a productive member of the society. Building relationships and increasing partnership initiatives will help make a seamless transition and eventual completion of the college credential. Ultimately college credential completion provides skilled, trained people for the work force. Educational enrollment exists for a strong and vital workforce (Shah, 2012; Hurman, 2014).

Procedures for Data Analysis

Quantitative statistical analysis will be used to identify statistical significance with the attributes of dual credit students and matriculation. By identifying the specific attributes of former dual credit students who matriculate to WKCTC, the researcher will share outcomes that may assist to increase overall student enrollment. Descriptive statistics will be requested to

provide student total credit hours, underrepresented minority, gender, and high school student graduated from. Data will provide information to review possible gaps which need to be addressed and create best practices from areas of strength.

Assumptions will be adhered to within the analyses to construct valid interpretations of outcome. The analyses will include students who earned dual credit and matriculate to WKCTC; student who earned dual credit and did not matriculate to WKCTC, the number of dual credit earned by all dual credit students and grouped by matriculation to WKCTC or did not matriculate to WKCTC; the dual credit students who matriculated to WKCTC what percentage are males and females; the dual credit students who matriculated to WKCTC what high school did they graduate from, and all dual credit students grouped by credit hour attainment.

Summary

Data provides the evidence which may create change in the enrollment to WKCTC. Numbers exist to explain the outcome related to percentages, rates, and measurement. The data set and analyses results in more than numbers, this study encompasses students, faculty, employers, and employees. The data will provide accurate facts and figure, definitive answers to quantitative questions, and results will be shared from the statistical analyses.

Statistical significance will be reviewed as related to matriculation rates at WKCTC. Outcomes will be shared with WKCTC administration, with intent to increased credential seeking headcount. Targeted dual credit enrollment and recruitment strategies will utilize the data analysis for future endeavors.

Dual credit increases enrollment at WKCTC and helps to create an increase of the transition to postsecondary education. Students who have earned dual credit and transition to

postsecondary are more likely than peers to complete a college credential. Building a well-skilled, highly-trained workforce helps to grow a vital economy.

Chapter 4 – Findings and Analysis

This chapter provides an analysis of the data collected over a five-year period of students who earned dual credit at WKCTC. The findings provide results which analyze attributes from dual credit students who matriculated to WKCTC and those who did not matriculate to WKCTC. Information was disaggregated by school, gender, ethnicity, credit hours, course enrollment, and dual credit programs.

The researcher sought to identify attributes that have the ability to increase matriculation. The narrowing of gender and ethnicity variables focused on enrollment and matriculation of underrepresented minority population. Credit hour attainment was chosen to identify correlations between higher or lower number of credit hours earned and matriculation rates. Understanding the relationship between high school dual credit and matriculation can help to define the partnership between K12 institutions and WKCTC.

Data was requested from WKCTC IPRE, after obtaining IRB approval from MSU, WKCTC, and KCTCS. Personal characteristics were removed from each record to ensure confidentiality and anonymity. The K12 Office reviewed data to confirm accuracy, remove any duplicates, and update incomplete records. Microsoft Excel was used to create results for the descriptive statistics in each of the variables. This software program also helps to remove duplicate records, sort for dual credit enrollment in high schools outside of the WKCTC service area, and find incomplete or missing data in each record. Statistical analyses were created using SPSS. The SPSS software allows the researcher to analyze data, review statistical significance, and authenticate correlation, if any exists.

The data analyses only included students who earned dual credit at a high school within the WKCTC service area. High schools outside of WKCTC's service area request dual credit courses, and approval is granted on a case-by-case basis. Variables of the data included gender, ethnicity, high school, dual credit programs, credit hour attainment, and course enrollment. A five-year data set was requested specific to dual credit student enrollment. Data began with dual credit student enrollment in fall of 2012 and extended to spring of 2016. The matriculation data of the dual credit student enrollment occurred in the subsequent five-year period beginning in the fall of 2013 and concluding with fall of 2017.

Quantitative research and descriptive statistics were the methods chosen to examine statistical significance between matriculation rates and attributes of dual credit students. Quantitative statistics uses numeric data to provide definitive answers between dependent and independent variables (Field, 2013; Crowell, 2012). Descriptive statistics represent data through the mean, median, and mode (Field, 2013). Variance was established by both of the analyses used. A binary logistic regression model provided the results of the variables with assigned numeric values.

Demographics

A summary of the demographic factors related to the student population is reported in this section. The data set includes a five-year range of student enrollment in dual credit and matriculation to WKCTC. Data consists of 5,472 students who earned dual credit through WKCTC. These students were enrolled in a private or public high school within the WKCTC ten-county service region. College credits ranged from one to 73 credit hours per student. Total student dual credit hour attainment for the data set was 45,811. Average student credit hour attainment was 8.37, with a standard deviation of 11.3.

Course delivery method for dual credit courses includes online, and face-to-face either at the WKCTC campus or on the high school campus. Dual credit students are blended into courses for all delivery methods. Students take courses with other college students online and on the WKCTC campus. This not only provides diversity of the population, but also offers the reality of expectations from the college course and peers. When dual credit students earn college credit on the secondary campus, the course is mixed with students who may not be earning college credit. The high school faculty member must be credentialed and approved by the SACSCOC guidelines before teaching a college course. The high school faculty use the college course syllabus and content to achieve the student learning outcomes.

Student enrollment is guided by an academic pathway, a high school counselor, and the dual credit advisor. Best practice includes parental involvement and career planning beginning in middle school and continuing to credential completion. Course selection included more than 300 offerings during the five-year timeframe. This allowed students to explore career pathways by earning college credit in potential elective areas if the student did not choose the same pathway when completing a college credential.

Dual credit enrollment consisted of 3,066 females and 2,406 males. Student ethnicity data, self-reported, included 4,453 white, 458 African American, and 561 other. Ethnicity “other” includes American Indian, Alaskan, Asian, Hispanic, two or more races, and non-specified. Of the 5,472 dual credit students, 1,848 matriculated to WKCTC. Table 1 provides enrollment data by high school, per gender and ethnicity.

Table 1

Five-year dual credit enrollment by high school

High school	Enrollment total	Male	Female	White	African American	Other
HS1	167	87	80	153	2	12
HS2	690	330	360	313	234	143
HS3	1651	774	877	1430	59	162
HS4	35	10	25	34	0	1
HS5	58	26	32	56	0	2
HS6	439	207	232	393	14	32
HS7	150	40	110	143	2	5
HS8	736	318	418	675	7	54
HS10	214	93	121	128	29	57
HS11	441	117	324	419	1	21
HS13	193	81	112	181	0	12
HS14	88	29	59	78	0	10
HS15	227	104	123	189	17	21
HS16	100	45	55	54	37	9
HS17	65	23	42	58	3	4
HS18	32	10	22	23	6	3
HS19	176	91	85	124	43	9

HS9 and HS12, with dual credit enrollment less than 10 students, were removed.

Average matriculation rate for dual credit students over the five-year timeframe was 33.8%. The matriculation rate by high school varied from 10.2% to 49.3%. Dual credit enrollment from high schools with less than ten students was removed when reporting data by

high school. The matriculation rates may be affected by distance from college, scholarship programs, credit hour attainment, and degree programs. Table 2 displays the number of students matriculated, matriculation rates by high school. The table also provides the distance from the high school to the WKCTC college main campus (as measured by Google Maps).

Table 2

Matriculation by high school and distance from college

High school	Distance (miles)	Matriculated	Did not matriculate	Average matriculation rate
HS1	2.2	42	125	25.1%
HS2	2.8	222	468	32.2%
HS3	6.0	665	996	39.7%
HS4	6.4	17	18	48.6%
HS5	10.0	23	35	39.7%
HS6	20.9	74	76	49.3%
HS7	21.8	144	295	32.8%
HS8	23.1	238	498	32.3%
HS10	25.1	47	167	22.0%
HS11	25.1	153	288	34.7%
HS13	26.8	75	118	38.9%
HS14	36.6	9	79	10.2
HS15	41.0	61	166	26.9%
HS16	44.6	21	79	21.0%
HS17	49.0	10	55	15.4%
HS18	49.5	4	28	12.5%
HS19	61.3	48	128	27.3%

HS9 and HS12 were removed due to enrollment less than 10 students.

WKCTC service area consists of 19 public and private high schools, four area technology centers (ATC), and three career and technical centers (CTC). Each high school can enroll students in one of the ATC or CTC facilities. Between 2012 and 2016, technical courses offered for dual credit through the ATCs or CTCs were in allied health, business, machining, industrial maintenance, welding, electricity, carpentry, and culinary divisions. The course offerings at each site are dependent on equipment, facilities and services, and qualified, credentialed faculty, as defined by the college's accrediting body, SACSCOC.

General education courses are taught in all but three high schools in the WKCTC service area. The general education faculty members must be credentialed and approved as defined by SACSCOC. Between 2012 and 2016, general education courses offered for dual credit at area high schools were in written communication, quantitative reasoning, natural sciences, heritage, and humanities. The course offerings are dependent on faculty credentials, lab equipment, and facilities.

For ease of data analysis and discussion, courses categorized by divisions and programs. These categories were technical, business, allied health, foreign language, humanities, heritage, written and oral communications, mathematics, science, social behavior science, and workforce. Table 3 provides course enrollment by the ten categories. The data was labeled 0 = no enrollment, 1 = enrolled in one course, and 2 = enrolled in two or more courses.

Table 3

Dual credit enrollment by division and student matriculation

Variables	Matriculated to WKCTC	Total Enrolled	Enrolled in one course	Enrolled in two or more courses
Allied health	293 (44.3%)	662	529	133
Business	193 (40.1%)	481	351	130
Foreign language	87 (49.7%)	175	70	105
Heritage	189 (37.2%)	508	385	123
Humanities	185 (42.2%)	438	407	31
Introduction to college (GEN 100)	1400 (34.3%)	4077	4077	0
Mathematics	445 (34.0%)	1307	909	398
Science	211 (42.7%)	494	252	242
Social behavior science	299 (40.6%)	737	560	177
Technical	108 (30.9%)	349	178	171
Written & oral communications	611 (36.1%)	1694	381	1313

Increasing the number of dual credit students who matriculate to WKCTC is an important outcome of the research. Statistical results from the correlation of matriculation to specific factors related to dual credit students will aid in finding areas to focus resources in order to obtain an increase in future enrollment totals.

Student enrollment is the source of viability for postsecondary institutions. Headcount is calculated based on enrollment and categorized by student admit types. Two different admit types are credential-seeking and non-credential seeking. Credential seeking is defined as a pathway toward college credential completion. A dual credit student is considered non-

credential seeking until he or she graduates from high school. Dual credit students are advised to select an academic pathway to follow when selecting courses.

The dependent variable for the research is matriculation, which is dichotomous. Matriculation = 1, did not matriculate = 0. Twenty independent variables examined including interval/scale, nominal, and ordinal. Term is conveyed by an interval/scale: 1 = 2012, 2 = 2013, 3 = 2014, 4 = 2015, and 5 = 2016. This includes students that completed dual credit, graduated from high school, and have the option of matriculation at WKCTC in the fall of the subsequent year. Credit hour is conveyed by an interval/scale: 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, using the standard deviation of 11.3 for credit hour scale.

The research for this study includes specific attributes of students who earned dual credit at WKCTC while enrolled in high school and matriculated immediately following high school graduation. The anticipated results from the research is correlation of specific attributes of dual credit students to matriculation with WKCTC. Defining the attributes which are statistically significant will provide colleges information to guide dual credit program design.

Results

Based on the statistical analysis of data collected, there is a correlation to matriculation, with several variables listed in the research questions. This section will provide data that resulted from the research of matriculation and variables that exist with dual credit. Tables are provided to clarify results when appropriate.

Results for Research Question 1

RQ1. How do the total number of dual credit hours earned correlate to matriculation rates for WKCTC during the fall semester immediately following high school graduation?

RH1 Credit hour attainment has no correlation to matriculation.

Correlations were computed among 5,472 dual credit students. Using the variable credit hour attainment data, statistical significance was reviewed with the factors specific to each student and matriculation. The binary logistic regression model reports no statistical significance of matriculation to credit hours, $p = .728$. Therefore, the finding that RH1 credit hour attainment has no correlation to matriculation, is accepted. The correlation matrix, $-.129$ reveals a negative weak correlation. The negative correlation means that more credit hours earned results in lower matriculation rates to WKCTC.

Dual credit enrollment, average credit hour attainment, and the average matriculation rate of the dual credit students are listed in Table 4. The decrease in credit hour attainment is a combination of increased knowledge and appreciative advising related to the dual credit student focused on a guided pathway. The cohort averages an 8.37 credit hour attainment ($SD = 11.3$). Overall, average credit hour attainment decreased from an average of 9.18 credit hours in 2012 to 7.7 credit hours in 2016.

Table 4

Dual credit enrollment, average credit hour attainment, and average matriculation rate

Year	Dual credit enrollment	Average credit hour attainment	Matriculation rate during subsequent fall semester
2012	925	9.18	36.3%
2013	1179	8.82	34.9%
2014	1113	8.16	34.3%
2015	1116	7.92	33.5%
2016	1139	7.7	31.1%

Source: WKCTC Office of Institutional Planning, Research, and Evaluation

Of the cohort group who matriculated to WKCTC (33.8%), 64.9% earned one to eight dual credit hours and 35.1% earned more than eight dual credit hours. Therefore, the data reported indicates that students who earn less dual credit hours are more likely to matriculate to WKCTC. Data in Table 5 provides total number of dual credit student matriculation to WKCTC during the fall, sequential to high school graduation, and credit hours earned by students who matriculated. Credit hour breakdown is based on average credit hours earned ($M = 8.37$, $SD = 11.30$) from the cohort. The data is specific to the cohort group who earned dual credit and matriculated to WKCTC within the five-year cohort.

Over the past five years, WKCTC dual credit enrollment has reported small, incremental gains to the headcount. In 2012, WKCTC reported an overall enrollment of 925 dual credit students, which increased to 1,139 in 2016. With the increase in dual credit headcount, the opposite occurred in the matriculation rates. WKCTC reported a decrease in the matriculation rate of 5.2% in the dual credit student population. In 2013, the matriculation rate was 36.3% and the 2017 matriculation rate was 31.1%.

Table 5

Credit hour attainment of matriculated students for fall semester

Fall semester	Matriculated students	1 to 8 credit hours	More than 8 credit hours
2017	355	253 (71.3%)	102 (28.7%)
2016	374	262 (70.1%)	112 (29.9%)
2015	398	273 (68.6%)	125 (31.4%)
2014	412	244 (59.2%)	168 (40.8%)
2013	322	176 (54.7%)	146 (45.3%)
Total	1,861	1,208 (64.9%)	653 (35.1%)

Source: WKCTC Office of Institutional Planning, Research, and Evaluation

RQ1 asks if there is a correlation between credit hour attainment and matriculation. The data shows a significant correlation between offering a lower number of overall credit hour attainment and matriculation. As the data indicates, students earning less than eight credit hours are more likely to matriculate to WKCTC than peers.

Matriculation rates, when calculated by credit hour attainment, remains strong when students earn eight credit hours or less. As students earn additional credit hours, the matriculation rates drop significantly. Postsecondary institutions need students to matriculate and complete a college credential to reap the benefits of dual credit enrollment.

Results for Research Question 2

RQ2. Does the high school from which a student graduates correlate to the dual credit matriculation rate?

RH2 Matriculation rates do not correlate to the high school from which a student graduates.

As stated in the description, WKCTC is located in rural western Kentucky. The distance from WKCTC main campus to area high schools within its service area ranges from 2.2 miles to 61.3 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. RH2 states that students who graduate from a school within the county where the main campus is located are more likely to matriculate to WKCTC, a commuter campus with no on-campus housing. RQ2: Does the high school from which a student graduates correlate to the dual credit matriculation rate?

Table 6 provides data consisting of the average matriculation rates for the cohort as related to the distance from WKCTC main campus. High schools located within the same county of WKCTC have an average matriculation rate of 37.0%. This is 3.2% above the average calculated for all high schools in the WKCTC service area (33.8%). 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. Students who graduate from a high school more than 35 miles away from the college average an 18.9% matriculation rate. Matriculation rates for area high schools categorized by distance from WKCTC main campus ranged from 10.2% (HS14) to 66.7% (HS9). The rural area provides multiple challenges for the

students and surrounding communities and transportation is one that is difficult to overcome. The only public transportation available is restricted to the city limits within WKCTC main campus.

RQ2: Does the high school from which a student graduates correlate to the dual credit matriculation rate? It appears that the high school is an influencing factor, based on distance from the college. Five high schools located in the same county as WKCTC have a matriculation rate of 37.0%. High schools outside of the county, within 26 miles of WKCTC, have a matriculation rate of 39.9%. RH2 is rejected as null based on matriculation rate of the schools outside of the county being higher than that of the high schools which reside in the same county as WKCTC. There is a significant association between schools and matriculation, $p < .001$, with a negative correlation (-.346). Table 6 provides matriculation rates based on distance from WKCTC main campus.

Table 6

Five-year average matriculation rates for area high schools, based on distance from WKCTC

High Schools	Matriculation rate
High schools within county (10 mile radius)	37.0%
High schools less than 30 miles from WKCTC	35.0%
High schools less than 60 miles from WKCTC	18.9%
All high schools	37.0%

Source: WKCTC Office of Institutional Planning, Research, and Evaluation

Students are more likely to matriculate to WKCTC if the high schools is less than 30 miles from the campus. The college campus does not have on-campus housing, is located in a

rural area, and there is limited public transportation. Distance becomes a contributing factor which has an influence on students' college decisions.

Results for Research Question 3

RQ3. What are the matriculation rates specific of underrepresented minority (defined by gender and ethnicity) with dual credit compared to peers who earn dual credit?

RH3 Underrepresented minority population, defined by gender and ethnicity, does not correlate to matriculation.

The number of students earning dual credit during five years was: 2012, $n = 925$; 2013, $n = 1,179$; 2014, $n = 1,113$; 2015, $n = 1,116$; and 2016, $n = 1,139$. Students were removed from the data set if they did not attend a high school in the WKCTC service area, had a duplicate record, or were incorrectly labeled in the database as a dual credit student. The breakdown by gender for students earning dual credit during 2012-2016 is: male = 43.9% and female = 56.1%. Gender reflects an increase, almost double, of female dual credit students over male dual credit students who matriculated to WKCTC: male = 10.16% and female = 18.94%.

The data broken down by gender is compiled by total number of WKCTC dual credit students who have the potential to enroll in the fall semester of years stated: 2013, female dual credit = 534 (57.7%), male dual credit = 391 (42.3%); 2014, female dual credit = 630 (53.4%), male dual credit = 549 (46.6%); 2015, female dual credit = 637 (57.2%), male dual credit = 476 (42.8%); 2016, female dual credit = 626 (56.1%), male dual credit = 490 (43.9%); 2017, female dual credit = 639 (56.1%), male dual credit = 500 (43.9%).

Race and ethnicity were analyzed with descriptive statistics compiled for the five-year group of 5,472 students. The 1,851 students who matriculated to WKCTC are: White/Caucasian

= 1,543 (25.07%), African American = 122 (1.65%), and other = 186 (2.46%). The data set of 3,621 students who did not matriculate to WKCTC are as follows: White/Caucasian = 2,910 (50.87%), African American = 336 (5.90%), and other = 375 (6.03%). Students in the category of “other” include ethnic backgrounds of Alaskan, American Indian, Asian, Hispanic, two or more, and non-specified.

Underrepresented minority students earning dual credit lack the representation mirroring the high school population throughout the United States. All students are encouraged to enroll in dual credit courses at the WKCTC secondary sites. Students must meet the college level benchmark scores to enroll, meet with the high school counselor, and bring a signed form from a parent or guardian. This corresponds to what Karp (2015) and Mansell and Justice (2014) found, overcoming obstacles opens the door for future enrollment and academic achievement. If any of these steps become obstacles to students who show an interest in enrollment, the college attempts to assist with other resources. After the initial student and parent meeting, students are encouraged to come to WKCTC and retest to achieve college level benchmark scores. The placement exam does not require the restriction of a timed test, and students are relieved of the anxiety of not having enough time to complete all sections.

A linear regression was calculated to analyze significance of correlation between gender and matriculation, gender, $p < .001$. A statistical significance was found in gender with a negative moderate correlation, $-.567$. Ethnicity reported statistical significance, $p = .020$. Correlation for ethnicity was negative weak, $-.299$, from the correlation matrix. Descriptive statistics show a decrease for matriculation rates of females in the cohort group. In 2017, only 32.1% of females matriculated to WKCTC compared to 40.2% in 2013.

Table 7

Female matriculation rates for cohort group

Year	Females/Matriculation rate	Females/Non-matriculation rate
2013	215 (40.2%)	319 (59.7%)
2014	244 (38.7%)	386 (61.2%)
2015	259 (40.6%)	378 (59.3%)
2016	231 (36.9%)	395 (63.1%)
2017	205 (32.1%)	434 (67.9%)

Source: WKCTC Office of Institutional Planning, Research, and Evaluation

RH3: Gender does not have statistical significance to matriculation rates. A contingency table analysis of matriculation rates and gender revealed a significant relationship between these two variables, $\chi^2 = 36.99$, $df = 1$, $p < .001$. Cramer's V resulted in the impact gender has on matriculation as a statistically significant measure with a small effect size (.082), which indicates a meaningful difference for the research. RH3: reject the null hypothesis with the statistical significance for gender and ethnicity.

Using the cross-tabulation for gender, more females matriculate to WKCTC than expected (expected = 1,040, count = 1,146). Contrasting this with the male matriculation rates, where fewer males matriculate to WKCTC than expected (expected = 808, count = 702), females are more likely to matriculate to WKCTC than males. On average, females matriculated to WKCTC at a rate of 37.2%, while males matriculated at 29.4%, over a five-year period.

Grand Tour Questions

Students who earned dual credit during high school have the choice of completing a college credential at WKCTC or at other postsecondary institutions within a 60-mile radius. Workforce, military, and other options exist for students with or without dual credit. Understanding factors that influence the decision by dual credit students to matriculate to WKCTC after high school is the foundation of this research.

The data utilizes information from 5,472 WKCTC dual credit students during a five-year period. The dependent variable is matriculation to WKCTC after high school graduation, labeled “1” for students who matriculated and “0” for students who did not matriculate. There are 20 independent variables reviewed to provide insight to factors that influence dual credit matriculation. One of the independent variables, school, is categorized as ordinal. Two of the independent variables are interval or scale: enrollment term and credit hour attainment. The majority of the independent variables are nominal: ethnicity, gender, students who only took the one hour introduction to college course (GEN), students who took the one hour introduction to college course and at least one additional course (Gen Any), students in Commonwealth Middle College students (CMC), students in Four Rivers Foundation (4RF), students in Community Scholarship Program (CSP), Humanities, Science, Workforce, Allied Health, Business, Communications, English, Foreign Language, Heritage, Mathematics, Social Behavior Science, and Technical.

The researcher generated a binary logistic regression model to establish if a correlation or relationship exists between the dichotomous dependent variable and 20 independent variables of nominal, ordinal, and interval categories. Using the Omnibus Test of Model Coefficients, statistical significance was proven, $\chi^2 = 228.59$, $df = 20$, $p < .001$. The likelihood ratio of chi-

square of 228.59 with a p value $< .001$ explains that the model, as a whole, significantly fits better than an empty model.

The Pseudo R^2 , as shown in Nagelkerke's R^2 , .057 variance is small. A small variance indicates that the data points tend to be close to the mean and to each other (Field, 2013). The Cox & Snell's R^2 is interpreted as 4% probability that all variables are explained by the model. The classification table for Percent of Accuracy (PAC) resulted with 67% accuracy that model is correct. The Hosmer and Lemeshow goodness-of-fit test is .647, as needed for a well-fitting model. A well-fitting model shows non-significance on the H-L goodness-of-fit test.

Of the 20 variables in the equation, statistical significance was proven in gender ($p < .001$), CMC ($p < .001$), allied health ($p < .001$), and Gen Any ($p < .001$) related to matriculation. School ($p < .001$) also revealed statistical significance.

Table 8

Variables in the equation

Variable	B	S. E.	Wald	df	Sig.	Exp(B)	95% C. I.	
							Lower	Upper
School	-.039	.007	30.083	1	.000	.962	.949	.976
Gender	.267	.062	18.501	1	.000	1.307	1.157	1.476
CMC	1.410	.236	35.708	1	.000	4.097	2.580	6.506
Ethnicity	-.110	.047	5.431	1	.020	.896	.817	.983
GEN	-.195	.091	4.555	1	.033	.823	.688	.984
Workforce	-.352	.374	.886	1	.347	.703	.338	1.463
Credit hours	.003	.010	.121	1	.728	1.003	.984	1.023
Term	-.005	.022	.047	1	.828	.995	.953	1.039

Source: WKCTC Office of Institutional Planning, Research, and Evaluation

Listed in Table 9 are general and technical education course headings, categorized in content areas, for WKCTC. Postsecondary students need at least one English and one math course to earn a degree or diploma at WKCTC. Kentucky high school graduation requirements for students require four years of math and four years of English. Area high school SBDM policies allow WKCTC English and math courses to satisfy such requirements. Other course headings include heritage, which may satisfy a high school social studies requirement, while the humanities category focuses on a high school arts and humanities requirement. The courses listed in the social behavioral science grouping fall into different categories for degree completion at the high school as compared to the postsecondary institutions. For example, POL 101, American Government, is a social studies credit in the high school and a social behavioral science credit at WKCTC.

The technical course enrollment is aligned with the technical career pathways for CTE courses in the applied technology fields. Many of the technical courses prepare the students for industry certificate completion. Students enrolled in allied health courses have been identified for a health pathway in the high school and can earn an industry certificate as a State Registered Nurse Aide (SRNA). Business courses cross over in multiple areas at the high school and postsecondary levels. WKCTC requires demonstration of digital literacy and taking certain courses listed in this category will complete that requirement.

Table 9

Variables in the equation, by division

Variable	B	S. E.	Wald	df	Sig.	Exp(B)	95% C. I.	
							Lower	Upper
Allied health	.455	.079	33.123	1	.000	1.576	1.350	1.840
GEN any	.509	.089	32.940	1	.000	1.664	1.398	1.980
Math	-.148	.062	5.727	1	.017	.863	.764	.974
Business	.194	.084	5.370	1	.020	1.214	1.030	1.430
GEN	-.195	.091	4.555	1	.033	.823	.688	.984
Science	-.159	.076	4.345	1	.037	.853	.734	.974
Humanities	.192	.107	3.250	1	.071	1.212	.983	1.493
Heritage	-.118	.091	1.687	1	.194	.889	.744	1.062
Workforce	-.352	.374	.886	1	.347	.703	.338	1.463
Communication	.043	.112	.147	1	.701	1.044	.838	1.301
Technical	-.027	.081	.111	1	.739	.973	.830	1.141
Social behavior science	-.025	.087	.086	1	.769	.975	.823	1.155
Foreign language	-.014	.125	.012	1	.913	.986	.773	1.260
English	-.002	.052	.001	1	.976	.998	.901	1.106

Source: WKCTC Office of Institutional Planning, Research, and Evaluation

The researcher also found data related to dual credit and scholarship programs have an impact on matriculation. Cross tabulation tables and chi-square analyses were administered to determine the correlation between matriculation and the variables of CMC, CSP, 4RF, and GEN. These are cohort programs which encourage dual credit in high school, provide additional support through tutoring and awareness, and give incentives to matriculate to postsecondary. In

order to address these variables, other factors were reviewed and data was disaggregated for additional results. Table 10 reflects correlation of matriculation and the dual credit programs, with significance reported.

Table 10

Correlation of dual credit programs to matriculation

Dual Credit Programs		CSP	4RF	GEN	CMC	Matriculation
CSP	Pearson Correlation	1	-.363**	.297**	.034*	.062**
	Sig. (two-tailed)		.000	.000	.013	.000
4RF	Pearson Correlation	-.363**	1	-.181**	-.091**	-.035**
	Sig. (two-tailed)	.000		.000	.000	.010
GEN	Pearson Correlation	.297**	-.181**	1	-.195**	-.031*
	Sig. (two-tailed)	.000	.000		.000	.020
CMC	Pearson Correlation	.034*	-.091**	-.195**	1	.110**
	Sig. (two-tailed)	.013	.000	.000		.000
N		5472	5472	5472	5472	5472

**** Correlation is significant at the 0.01 level (two-tailed). * Correlation is significant at the 0.05 level (two-tailed).**

Source: WKCTC Office of Institutional Planning, Research, and Evaluation

Factors including scholarship programs, course offerings, and a middle college model all intertwine into the five-year cohort group. These are variables require additional information and background to fully understand all aspects. Specific scholarship and dual credit programs affect dual credit enrollment and matriculation.

To define the strength of the relationship, Pearson's correlation coefficient was calculated for matriculation and each of the four dual credit programs. Scale scores were keyed in as a numeric code of 0 or 1. If the student was a participant in the program, the code of 1 was

entered. If the student was not participating in the program, a code of 0 was entered. Four programs were detailed and labeled as CSP, 4RF, GEN, and CMC. Using a Pearson's r data analysis, it revealed a significant negative relationship to matriculation from students who only earned GEN 100 college credit, $r = -.031$, and students from 4RF, $r = -.035$. A significant positive relationship to matriculation was found with the CSP students, $r = .062$, and the students of the CMC, $r = .110$.

There is evidence of a relationship between the GEN data set and matriculation, ($\chi^2 = 5.42$, $df = 1$, $p = .020$). Of the 2,176 GEN students, 31.9% matriculated to WKCTC. GEN group has a negative weak Pearson correlation, $r(5470) = -.031$, $p = .020$, with a small effect size.

CMC group resulted in very strong evidence of a relationship with matriculation ($\chi^2 = 66.63$, $df = 1$, $p < .001$). The rate of matriculation to WKCTC from CMC ($n = 297$) equals 55.6%. CMC has a weak positive Pearson correlation, $r(5470)$, $.110$, $p < .001$, with a small effect size.

There is evidence of a very strong relationship between the 4RF data set and matriculation, ($\chi^2 = 6.65$, $df = 1$, $p = .010$). Of the 696 4RF students, 29.5% matriculated to WKCTC. A Pearson correlation coefficient was computed to assess the relationship between 4RF and matriculation. A negative weak correlation resulted, $r(5470) = -.035$, $p = .010$, with a small effect size.

CSP group resulted in strong evidence of a relationship with matriculation ($\chi^2 = 21.28$, $df = 1$, $p = .000$). The rate of matriculation to WKCTC from CSP ($n = 2601$) equals 36.9%. CSP has a weak positive Pearson correlation, $r(5470)$, $.062$, $p < .001$, with a small effect size.

Using the cross tabulation matrix for matriculation and four of the identified WKCTC dual credit programs, CMC, CSP, 4RF, and GEN as variables, matriculation rates were identified. CMC reported the highest matriculation rates ($n = 297$), 55.6%. The other three

programs hovered in the 30% range, with a much larger group of students identified. CSP ($n = 2601$), 36.9%, GEN ($n = 2176$), 31.9%, and 4RF ($n = 696$), 29.5%.

Conclusion

The study sought to fill a gap in the research literature related to specific factors that influence dual credit matriculation rates at WKCTC. Enrollment numbers are reviewed on a daily basis and at regular monthly meetings. Dual credit transition rates have increased over the past ten years (ECS, 2015). Dual credit students, as Casey (2015) states, are more likely than peers to persist once they have matriculated to a postsecondary institution. With that, action is imperative to increase the awareness of and participation in dual credit. Students and parents need to begin reviewing dual credit options while enrolled in middle school. This will provide ample time to achieve high school and college level benchmark score.

As this is an ever-changing process, students need to gain as much information related to an academic pathway as possible. This will be useful in ultimately leading to the career of choice. Without a pathway or plan, college credit hour attainment may not help students earn a college credential and may even create obstacles related to completion (Ganzert, 2014). Student knowledge and appreciative advising is essential to successful dual credit enrollment and pathway completion (O'Banion, 2013; Vargas, Roach, & David, 2014). The partnership with the high school, community, parents, and students is essential to the dual credit process and student achievement (Kim, 2014).

As reported, statistical significance to matriculation was found with high school, gender, and ethnicity. Other variables proving to be statistically significant were CMC, allied health courses, and all students enrolled in GEN. The variable GEN has a strong negative correlation. This suggests as more students take GEN, a higher negative outcome exists. Additional research is needed to understand correlation to these variables. Credit hour correlation to matriculation was not statistically significant, as reported in the model. However, through the descriptive

statistics, it was shown that students are more likely to matriculate to WKCTC if they earn one to eight college credit hours through dual credit.

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 order to study 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. The only variable 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 were less likely to matriculate.

Chapter 5: Conclusion

This chapter presents conclusions drawn from findings, limitations, and recommendations for future studies. The researcher used an overarching question which led to 20 variables to be reviewed. What factors lead to matriculation of dual credit student at WKCTC during the fall semester, immediately following high school graduation?

Three questions and hypotheses were developed to reveal possible correlation to matriculation. RQ1 – How do the total number of dual credit hours earned correlate to matriculation rates for WKCTC during the fall semester immediately following high school graduation? RQ2 – Does the high school from which a student graduates correlate to the dual credit matriculation rate? RQ3 – What are the matriculation rates specific of underrepresented minority (defined by gender and ethnicity) with dual credit compared to peers who earn dual credit?

The study sought to determine if there was a significant relationship of matriculation to gender and ethnicity, credit hour attainment, and high school. Other variables were reviewed and outcomes reported in order to provide additional in-depth information regarding dual credit enrollment. The information may assist in increasing matriculation rates for future, potential, credential-seeking students.

Students earning college credit before high school graduation is an option for all of the students who live within the WKCTC service area. For a college course to be considered dual credit, it must be recorded on the transcript for both high school and college. Students have a wide variety of course offering to select from. As long as the course follows a potential academic pathway toward a college credential and crosswalks to a high school course, the high

school student can choose to enroll in the course. This study examines attributes of students who earned dual credit at WKCTC, over a five-year period and the students who matriculated to WKCTC.

This study reviews variables of dual credit students to assist with increasing matriculation rates at WKCTC. Using descriptive statistics and a binary logistic regression model, the researcher examined data to identify statistically significant correlations between matriculation and identified variables.

Research Question 1 Conclusion

RH1 null hypothesis was accepted: as credit hour attainment increases, matriculation rates decrease. The average dual credit hour attainment was the most practical statistic, 8.37. Using the mean, data was disaggregated into two categories, students who earned one credit hour up to eight credit hours and students who earned more than eight credit hours. Of the dual credit students who matriculated to WKCTC, 64.9% earned one to eight dual credit hours. Students who matriculated to WKCTC with more than eight credit hours resulted in a 35.1% matriculation rate. Overall dual credit students matriculated to WKCTC at an average rate of 33.8%. This is significant information to assist with increasing future matriculation rates.

Reviewing credit hour attainment will be a specific area of improvement for the dual credit program at WKCTC. While the initial thought may be to reduce the total number of credit hours a student can earn, it is more effective to implement a plan which is individualized for the student with an intended career goal. Student's high school is significant to credit hour attainment, due to the ability or inability of the high school faculty who are credentialed and qualified to teach a dual credit course on the high school campus. There are many high schools

in the WKCTC service area that do not have faculty with credentials to teach a dual credit course, while some of the high schools have three or more faculty members teaching dual credit courses.

Postsecondary institutions need to focus credit hour attainment that will help to 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 (Zinth, 2015; Stephenson, 2014). 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. Dual credit programs are linked to college success for students who earn at least nine credit hours (Barnett, 2016).

Research Question 2 Conclusion

Students who graduate from a high school which resides in the same county as WKCTC have an average of 37% matriculation rate. However, when an additional five schools within a 30-mile radius are calculated, the average matriculation rate increases to 39.9%. The schools located 30 miles or more from WKCTC have a matriculation rate of only 18.9%. The null hypothesis for high school and matriculation rates was rejected. There is a statistical significance related to the high school with matriculation.

Students who live physically closer to the WKCTC main campus have the ability to take a college class during the school day without having to miss more than one or two class periods. This helps to balance the time missed from the high school curriculum due to the drive time for the college course. Students who are more than 30 miles from campus are less likely to enroll in

a college class at WKCTC and must take an online course if the high school does not have credentialed faculty.

Distance was a significant factor in matriculation rates for area high schools. WKCTC is a commuter campus with no on-campus housing. Public transportation in the western Kentucky region is limited and creates obstacles for dual credit enrollment and matriculation. Of the 19 high schools, nine have a significant scholarship program that assists students with college tuition, books, and housing. Distance was not an intended point of reference in the beginning of the research, but it later became an important piece.

Research Question 3 Conclusion

Students from all ethnic groups and both genders were included in the data compiled for this study. Underrepresented minority (URM) population, including both females and ethnic groups, was assessed to find any statistical significance. Dual credit enrollment reflects similar representation of gender and ethnicity within the area high schools. The matriculation rates, however, reflect a statistical significance for gender and ethnic groups. Females matriculate to WKCTC almost twice as much as male students who earned dual credit. Of the 1,848 students who matriculated to WKCTC, 62% were females and 38% were males.

WKCTC student matriculation by ethnic population provided a significant gap in both dual credit enrollment and matriculation rates. White students consisted of 81.4% of the dual credit population, African American/black students totaled 8.4%, and “other” group, comprised of all other ethnicities except white and African American/black, was 10.2%. Matriculation rates within the ethnic population almost mirrored the dual credit enrollment rates, 83%, 7%, and 10%, respectively. The gap among ethnic groups reflects an aligned rate with overall WKCTC

enrollment for students. The minority rate for WKCTC overall enrollment was 10.8%, excluding the “other” ethnic category.

Discussion

Quantitative research provided evidence indicating significance of prior dual credit attainment to college transition and completion (Carey, 2015; Flores, 2012). Karp (2014) utilized quantitative research for dual credit students and outcomes related to credential attainment, which aligns with findings of this research. The statistical results and findings of this research were produced through raw data provided by WKCTC IPRE, after gaining IRB approval from MSU, KCTCS, and WKCTC. The data set was submitted without identifying attributes, for the protection of students.

The raw data was comprised of 17,645 entries for dual credit students at WKCTC from 2012 until 2016. The data was evaluated using Microsoft Excel data tools. Duplicate records were removed from all 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 a home high schools located within the WKCTC service area. The unduplicated student headcount for the total data was 5,472 and they earned 26,402 college credits.

Microsoft Excel was used to convert the variable entries to numeric values which allows for entries to be defined and computer accurately in SPSS. Variables for the research were defined as:

- Matriculation = 1, did not matriculate = 0.
- Term, 1 = 2012, 2 = 2013, 3 = 2014, 4 = 2015, and 5 = 2016.

- Credit hour, 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, using the standard deviation of 11.3 for credit hour scale.
- Gender, male = 1, female = 2
- High school, 1 = high school closest to WKCTC campus, through 19 = high school farthest from WKCTC campus.
- Ethnicity, 1 = white, 2 = African American, 3 = Other
- Enrollment in scholarship or dual credit programs, 1 = enrolled, 0 = not enrolled (GEN, CMC, 4RF, and CSP)
- Enrollment in courses by category, 2 = enrolled in more than two courses, 1 = enrolled in one course, 0 = not enrolled in course

Students were assigned a unique identifier before data was received from WKCTC IPRE. Missing values are important to address before running any statistical analysis (Creswell, 2017). In SPSS, the researcher ran frequencies on the data and the output confirmed missing data which was updated. Numeric variables were labeled and defined in SPSS for better understanding of results.

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

Relationship of Conclusions 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 institution offering the dual credit courses. The results of this study will add to the limited research of variables and attributes shown to have statistical significant correlation to matriculation. Enrollment keeps the doors open at a college, but enrollment is only one part of the equation (Hlinka, Mobelini, & Giltner, 2015). Credential completion is the ultimate goal for college enrollment and helping the student become a successful contributor to society (Karp et al, 2007).

Limitations of the Study

Limitations of the study were realized and researcher bias will be shared in this section. 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.

Data was retrieved from WKCTC IPRE and only students who attended a high school within the WKCTC service area were calculated in the final results. The limitation of the study must also include the rural area where WKCTC is located. Challenges exist with transportation and no on-campus housing for the students. While the benefits of attending a four-time award winning community college enhances the experience for all (The Aspen Institute, 2017).

Area high schools of the WKCTC service area offer courses in AP, IB degree, Cambridge Studies, and dual credit from other public and private postsecondary institutions. Each of these

programs offer students the option of earning college credit. The requirements for students to earn college credit vary between programs on how the credit is to be transcribed. Each of the area high schools have different offerings and choices for the students.

Credit hour attainment is dramatically different for students. Some students were allowed and encouraged to accumulate as many credit hours possible. Other students had very limited options of earning college credit in high school. In line with credit hour attainment, the amount of money paid for the college course has ranged from full price to zero dollars. The varying amounts paid for courses differs due to resources at the high school level with dual credit programs, grant, scholarship offerings, and sponsorships. The tuition rates for the dual credit courses have fluctuated within the five years of the research data. Tuition has ranged from the rate being completely waived, partially waived tuition, and no waivers, student is charged full price.

Faculty credentialing has been reviewed by SACSCOC throughout the process to maintain academic integrity and credibility of course offerings. Credentialed high school faculty members may have been hired, retired or left the school, which causes a fluctuation of courses offered to students at the high school. WKCTC partnering high schools range from no credentialed faculty members to teach college courses, to upwards of six or seven faculty members who are credentialed to teach college courses at the high school.

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 students' performance and ability cannot be measured solely by numbers. Student choices and experiences

are molded from environment and family. Research needs to include qualitative analysis in addition to quantitative results.

A final limitation of the study is the bias of the researcher. The five-year data set, implementations of policies and procedures, and the NACEP accreditation was led by the researcher. This includes continuous communication with the 22 secondary partners, parent and community meetings, and dual credit enrollment. The researcher in this study is an employee of WKCTC and works directly with dual credit students and partners. Researcher's bias due to direct connection with the WKCTC dual credit program creates an unintentional bias (Lauck, 210617). This relationship could also be considered beneficial in motivating the researcher to improve the program's contribution to the WKCTC mission.

Recommendations for Future Research

This study reviewed the attributes of dual credit students within the WKCTC service area and students who matriculated immediately following high school graduation. Areas of policies and procedures of dual credit, course enrollment, and other areas to be expanded 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 schools. Future studies need to review students who earn dual credit and reveal overall matriculation rates for students who attend any postsecondary institution.

Summary

This chapter provided explanation of results and discussion of findings shared from the five-year data set of students who earned dual credit with WKCTC. The most significant outcome was related to credit hour attainment. Of the dual credit students who matriculated to WKCTC, 64.9% earned eight or less dual credit hours. The 5,472 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.

URM populations have the largest growth area for postsecondary enrollment and dual credit. Dual credit enrollment of URM for the five-year data set was 18.62%. Additional work is needed to assist all students in meeting college benchmark scores and enrolling in college courses, especially URM population.

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 every student helps to relieve anxiety, reduce tensions, and encourage the ability to achieve goals and work toward the career of their choice.

As dual credit policies and procedures continue to change, this research is very timely for WKCTC. When offering dual credit, credit hour attainment and course options are extremely important to the student, school and postsecondary institution. Credit hour attainment can increase matriculation rates, unless a student earns an abundance of them. On average, 60 credit hours are required for an associate's degree. If a dual credit student earns upwards of 40 credit hours, they rarely choose to enroll in the community college for only one or two semesters. In contrast, when a student earns one to eight credit hours he or she is more likely to matriculate to the 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, Borden, & Park, 2015). Community colleges embrace dual credit as a recruiting tool and enhancement to educational outcomes (Wang, Chan, Phelps, & Washborn, 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



MURRAY STATE UNIVERSITY

Institutional Review Board

318 Wells Hall
Murray, KY 42075-3318
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

Equal education and employment opportunities: MTD, AA/EO/DFW. Murray State University opposes sexual and gender harassment and sexual violence on its campus.

Lorry Beth Wilson
lorrybeth.wilson@kctcs.edu

CURRICULUM VITAE

Academic Background

1992 Paducah Community College, Associate of Arts
 1996 Murray State University, Bachelor of Arts – Comprehensive Business Education
 2002 Murray State University, Master of Arts in Education – Guidance and Counseling
 2008 Murray State University, Rank 1 Certification – 30 hours above Masters

Professional Experience

2011 to Present Director, West Kentucky College Academy
 West Kentucky Community and Technical College
 2011 – 2006 Guidance Counselor, Business Educator, ILP Coordinator
 Ballard Memorial High School
 1997 – 2006 Business Educator, Tech Prep Coordinator, FBLA Adviser
 Carlisle County High School
 1996 – 1997 Computer Software Educator
 Productive Edge

Professional Service

Committee Chairperson, KCTCS Dual Credit Peer Team
 Peer Reviewer, NACEP Accreditation Committee
 Class 26 Member, Leadership Paducah
 Committee Member, WKCTC – One Book Read
 Committee Member, WKCTC – Regional Educators Awards and Scholarship Program

Presentations on Dual Credit, Concurrent Enrollment, and Dual Enrollment

National Alliance of Concurrent Enrollment Partnerships, Regional and National Conference
 Kentucky Community and Technical College, New Horizons Annual Conference
 Kentucky Career and Technical Education Annual State Conference
 National Institute of Staff and Institutional Development, National Conference
 St. Louis Community College Summit, Regional Conference
 College and Career Readiness Summit, Regional Conference

Community Service

St. Charles, Religion Teacher
 Run for Babies 5K Run, Chairperson
 Pink Out Event, Committee member
 Spring Fling Bazaar, Committee member
 21st Century Grant Committee member
 HOSA and FBLA, Event Judge