

ACADEMIC SELF-CONCEPT OF DUAL CREDIT SECONDARY CAREER TECHNICAL
EDUCATION STUDENTS

by

Scott D. Griggs

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

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ABSTRACT

Dual credit continues to expand in approach, including a single course, multiple courses, up to associate degree offerings embedded in high schools, career technical education (CTE) programs, and located in a range of secondary and postsecondary locations. As of the 2010–2011 school year, 82% of all public secondary schools had students enrolled in dual credit courses (U. S. Department of Education, 2013). In the 2016–2017 school year, 73% of CTE courses of study included both high school and postsecondary credit (U.S. Department of Education, 2018). Existing dual credit research focuses heavily on academic impact, college credit, and continuation, along with degree completion rates. CTE, under the Carl D. Perkins Career and Technical Education Act of 2006, is required to prepare students for both college and career. The current study adds to the limited body of research in career technical education dual credit programs. The purpose of this quantitative study was to examine data connected to the possible impact of dual credit on the academic self-concept of career technical education students in the state of Vermont. The research used a survey to collect data from 11th- and 12th-grade students enrolled in dual credit CTE programs in six CTE centers across the state of Vermont. Results showed no significant difference in academic self-concept between CTE students taking dual credit and CTE students not taking dual credit.

Keywords: academic motivation, academic self-efficacy, dual credit, dual enrollment, early college, career technical education, program of study

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Dedication

To my wife Debbie for her understanding and support, to my children for reflecting back a belief in me with the encouragement to never give up, and most of all to the one true God, for His strength, wisdom, and peace in this journey.

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List of Abbreviations

Academic Self-Concept Scale (ASCS)

Advanced Placement (AP)

Agency of Education (AOE)

Career Technical Education (CTE)

Early College High School (ECHS)

Early-Middle College High School (E-MCHS)

Education Commission of the States (ECS)

Elementary and Secondary Education Act (ESEA)

Experiential Learning Theory (ELT)

Free and Appropriate Public Education (FAPE)

Grade Point Average (GPA)

Jobs for the Future (JFF)

New Century Scholarship (NCS)

Programs of Study (POS)

Statewide Longitudinal Data System (SLDS)

CHAPTER ONE: INTRODUCTION

Overview

Education in the United States operates in a world increasingly demanding postsecondary certificates and degrees. With the employment advantages of college degrees, government and private industry continue to collaborate with secondary and postsecondary institutions for purposes of college readiness, retention, and higher degree completion rates. Asoni and Sanandaji (2016) found college degrees to have a significantly positive effect on employee survival. The United States Department of Labor, Bureau of Labor Statistics, showed unemployment rates of 2.4% for those who have earned a master's degree, and 5.4% for those who have no more than a high school diploma (U. S. Department of Labor, 2016a). This chapter introduces the history of dual credit from a single course to higher credit initiatives. Common areas of existing related research are described, noting limited research in the area of Career Technical Education dual enrollment. This chapter presents the purpose, significance and design of the study, introduces the research question, and defines the key terms related to the study.

Background

Postsecondary institutions invest valuable resources in remediation of entry-level students, while employers address basic skills with entry-level employees. Dating back to the 2001 reauthorization of the Elementary and Secondary Education Act (No Child Left Behind Act, 2002), public education has sought to prepare students for postsecondary education and the workplace. The goals include an emphasis on college and career awareness, and college and career preparation as measures of program success. The 2015 Elementary and Secondary Education Act reauthorization, known as Every Student Succeeds Act (2015), continues career and college preparation as priorities while making significant changes in accountability, granting

more state control. The less centralized approach may allow for flexibility in early college programs while increasing the risk of state-to-state inconsistency.

Approaches to providing postsecondary credit opportunities at the secondary level have changed over time, while the problems remain steady. Tech prep developed into a broader dual credit approach to awarding college credit in career technical education programs, while early college high school (ECHS) has expanded in serving populations beyond the traditionally college-bound. For example, the New Century Scholarship (NCS) program in Utah has been successful relative to college continuation and degree attainment for over 20 years yet comes at an annual cost to taxpayers of two million dollars (Kearl, Byrnes, & Maahs-Fladung, 2013). While agreement continues regarding the need to provide opportunities for all students, the methods, locations, size of initiatives, and funding mechanisms continue to evolve.

College readiness increases in importance with the increase in the value of degree completion. Carlson and McChesney (2015), in an analysis of peer-reviewed literature and multiple national data sources, found earnings adjusted for inflation declined from 1991 through 2010 for those not attaining at least a bachelor's degree. Combined with the 63% increase in consumer price index for postsecondary tuition and fees between January 2006 and July 2016 (U.S. Department of Labor, 2016b), the importance of postsecondary credit-bearing opportunities for students during their secondary years continues to rise.

Historical

Public secondary schools in the United States have undergone significant changes since their inception in the 1830s. Judd (1935) describes an expansion to students over age 14 years old, growing from a basic elementary education reaching rural regions to a significant expansion of public secondary schools following the Civil War and the Depression of 1873. Continued

growth led to the first consideration of a national curriculum through the National Education Association-sponsored Committee of Ten of 1892 (Nelson, 1992). Through court rulings and legislation, public education has grown in its equitable reach. *Brown v. Board of Education* (1954) addressed segregation in public education based on race. Students with disabilities were afforded free and public education through section 504 of the Rehabilitation Act of 1973. The Elementary and Secondary Education Act (ESEA) of 1965 in its original form and its later versions sought to offer educational opportunities to all students. A natural outcome of ESEA was a distinction between secondary and postsecondary education. Legislation and funding mechanisms further defined the separation of the two levels. Public and private institutions prepared students for college, careers, or both. Beginning with Ford Foundation funds in the 1950s (Ford Foundation Annual Report, 1957), development of a range of programs and initiatives have blurred the lines between secondary and postsecondary education. Programs are designed to expand postsecondary access and continuation, and degree completion.

Recognition of the abilities of advanced secondary school learners led to the Advanced Placement (AP) program created by the not-for-profit College Board of New York in 1955, which enabled students, based on exam scores, to enter postsecondary schools with advanced standing. In their exploratory study of the AP program, Judson and Hobson (2015) examined program growth and student achievement. They found significant growth in the number and variety of AP courses offered and in total enrollment. However, their analysis also revealed decreased pass rates and completion of the associated AP test. The authors suggested the specific act of offering college courses may not equate with preparing students to be college ready.

Differing from AP, dual credit, also known as dual or concurrent enrollment, aligns courses through an arrangement with specific colleges, state college systems, or other postsecondary consortiums. Enrolled students dually earn secondary and postsecondary credit. An and Taylor (2015) found at the end of the year for first-year college students that dual credit had a positive impact on their college readiness. The authors projected improved postgraduation outcomes for high schools and improved retention and graduation outcomes for colleges engaged in dual credit.

Many states engage in higher credit count dual credit initiatives. For over 20 years the state of Utah has funded the New Century Scholarship (NCS), a dual credit program in which students can earn an Associate of Arts (AA) degree by the time they graduate high school. Kearn et al. (2013) found that 90% of study participants who took dual credit courses taught by high school teachers meeting adjunct professor requirements reported that their baccalaureate programs accepted nearly all their NCS program AA degree courses.

Early college programs, located on high school and college campuses, include Early College High School (ECHS). Programs combine high school completion with high credit counts toward postsecondary degrees. As with AP and single course dual credit, early college targets college readiness. In a qualitative study of Texas ECHS graduates, study participants perceived positive academic and social impact of their experience (Woodcock & Olson Beal, 2013, p. 73). The Texas study found similarities between ECHS and later college experience, including academic rigor and new friendships. Early and middle college high schools (E-MCHSs) give an opportunity for underserved populations to experience college. Barnett, Maclutsky, and Wagonlander (2015) describe the E-MCHS model as a college-campus based high school. The first E-MCHS began in 1974 at New York's LaGuardia Community College.

The segment of early college models falling under federal grant funding through the Jobs for the Future early college initiative and affiliated local and state initiatives served an estimated 130,000 students in 2014 (Early College Expansion, 2014).

Career technical education (CTE) has been an intentional focus of dual credit by states to address college readiness and credit for CTE students. The broadening system addresses the goals of Carl D. Perkins Career and Technical Education Act (2006) to prepare CTE students for both college and career. High credit count initiatives, such as *The Bridge Year* in Maine, require CTE as a partner (Maine CTE, n.d.). CTE dual enrollment addresses college and career simultaneously.

Social

Expansion and policy growth of dual enrollment have increased access to postsecondary education. The opportunity for students to earn college credit while still in high school helps address socioeconomic barriers when made accessible. In greater Tulsa, Oklahoma, policymakers recognized benefits of dual enrollment on performance and persistence and adjusted dual enrollment admissions standards and financial barriers with the goal of increasing accessibility (Roach, Gamez Vargas, & David, 2015). Dual enrollment improves degree attainment by a diverse range of participants, based on The National Education Longitudinal Study of 1988 as analyzed by An (2013).

Dual credit offerings, including high credit early college, have expanded connections between secondary and postsecondary institutions to address overlapping goals. Comparing perspective surveys of K–12 and postsecondary, Kilgore and Wagner (2017) found common dual enrollment priorities of college course affordability, college course access, and improved access to a broader curriculum. Blankenberger, Lichtenberger, Witt, and Franklin (2017) analyzed an

Illinois statewide dataset for 2003 high school graduates. They found that including early college decreased duplication of secondary and postsecondary work, along with an increase in baccalaureate degree attainment. As a tool for postsecondary credit and degree completion, dual credit joins the expansion of community college systems as a part of a more seamless secondary to postsecondary system. Grubb, Scott, and Good (2017) found dual enrollment decreased remediation needs and accelerated degree completion rates in a study of community college students in northeastern Tennessee.

Secondary students choosing a CTE path access dual enrollment as institutions meet Carl D. Perkins Career and Technical Education Act (2006) requirements of preparation for both college and career. Dual enrollment counters traditional views of CTE as a non-academic pathway.

Theoretical

CTE as an alternative to traditional academic secondary education combines new skills and content with application. Relevance is immediately apparent as students move from classroom to lab or shop. The specific significance to the student is inherent in the ability of students to choose their Program of Study, the term used to categorize areas of study meeting the CTE requirements of the Carl D. Perkins Career and Technical Education Act (2006) of both career and postsecondary preparation.

Experiential learning, rooted in practical application, is likely traced as far back as the generational passing on of trades since the creation of man. Carrying forward to the development of educational theory, John Dewey was among those articulating the value of practically applied education. As Dewey grappled with the relationship between traditional studies and the empirical aspects of an industrial world, he concluded, “We are close to the

opportunity of planning our work on the basis of a coherent philosophy of experience and a philosophy of the relation of school studies to that experience” (Dewey, 2001, p. 403).

Building on the experiential-based elements of John Dewey’s theories of education, David Kolb’s (1984) experiential learning theory (ELT) is described as follows:

A dynamic view of learning based on a learning cycle driven by the resolution of the dual dialectics of action/reflection and experience/abstraction. It is a holistic theory that defines learning as the major process of human adaptation involving the whole person. (Kolb & Kolb, 2012)

A common misconception is articulating a choice between preparing for college and preparing for a career, where traditional academic paths link to college and CTE programs link to careers. Further, CTE continues to be viewed by long-held stereotypes of vocational education as a non-academic path. CTE, under the Carl D. Perkins Career and Technical Education Act (2006), is required to prepare students for both college and career. Under the Every Student Succeeds Act of 2015, the guiding and current legislation guiding public education, CTE is to be “aligned with the challenging State academic standards” (§1003A(c)(3)(A)ii).

Self-efficacy theory (Bandura, 1977), a derivative of social learning theory, considers the degree to which individuals believe in themselves and their abilities. Bandura’s theory postulates that any psychological procedure will change an individual’s level of self-efficacy. Bandura (1977) found self-efficacy to be a better predictor of future behavior than past performance. In a study of high school students in two eastern United States schools, Zimmerman, Bandura, and Martinez-Pons (1992) connected self-efficacy to personal goal setting. The study used two subscales of Bandura’s (1989) *Children’s Multidimensional Self-Efficacy Scales*. Conley and French (2014) later included self-efficacy and self-confidence in

models of ownership of learning and college readiness. Students' self-efficacy relative to postsecondary education may impact their decisions to pursue formal education beyond high school.

Self-efficacy theory (Bandura, 1997) presents the argument that belief in self matters. The present study does not add to research regarding the value of self-efficacy; instead, the study considers a possible impact on self-efficacy. The dependent variable was academic self-efficacy as measured by the Academic Self-Concept Survey (Reynolds, Ramírez, Magriña, & Allen, 1980). The independent variable was whether the student was enrolled in dual credit as a part of their career technical education program. Results of the current study are important to the degree that future research supports the value of self-efficacy. The results provide direct feedback to the participating institution and may inform future research.

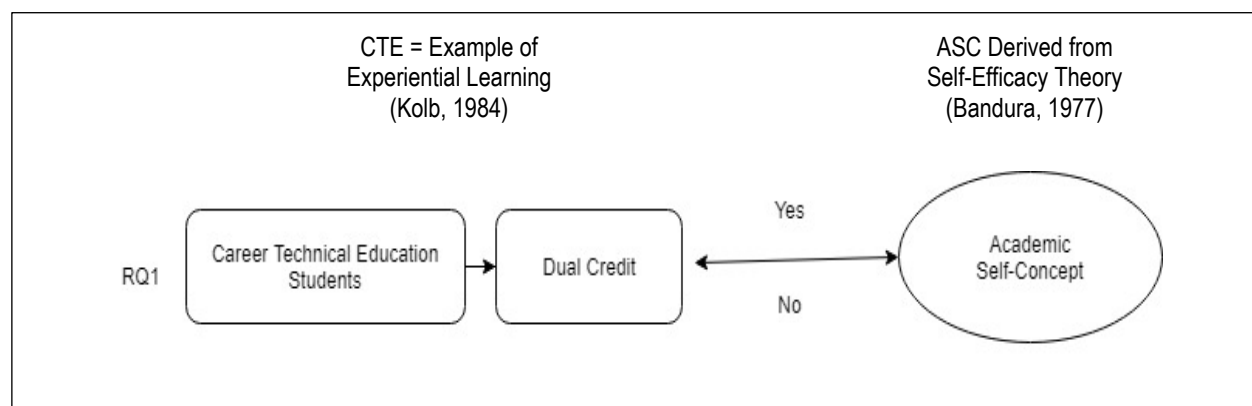


Figure 1. Tree model displaying the study's research question in theoretical context.

Summary

Dual credit continues to expand in enrollment and design since its unofficial beginning with Advanced Placement in 1955. The distinction between secondary and postsecondary formalized through the Elementary and Secondary Education Act (1965) has been replaced by the blending of secondary and postsecondary education through dual credit articulation agreements and partnerships. The expansion of dual credit into CTE has replaced the distinction

between programs isolating postsecondary preparation from career preparation. The body of dual credit research includes college readiness, academic impact, college enrollment, and degree completion. Research connecting dual credit with self-efficacy theory (Bandura, 1977) is limited.

Problem Statement

Dual credit brings postsecondary credit and readiness to the secondary level through a broad range of delivery models and partnership makeup. The body of quantitative and qualitative research continues to grow, assessing the level of impact of dual credit on areas such as postsecondary enrollment, secondary and postsecondary academic performance, postsecondary degree completion, and student motivation and engagement. Multiple studies support a connection between dual credit models and postsecondary measures of success. Unlu, Edmunds, Fesler, and Glennie (2015) found that increased Early College High School participation caused an increase in postsecondary enrollment. Meanwhile, Giani, Alexander, and Reyes (2014) found a connection between dual credit coursework and the likelihood of students beginning, persisting, and completing postsecondary degrees. Studies also support dual credit impact on motivation and engagement, including Dare and Nowicki's (2015) study of students in Ontario, along with the Wabash study (2011) as analyzed by An (2015). An's (2015) analysis also found a positive impact of dual credit on postsecondary academic performance. In contrast to studies supporting connections between dual credit and postsecondary success, Deaton (2014) found no connection between English AP participation and postsecondary grade point average (GPA) among rural Appalachian students.

Other studies consider dual credit impact on high school completion (Cowan & Goldhaber, 2015; Haxton et al., 2016; Naumenko, Henson, & Hutchins, 2016), college readiness

(Carlson & McChesney, 2015; Martin, 2013; Venezia & Jaeger, 2013), reaching underserved populations (Locke & McKenzie, 2016; Muñoz, Fischetti, & Prather, 2014) and addressing barriers to postsecondary education (Hoxby & Avery, 2013; Roach et al., 2015), and limited research regarding differences in the level of enrollment and performance between males and females. Dual credit systems-based studies and analysis include policy (Howley, Howley, Howley, & Duncan, 2013; Powell & Scott, 2013), funding sources (Leonard, 2013b; Stephenson, 2014), the roles of community colleges (Lichtenberger & Dietrich, 2017; Wang, 2016; Wilson & Lowry, 2016), and CTE at the secondary and postsecondary levels (Dougherty, 2016b; Hioki, Lester, & Martinez, 2015; Kim, 2014). Dual credit studies also include consideration of differences based on gender. More females enrolled in dual credit than males in Kentucky (Lochmiller, Sugimoto, Muller, Mosier, & Williamson, 2016), Oregon (Pierson, Hodara, & Luke, 2017), and Texas (Young, Slate, Moore, & Barnes, 2013). In Utah female completers of the state's early college high school program earned their bachelor's degree more quickly than their male counterparts (Kearl et al., 2013). Females were also found to be more college ready than males in the 2008 Wabash National Study of Liberal Arts (An & Taylor, 2015), and earned higher first-year college GPAs (Ganzert, 2012). The problem is that the body of research is limited relative to academic self-efficacy of CTE dual credit students.

Purpose Statement

The purpose of this causal-comparative quantitative study was to examine current dual credit CTE students in the state of Vermont, specifically considering the possible impact of dual credit participation on academic self-efficacy of currently enrolled secondary CTE students. The independent variable was whether or not the student is enrolled in dual credit as a part of his or her CTE program. The dependent variable was academic self-concept as measured by a

modified version of the Academic Self-Concept Survey (Reynolds et al., 1980). The convenience sample included 11th- and 12th-grade students in six of the 17 CTE centers in Vermont.

Significance of the Study

This study contributes to the limited body of research analyzing the impacts of CTE-based prior college experience. Kim (2014) found mixed results in examining the impact on total college credits earned by students with prior college experience through CTE-based dual credit in Florida and Oregon. Kim (2014) viewed his study as the first to consider interaction effects of CTE on postsecondary outcomes. Hioki et al. (2015) focused on CTE impact on students pursuing postsecondary education through community colleges and four-year institutions. Dougherty (2016a) focused directly on the impact of secondary CTE on postsecondary enrollment using a descriptive study following three cohort years of Arkansas students. The current study is significant given the focus on currently enrolled CTE students nearing the end of their school year, before completing high school. The timing narrows the focus to a snapshot in time, prior to post-high school influences. The study targets students in career technical education, a segment of public education that is traditionally overlooked when considering academic rigor. By focusing specifically on academic self-efficacy of CTE students, the study adds breadth to the picture of students engaged in a segment of education designed to prepare students for both postsecondary education and careers. Understanding academic self-efficacy of CTE students can inform educators and decision-makers going forward.

Research Question

RQ: Is there a difference in academic self-concept between CTE students taking dual credit and CTE students not taking dual credit?

Null Hypothesis

H₀: There is no significant difference in academic self-concept between CTE students taking dual credit and CTE students not taking dual credit.

Definitions

1. *Advanced Placement* – The Advanced Placement program offers college-level courses, using secondary teachers, with the possibility for college credit based on scores on the related academic test. The program originally targeted gifted students (Nugent & Karnes, 2002).
2. *Career and Technical Education* – “A term applied to schools, institutions, and educational programs that specialize in the skilled trades, applied sciences, modern technologies, and career preparation” (Great Schools Partnership, 2014).
3. *Concurrent Credit, Concurrent Enrollment* – (see *Dual Credit, Dual Enrollment*)
4. *Dual Credit, Dual Enrollment* – “A college course that high school students take and for which they receive college credit upon successful completion” (An & Taylor, 2015, p. 2).
5. *Early College (EC)* – Commonly used as a synonym for ECHS (see below).
6. *Early College High School (ECHS)* – “The ECHS model is an innovative approach to preparing students for college. It represents a comprehensive school reform model that is focused explicitly and purposefully on preparing all of its students for college” (Edmunds, 2012, p. 81). The term was first used by Jobs for the Future, with funding provided by the Bill and Melinda Gates Foundation, beginning in 2002.
7. *Early and Middle College High School (E-MCHS)* – “A small high school located on a college campus” (Barnett et al., 2015, p. 39).

8. *Program of Study (POS)* –The Carl D. Perkins Career and Technical Education Act of 2006 defines CTE programs of study with minimum elements of secondary and postsecondary alignment, academic and CTE progression, postsecondary credit “where appropriate,” which lead to industrial-recognized credentials or postsecondary level certificates or degrees.

CHAPTER TWO: LITERATURE REVIEW

Overview

The sustained rise in the value of postsecondary degrees, combined with their rise in cost, has been the catalyst for a rapid expansion of early access to college credits. Dating back to the 1950s, opportunity to begin college work in high school was limited to Advanced Placement programs, targeting a limited college-bound population. Today higher education is accessed through a continually expanding range of dual credit opportunities, serving an increasingly broad population, a trend which has drawn quantitative and qualitative research. This chapter begins by laying out the theoretical frameworks. The examination of related literature is broken down into postsecondary benefits and barriers, dual credit history, the organizational structure of dual credit partnerships, reaching underserved populations, and concludes with impacts of dual credit.

Theoretical Framework

Experiential learning, rooted in practical application, is likely traced as far back as the generational passing on of trades since the creation of man, with reference dating back to early philosophers. Confucius (551 B.C.–479 B.C.) stated, “I hear and forget, I see and remember, I do and understand.” Aristotle, a proponent of outdoor education, broke experience down into learning through community and practice (Smith & Knapp, 2011, p. 23). Eighteenth-century philosopher, writer, and composer Jean-Jacques Rousseau referred to the importance of space for a child’s soul to be idle to be “in sync with the child’s own experiential rhythm” (LØvlie, 2002, p. 338).

Carrying forward to the development of modern education theory, John Dewey was among those who articulated the value of practically applied education. As Dewey grappled with the relationship of traditional studies and the empirical aspects of an industrial world, he

concluded, “We are close to the opportunity of planning our work by a coherent philosophy of experience and a philosophy of the relation of school studies to that experience” (Dewey, 2001, p. 403).

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A common misconception is articulating a choice between preparing for college and preparing for a career, where traditional academic paths link to college and CTE programs link to careers. Further, CTE continues to be viewed by long-held stereotypes of vocational education as a non-academic path. However, under the Carl D. Perkins Career and Technical Education Act (2006), CTE is required to prepare students for both college and career. Under Every Student Succeeds Act of 2015, the guiding and current legislation guiding public education, CTE is to be “aligned with the challenging State academic standards” (§1003A(c)(3)(A)ii).

Related Literature

Postsecondary Benefits

According to the United States Department of Labor, Bureau of Labor Statistics, national survey (U. S. Department of Labor, 2016a), 2015 median earnings for those age 25 and above with an associate’s degree were 17.7% greater than those with only a high school diploma. Earnings were 42.5% and 17.9% greater for bachelor’s over associate’s, and master’s over bachelor’s, respectively. Notably, there was a significant rise in earnings potential from

associate's to bachelor's degree completers. The same survey showed a drop in the unemployment rate from 5.4% to 2.4% when comparing high school diploma attainment to master's degree, with the most significant drops coming between high school diploma and associate's degree, and associate's degree and bachelor's degree, respectively.

In a quantitative comparative analysis covering 1991–2010, Carlson and McChesney (2015) verified a widening income gap based on the level of education. When accounting for inflation, they found a drop in purchasing power over that 20-year span for males with less than a master's degree and females with less than a bachelor's degree.

Postsecondary Barriers

Costs. The necessity for postsecondary degrees continues to rise as barriers to postsecondary credit, continuation, and degree completion persist. Average tuition increased 16.1% while average room and board increased 3.4% in constant dollars between the 2002–2003 and 20122013 academic years, based on the Consumer Price Index for four-year and two-year institutions (U. S. Department of Education, 2015). Costs restrict access for many while increasing the debt load of those who attend. Average college debt for the Class of 2016 was \$37,172, a 6% increase from the prior year (Center for Microeconomic Data, n.d.).

Traditional-aged undergraduate students rely on family contribution and external sources to afford postsecondary credit and continuation, along with persistence toward degrees. Houle (2014) found that postsecondary students from middle-income families carried the highest education debt potential, noting that low-income families qualify for significant institutional and public and private grant assistance to lessen college debt, while high-income families were able to minimize college debt through financial planning and current resources. Those who complete their degrees enter their careers carrying a significant debt load. Students from families in the

lowest 75% of income, as noted by Dwyer, McCloud, and Hodson (2012), were less likely to complete their degrees as their debt load increased above \$10,000.

Parallel to the direct monetary costs of postsecondary education is the opportunity costs of lost wages and career progression, based on options lost or delayed due to the decision to pursue postsecondary training. Cornacchione and Daugherty (2013) found, in their analysis of postsecondary secondary education between 1975–2005, that opportunity costs do connect with postsecondary degree pursuit. The researchers note the narrowness of the study relative to the full context of human resource development.

Cost trends in postsecondary education cause a barrier to access, with resulting debt impacting continuation and degree completion. Middle-income families experience rising debt supporting their children's postsecondary pursuits, while students from low-income families often find college to be out of reach. With costs continuing to rise through traditional college approaches, programs that reduce costs continue to increase in popularity.

Equitable access. The struggle for equity weaves through the fabric of the history of the United States. At the time the new nation declared independence, it held on to slavery. Four-score-and-seven years later the nation addressed slavery; however, women were not allowed to vote. The struggle for equity continues today as individuals and groups seek increased access and voice. In line with the nation at large, postsecondary education carries implications to access and equity in career and economic opportunity, along with voice and power in all areas of the public and private sector. President Truman's 1947 Commission on Higher Education pushed policy to eliminate financial barriers, antifeminism, along with race and religious discrimination (President's Commission on Higher Education, 1947). Gilbert and Heller (2013) described the

commission as ahead of its time, the long-term results as short on policy results, but viewed it as important work in the advent and expansion of a community college system.

For high school students in less advantaged communities, many of whom belong to a racial or ethnic minority, policy impacts access. The role that federal and state government plays has implications for access to and affordability of higher education. College is cost prohibitive for many without intervention through policy and grant-funded support. Powell and Scott (2013) highlighted decreases in financial aid funding and programs, contributing to decreased minority access. The authors also noted the role of community colleges and two-year institutions as a means for ethnic minority access and the need for grant funding for the schools to meet the demands for expansion.

High school students with a low socioeconomic status (SES) experience barriers to higher education relative to their high-SES counterparts. Andrew (2017) found a greater postsecondary reach for high-SES students at the point of postsecondary entry in regular and selective four-year schools, while both high- and low-SES groups improved their access based on grades, test scores, and expectations for education. Disparate secondary schools, according to Klugman's (2012) study, set in place a system for high-SES parents to better position their students for postsecondary access through school choice and private schools, where their student's high school offerings exceed their low-SES peers. High achieving, low-SES students tend not to choose selective colleges, based on Hoxby and Avery's (2013) analysis of 2008 high school seniors who scored in the top 10% of the ACT or SAT scores. The access may be based on perception, as the authors point to the high amount of financial aid available to students who are both high achieving and low-SES.

Within secondary education, schools are positioned to provide equitable access to a broad range of opportunities, including dual credit courses and programs. Research indicates dual credit counters the SES postsecondary barrier. The National Education Longitudinal Study of 1988 surveyed a group of eighth graders in 1988, repeating the survey with the group in 1990, 1992, 1994, and 2000. An's (2013) analysis of the study found degree attainment significantly greater for students completing dual credit courses, including low-SES students, such as first-generation college students.

Intentional focus on equitable access carries policy implications. Locating programs in districts and regions with limited access or a history of low postsecondary pursuit encourages improved equity. Policy and design initiated by a 20-community action council in greater Tulsa, Oklahoma, carried a focus on low-SES dual credit (Roach et al., 2015). Originally developed in 2010, results indicate the success of low-SES access through a low-cost, college credit model. Roach et al. recommended a proactive approach to provide additional supports for low-SES students.

In contrast, an urban dual credit program in Los Angeles, California, did not include support systems targeting the Latino population (Kanny, 2015). The location would have been a good choice due to the high percentage of low-SES students. However, without intentional supports, Latino students perceived a negative impact of the dual credit program. Dual credit will not impact equity without program design which considers the unique context of the student population and community.

Dual Credit History

Advanced placement. In 1955, the not-for-profit College Board of New York developed the Advanced Placement (AP) program. The program covers content area courses, concluding

with assessments that qualify students for college credit or waiving of specific degree requirements, varying by the postsecondary institution.

The longstanding program has served many students while producing mixed results. In their study of two cohort years of Utah students ($N = 90,044$), Warne, Larson, Anderson, and Odasso (2015) found credit in AP English and AP calculus courses to have little benefit, while success on the associated AP exams bore a connection to higher scores on the ACT college admission test.

Originally accessed by students who met the traditional expectations of college-bound students, an increasing number of participants in AP courses come from the broader population. To demonstrate a tangible focus on academics, secondary schools have increased AP course offerings and expanded student exposure to AP through distance and hybrid models. In an analysis of growth and trends over the previous 20 years, Judson and Hobson (2015) found higher participation in AP courses among underclassmen and minority groups. However, they also found scoring to be trending downward. Chajewski, Mattern, and Shaw (2011) found AP exam participants more likely than non-participants to enroll in four-year college programs. However, Deaton (2014) found in a study of rural Appalachian students that English ACT scores were “a better predictor of first-semester college grade point average than the English AP score” (p. 1).

A downward scoring trend parallel to a broadening reach raises the question of the impact of AP as compared to the impact of the demographic characteristics. A study of 2010 seniors taking the Scholastic Aptitude Test (SAT; $N = 425,318$) compared scores of students who had taken Calculus AB, chemistry, or English language and composition AP tests in their junior year with those who had not (McKillip & Rawls, 2013). SATs are a common assessment tool

considered in the college admission process as a standardized tool to compare applicants from different secondary schools. McKillip and Rawls (2013) did not find significant differences between AP and non-AP students in their SAT results. They noted background characteristics to be of greater import. McKillip and Rawls (2013) did find the greatest SAT score advantage to be among those who scored the highest on the AP exams.

The total number of students taking at least one AP exam increased from .75 million in 1999–2000 to 1.80 million in 2009–2010, with a drop in minimum pass rate (3) from 63.7% to 57.5% over that same time (U.S. Department of Education, 2011). Judson and Hobson’s (2015) analysis of growth and trends indicated a failure to maintain assessment scores as participation levels grew. They suggested a greater focus on rigor, moving away from high school models that attempt to resemble universities. Their findings provide an alternative explanation to the McKillip and Rawls (2013) study. Together the studies may point to broader topics of teaching strategies and student expectations.

Dual credit. While AP operates under a set of standardized assessments under the auspices of the College Board, dual credit is implemented through a range of programs and initiatives, varying by region, population, and sponsoring partner makeup. A variant to dual credit, concurrent credit “provides high school students the opportunity to take college-bearing courses taught by college-approved high school teachers” (National Alliance of Concurrent Enrollment Partnerships, n.d.). High schools and CTE centers engage with postsecondary institutions to provide dual credit and concurrent credit opportunities using diverse methods and curricula, covering a much broader range of courses than those under the AP umbrella. While definitions vary, including the precise differentiation between concurrent credit and dual credit, an acceptable collective definition of dual credit refers to initiatives that give an opportunity for

high school students to earn college credit without the requirement of a standardized test (Tobolowsky & Allen, 2016, p. 8). Dual credit allows a broad range of student access. Many choose dual credit options with the intention of pursuing postsecondary degrees. Others may earn dual credit as an unintended benefit of engaging in a specific course or program of interest.

In the high school arena, schools struggle with the balance of preparation for college and careers. AP at its inception encouraged a pathway where college-bound students would experience greater rigor, using content equivalent to postsecondary coursework. In its standardized implementation, exam-focused motivation may be at the expense of the learning process and retention of knowledge. Parker et al. (2013) in their description of a project-based AP approach described the more typical AP training as a “breadth-speed-test formula . . . emphasiz[ing] fast, superficial learning at the expense of meaningful learning” (p. 1454).

Dual credit in its wide range of iterations is better suited to meet the balance of looking ahead while addressing motivation and learning in the present, due to the ability of program partners to develop offerings meeting the needs of their unique populations. The approach is a means for acceleration, while an equivalent number of students held “love for learning” and “preparation for university” as their main reason for pursuing dual credit (Dare, Dare, & Nowicki, 2017). Research has shown academic motivation due to the challenging level of coursework. An (2015) analyzed the Wabash National Study of Liberal Arts Education (Center of Inquiry, 2011), with interest in the impact of dual credit on motivation and engagement. His analysis indicated stronger academic performance, based on first-year college GPA, and higher motivation and engagement when comparing dual credit participants against non-participants, except for students attending highly selective institutions. The findings could be explained by

the high level of motivation of most students attending highly selective institutions, while mid-selective schools may draw a broader range of students.

The Wabash study of 2011, as analyzed by An (2015), considered dual credit students after their first year in college. Another area of question is the impact of dual credit on the motivation and engagement of students while they are still in high school. A study of students engaged in a concurrent credit program in Ontario found the highest areas of motivation to be the following: “prepare for university, demonstrate initiative, get ahead, and love to learn” (Dare & Nowicki, 2015). The program allows students to select from any course that the university offers to first-year students. Findings indicate a combination of intrinsic and extrinsic motivation (Dare & Nowicki, 2015).

The rapid expansion of dual credit has resulted in a range of design, delivery, and effectiveness. In one study of faculty perceptions, dual credit courses were found to be as rigorous or more rigorous than community college based general education courses (Ferguson, Baker, & Burnett, 2015). The faculty also perceived a lower maturity level of dual credit students, leading the researchers to conclude dual credit students, while academically college-ready, are not necessarily ready for a college experience. Age is a factor to consider in dual credit offerings. AP course expansion included lowering the age of access. The more diverse collection of dual credit offerings includes those restricted to high school juniors and seniors, while initiatives such as ECHS are designed to begin in ninth grade or earlier. ECHS, as an example of expansion, currently operates in 30 states and the District of Columbia (Jobs for the Future, n.d.).

Research supports a connection between dual credit and baccalaureate degree completion. Crouse and Allen (2014) found that connection while noting a significant limitation

in their study, as they raised questions about the possible impact of preexisting characteristics of dual credit students. Crouse and Allen (2014) speculated that those choosing dual credit in high school might have had more to do with who they were than the experience of completing a dual credit course. The decision to engage in dual credit is difficult to assess. The range of offerings, locations, and delivery models has broadened the reach of dual credit. Reaching a broader demographic also broadens the definition of pre-existing characteristics of dual credit students.

Early college: High credit count initiatives. Dual credit programs and initiatives span from single course offerings to early college alternatives, beginning as early as ninth grade, with a number leading to associate's degrees by the time of high school graduation. The impact of high credit count initiatives extends beyond the expected cost savings for students and their families. Woodcock and Olson Beal (2013) considered the impact on academic performance and relationships, recognizing the potential social issue of early college high school completers entering college as juniors. Their qualitative study in Texas indicated students perceived advantages in experiencing college with older students. As dual credit programs grow, including the advent of college campus-based early college, postsecondary institutions are continuing to experience a shift in their on-campus client base. Sixteen and 17-year-old students are enrolling on postsecondary campuses at the same time as an increasing number of students are choosing to begin their residential postsecondary credit older than the traditional student, entering at ages 19 and 20, following gap years or bridge year experiences.

Given physiological and social-emotional changes over time, younger students are potentially less ready for certain aspects of postsecondary learning. Higher credit count initiatives, such as ECHS, typically begin in Grade 9, whereas most other dual credit programs begin at Grade 11. Cognitive college readiness was lower for ECHS students than dual credit

alternatives in North Carolina (Martin, 2013). A confounding factor was location. ECHS and smaller credit count dual credit option participants held on college campuses measured higher in cognitive college readiness than those enrolled in high school-based alternatives.

If dual credit enrollment improves the high school graduation rate and time to degree completion, then high credit count initiatives, such as ECHS, may yield an even greater impact. In his examination of Utah data analysis statistics, Haskell (2016) found these improvements in 2008 and 2009 cohorts. For example, ECHS students in the 2009 cohort took an average of 128 and 317 fewer days to bachelor's degree completion than DCE and the general student population, respectively.

In their analysis of North Carolina students attending early college high school beginning in ninth grade, Unlu and Furey (2016) found 89% had enrolled in postsecondary education within six years of their ECHS start, as compared to 74% for the non-ECHS control group. In their analysis, Unlu and Furey (2016) speculated that the design of the early college was a determining factor.

Student engagement, a common topic of education research, is a priority for schools and initiatives; however, it is difficult to measure. Cavanagh's (2015) eight-part learning environment model considered student capabilities and expectations of students. Students, peers, teachers, and parents were recognized contributors to student engagement. Great Schools Partnership (2016) defined the concept to include intellectual, emotional, behavioral, and physical student engagement. Students enter a lottery to attend North Carolina's ECHS. A comparison study of ECHS and non-ECHS ninth graders found a significant difference in multiple measures of student engagement (Edmunds, Willse, Arshavsky, & Dallas, 2013). ECHS students had higher attendance, lower suspension rates, and higher in-school engagement

and challenge. ECHS student respondents rated higher expectations, stronger relationships, better supports, and greater rigor and relevance in instruction when compared to students attending traditional high school (Edmunds et al., 2013).

Choosing ECHS is a larger commitment than lower credit count initiatives. The decision often involves a departure from extracurricular activities and experiences that students would engage in if continuing with their peers in traditional high schools. A comparison study of a traditional high school and ECHS in Texas found student perceptions of what they would give up were a primary reason for students to choose traditional high school over ECHS (Mansell & Justice, 2014). In a 2013 study of five Texas ECHS campuses, Cravey considered the school culture perceptions of students. She discovered common aspects in the focus group interview study, indicating a developing culture within the high credit count model. Shared perceptions included rigor, social justice, and caring teachers in a safe environment. Where Mansell and Justice (2014) found reasons students chose to stay in traditional high school, Cravey (2013) found a resulting culture that showed students' high view of their ECHS choice.

Dual credit and career technical education (CTE). The Smith-Hughes Act of 1917 (also known as the Vocational Education Act of 1917) provided federal funding for the states to stimulate secondary education in the areas of agricultural, industrial trades, and home economics. The legislation came following a movement in the late 19th century to create vocational-education programs in public education. Through the George-Deen Act of 1936, vocational-education coverage expanded to teacher education and marketing occupations. Expansion of vocational education continued with the George-Barden Act of 1946. The Vocational Education Act of 1963 marked the final demographic expansion to include all people of all ages, including those with disabilities.

CTE was a clear component in the Elementary and Secondary Education Act (ESEA) of 1965 and has been prevalent in each reauthorization of ESEA, including the most recent Every Student Succeeds Act (ESSA) of 2015. ESSA refers to CTE in the context of relevant secondary paths, the source of experiential learning, and as a possible component of dual or concurrent credit programs. The Carl D. Perkins Career and Technical Education Act of 2006 defines CTE programs of study (POS) with minimum elements of secondary and postsecondary alignment, academic and CTE progression, postsecondary credit “where appropriate,” leading to industrial-recognized credentials or postsecondary level certificates or degrees. One POS-related study articulated a theory of change regarding the overall impact of POS on the high school experience (Castellano, Richardson, Sundell, & Stone, 2017). While the study did not isolate dual credit components, POS enrollment positively impacted the high school graduation rate. Castellano et al. (2017) called for future research that considers the complete career pathway POS impact, to include secondary, postsecondary, and workplace data.

Many CTE programs at the high school level include dual credit. Kim (2014) found positive and negative relationships between college credit earned through CTE and total credits earned, in Florida and Oregon consortiums, respectively. Many initiatives, such as the *Bridge Year* program in the state of Maine, include CTE as a partner in high credit count early college. As of 2017, the Maine program included 15 high schools, seven CTE centers, and three postsecondary institutions, with the intent of combining skills gained through CTE, with 25 credits toward a postsecondary degree (Maine CTE, n.d.).

A long-held stereotype of CTE students is that they are only interested in a career or vocational focus with less interest in postsecondary work than their traditional secondary peers. The concept of dual credit for CTE students counters that stereotype. Dougherty (2016b), in a

descriptive study of Arkansas students, considered the non-CTE and CTE student comparison relative to postsecondary interest while also looking at postsecondary probability between programs. The study found no significant difference between the non-CTE and CTE cohorts, while certain CTE programs, such as health services, exceeded other CTE programs in postsecondary credits. Dougherty (2016b) noted the context of Arkansas' *Smart Core*, adopted in 2014, which sets priorities for college and career readiness for all secondary graduates. College and career have been the long-held two-pronged goal of CTE.

Postsecondary CTE, typically held at community colleges, two-year technical colleges, or hybrid community and technical college institutions, provides an alternative path for students interested in a CTE experience. Advantages of four-year degrees raise questions of transition between two-year community or technical college-based programs and four-year institutions. A qualitative study of six Nevada postsecondary CTE to baccalaureate transfers found persistence toward degree completion, even if from non-academic backgrounds (Hioki et al., 2015). Bridges between secondary, two-year, and four-year institutions continue to develop. Secondary dual credit and postsecondary transfer credit are expanding elements of complex systems.

Dual credit and the community college student. Community colleges and two-year technical colleges, for traditional-aged students, are cost-effective options for students to earn two-year degrees or serve as a cost-effective bridge to four-year institutions. Dual credit is a means to ease the move from secondary school to a community college setting, while community colleges often serve as a transition to institutions carrying bachelor's and advanced degrees. In one example of a community college and four-year institution partnership, students who were denied direct entry into the four-year institution enrolled in a program designed to improve college readiness while earning community college credit (Wilson & Lowry, 2016). The

community college-based program includes the use of academic coaches to address specific areas where students are underprepared for college success.

In a broader look at the transition to four-year institutions, Wang (2016) noted that community colleges might fill general gaps, but many do not prepare students to a level required for selective institutions. Lichtenberger and Dietrich (2017) found a longer total time to degree completion for community college transfers than for students commencing at four-year institutions. These potential disadvantages are important for community colleges to consider, as well as a consideration of dual credit initiatives in preparing students with the context of four-year and advanced degree options in mind.

Dual credit provides a head start for students, and in Kim's (2014) study of the Wisconsin Technical College System, was shown to provide academic momentum, impacting retention and continuation. Given the financial advantages of dual credit to students and their families, and the evidence of the increased importance of degree attainment, there is a role for programs that expand access to students toward community college or secondary and postsecondary CTE.

Dual credit courses through community colleges are located both on high school campuses taught by high school teachers and on community college campuses taught by college professors. The high school teachers go through a qualification process, with many community colleges requiring a master's degree to teach a college credit-bearing course. College campus courses compared to high school courses differ. A comparison study in Texas (Dixon & Slate, 2014) found a lower success rate and higher frequency of D and F grades among students completing college campus-based courses than the same courses offered on high school campuses. While not proven, Dixon and Slate (2014) hypothesize college campus-based courses provide a higher level of rigor than those on high school campuses.

Organizational Structure and Partnership Development

Communities, states, and regions have engaged in the complicated work of bringing partners together with disparate strengths, ideas, and goals around dual credit system development. In a four-year case study of an early college partnership between a New England community college and suburban high school, Leonard (2013a) noticed elements typical of the complex work centered around organization and development. Leonard (2013a) summarized the formative steps to include deciding to move forward, team formation, student recruitment targets, curriculum, and funding. The partners in Leonard's (2013a) study had a history of collaboration but still struggled in the development stages. Stakeholders came to the table with differing theories, based in part on their past practice.

Operation around a common purpose arose as a primary requirement to move past barriers to change, to engage in ECHS (Bush, 2016). The study assessed perceptions of secondary and postsecondary administrators and counselors serving in a four-school ECHS partnership in Texas. Results indicated priorities of policy change at the institutions and affinity to collaboration as perceived requirements for success. Study participants also noted their desire to have their institution have strong representation and for their institution's goals to be honored. In this Texas-based collaboration, the common desire to reach low-income populations underserved in higher education was important to their success. The incentive for partnership varies by community and region, determined by needs specific to the population served, with attention to their societal and economic needs.

A case study of a rural consortium, comprised of eight secondary and three postsecondary institutions in the Midwest, revealed the complicated attitudes and relationships as stakeholders worked together with varying degrees of commitment to the early college initiative (Howley et

al., 2013). In contrast to the Texas study (Bush, 2016), the group failed to arrive at a common purpose, with the specific conflict between educational and financial intentions. Howley et al. (2013) described common themes that collectively describe an initiative which progressed at a slow and inconsistent rate, due to the resistance of individual stakeholders and the arduous process of bringing institutions together. Change and compromise are inherent in a successful collaboration, requiring institution willingness to adjust for a common goal.

One question that most states or individual collaboratives and partnerships are asked to address is the specific roles of secondary schools, community colleges, and four-year institutions. Pretlow and Patteson (2015) pointed to differences between stakeholders and historical priorities and the complicated process of blending diverse institution types

Institution impact. Secondary and postsecondary institutions operate with limited resources, requiring prioritizing of programs and initiatives. Development and implementation of dual credit programs, whether required by state legislation or not, have implications for institutions involved. Commitment to programs such as dual credit often come at the expense of existing programs, meaning the new program must show positive results for continued institution commitment. Georgia's Kennesaw State University (KSU) found a positive impact of the addition of dual credit (Kinnick, 2012). Specific benefits came in the areas of university image, attracting high-achieving students, and classroom environment.

Kinnick (2012) noted the importance of impact measures at KSU and similar institutions given internal pressures, such as credit and limited resources, along with external pressures, including state funding shifts intensifying differing perspectives and priorities between higher education and public secondary education. Statewide initiatives commonly include short-term

financial supports, allowing a window of time for early program development and implementation.

Policy. Self-interest is a recognizable element in every organization. Secondary and postsecondary institutions are reaching out to each other while they are also concerned with jeopardizing their own current goals, theories, and structures. As stakeholders convene to collaborate around a common goal, such as reaching a population previously underserved by higher education, “self-interest is subsumed in the collective interest” (Leonard, 2013a, p. 3). Once secondary and postsecondary schools embrace the common goal, the hard work of policy development begins.

In their examination of state policies, Taylor, Borden, and Park (2015) noted consideration of quality of dual credit courses broken down into the input, process, and output components. Input alone includes difficult decisions around students eligible to participate, faculty eligible to teach, curriculum to be included, and where to access the funding. Training and monitoring constitute the process, while the output includes outcomes at the student, course, and program levels. Taylor et al. (2015) indicated a diverse range of policies throughout the United States, triggering issues around compatibility of dual credit policy with regional accreditation and local-level distinctions. In a comparison of state policies in Ohio and Virginia, Pretlow and Patteson (2015) found major differences, led by differing methods of policy development. Both states had a similar level of inconsistency between written policy and policy implementation. Oregon, with community college dual credit greater than the national average, and data indicating benefits over its non-participating Oregon students, also encountered inconsistency between colleges (Pierson et al., 2017).

The Education Commission of the States (ECS), founded in 1965, advises education policy-makers throughout the United States. An ECS position on community colleges recognizes the significant expansion of dual credit, and the importance of its inclusion in defining community colleges (Sponsler, Pingel, & Anderson, 2015). The ECS observes the increasing importance of transfer and articulation of credits in the context of community colleges and dual credit. It also notes an opportunity for states to use performance measures to determine the level of funding they give to specific schools, programs, or initiatives.

In one state-level example, the Kentucky Postsecondary Education Improvement Act of 1997 created the postsecondary system to address underrepresented and underprepared populations. Stephenson (2014) described two Middle College High Schools developed under the 1997 Kentucky law. One positive practice gleaned from the qualitative study was to involve all partners in the proactive development of policies and procedures. Stephenson (2014) also recommended consideration of the successful maintenance of systems through ongoing collaboration. The number of stakeholders in statewide initiatives adds to the investment required to maintain structures and supports, with the capacity to adapt.

A recent study of dual credit responded to the questions of the impact of dual credit initiatives developed following the Kentucky Postsecondary Education Improvement Act of 1997. The study of six non-urban Kentucky districts compared credits, course offerings, teacher credentials, quality assurance, and costs (Piontek, Kannapel, Flory, & Stewart, 2016). With disparate results within and between districts, the researchers noted differences in policies and procedures beyond limited guidelines drawn from legislation. With a range of standards, the data indicated differences in all areas of comparison. In a statewide view of Kentucky dual credit between 2009 and 2013, Lochmiller et al. (2016) found significant participation and

completion rates between districts and when disaggregating by sex, SES, and population density. With limited legislative structures as guides, the Kentucky example shows the window left open for diverse approaches. A key advantage of the autonomous space is adaptability to unique demographics, including unique gaps in available credit-bearing opportunities. The disadvantage of independent approaches is the consistency of preparation, leading to differing levels of preparation of students entering postsecondary programs.

In a study of dual credit policy at Florida Atlantic University (FAU) and the State of Florida, Khazem and Khazem (2012) interviewed eight policy agents including FAU officials, Florida legislators, and Florida Board of Governors' staff. Their study detailed the complexities of policies to support and expand dual credit. Student eligibility and participation, secondary and postsecondary investments and agreements, and multifaceted financing, all are ongoing considerations of policy writers and decision-makers. Khazem and Khazem (2012) recognized the advantages of dual credit in Florida, recommending continuation as a priority, noting that policy priority also requires a shift in focus and education funding.

Conflict and constituent concern can arise as a seemingly beneficial program develops. In Leonard's (2013a) example, policies around student recruitment led to concerns perceived by parents of secondary honors students that early college would draw resources at the expense of current programs. Simultaneously, concerns existed around honors students choosing a nearby college, potentially squeezing out the partnership's targeted population of middle-level students. The example highlights the reality of limited resources and the importance of considering the impact on current programs when developing early college partnerships.

Local consortium policies may be adjusted quickly, such as Tulsa (Oklahoma) Community College, and Tulsa area schools, where admission requirements and financial

barriers changed in response to data drawn from the pilot year of their program (Roach et al., 2015). Policy adjustments were designed to broaden program reach to middle-level-learners for the 2015–2016 year. Pilot approaches are common as institutions and partnerships initiate programs without committing to long-term investment and collaboration until initial results are available.

Zinth (2016) included CTE in a comparison of 50 state dual enrollment policies. At that time 44 states had statutes or regulations in place authorizing high school CTE courses to award postsecondary credit. The level of accepted programs varied widely, including eight states including CTE in the definition of dual enrollment without additional requirements, and seven other states allowing CTE postsecondary credit with an articulation agreement in place between the secondary and postsecondary institutions. The other 29 CTE dual enrollment states have more extensive requirements but vary from state to state. Elements common to many include ties to specific statewide approved programs, attachment to community college or technical college systems, or requirements that credit leads to a degree or postsecondary certificate.

Funding. Funding streams are limited and diverse. Decisions to reach out to underserved populations may impact the limited capacity of taxpayers. Drawing public and private grant funding often includes limits in length of funding availability, allowing for the successful development of early college programs without the guarantee of funds to sustain the work. Public funding for higher education and secondary education, including programs bridging the two, depends on federal policies and priorities. Dar and Lee (2014) concluded that public investment in higher education is impacted by partisan politics, with Democratic party control being favorable for programs and development. As a component of secondary and

postsecondary education, dual credit depends on funding priority decisions, including those made in political contexts.

Given limited funding, cost effectiveness is a key measure of early college initiatives. In a longitudinal study of North Carolina's early college system, Unlu et al. (2015) considered costs and benefits. Their study found a positive impact on postsecondary credit, suggesting the advantage of college exposure for high school students. The associated costs were 20% greater for ECHS participants than non-participants. The North Carolina example does not lead to a clear cost and benefit analysis. The benefits to society of increased postsecondary credit may be difficult to measure, while the benefit to the individual students has statistical proof, based on increased employability and income capacity.

In a Kentucky study by Stephenson (2014), potential issues of long-term funding were considered less important than the benefits of program development. The two MCHS programs diverted state formula pre-kindergarten to Grade 12 funds to establish the work. At the time of Stephenson's (2014) study, alternative funding sources were soon needed, with regrets of most that they had not considered long-term funding sooner. The program had not become a part of the internal budget priority process.

Philanthropic organizations have played a significant role in early college development. Most notably, ECHS was developed and initially implemented with funding from the Bill and Melinda Gates Foundation beginning in 2002, under the national work of Jobs for the Future (JFF, n.d.). Early college work under JFF currently secures funding from a federal grant through the U. S. Department of Education's Investing in Innovation (i3)program (2016) while using Bill and Melinda Gates Foundation funds to support other initiatives (JFF, n.d.). The intermediary organizations provide a channel of funding for local early college initiatives. Recipients of

public and private grant funding will expend a portion of their funds in grant compliance, thereby reducing funds available for grant implementation.

As partnerships operate with funds limited both in amount and duration, logical funding sources are the students and families benefiting from the programs. Leonard (2013b) described the Agassiz plan used in a Massachusetts-based partnership where a gradual increase in family contribution to early college funding carried the benefit of family college readiness. All participants paid a portion. The program used local foundation funding to reduce, but not eliminate, costs to low-income families. The partnership planning team found requiring participating family financial contribution “added ownership in the program and boosted academic effort and family engagement” (Leonard, 2013b, p. 12).

Reaching Underserved

Low-income families, as those in the Leonard (2013b) study, are among groups traditionally underserved in higher education. Early college can reduce higher education costs for students and families, making credit and degree completion more accessible to low-income families. The ECHS Initiative, initially funded by the Bill and Melinda Gates Foundation, was developed to increase access to college-level coursework to underserved populations (Berger, Adelman, & Cole, 2010).

ECHS was introduced at the Jefferson County Public School System in urban Louisville, Kentucky, to reach high-poverty students where negative patterns of attendance, dropout rates, and low academic achievement were ongoing issues. Muñoz et al. (2014) found in the first year of ECHS implementation in 2010–2011, a rise in academic achievement and a decrease in suspensions. The location is one example where ECHS had an immediate impact. In a broader ECHS initiative in Illinois, the target population was broad, open to all students, positively

impacting a wider demographic, including traditionally underserved. The Illinois example raises questions about whether ECHS should specifically target the underserved, as their data demonstrated a positive impact on the population served while carrying a greater impact for those not considered underserved. ECHS collaborations might consider in their design to encourage increased participation of the underserved.

While planning and policies are designed to reach the underserved, initiatives can overlook specific barriers, as was the case among underperforming Latino students attending Tambryn ECHS, a public charter school in Texas (Locke & McKenzie, 2016). The qualitative inquiry found that Tambryn ECHS failed to address the life contexts of students, by having offerings not easily accessed by those students most in need of the systems benefits.

A 2005 change in policy in Virginia successfully reached its goal of increasing dual credit numbers but resulted in an expanded gap in total for underserved populations (Pretlow & Wathington, 2014). A common reason for students choosing traditional high school over ECHS was the short-term costs of dual credits (Mansell & Justice, 2014). Their decisions were made, even with knowing the greater long-term savings associated with earning college credit during high school. Mansell and Justice (2014) noted the importance of clear communication by administrators and counselors regarding dual credit advantages.

Early-Middle College High School (E-MCHS) initiatives in New York and Michigan sought to close gaps through college campus-based programs designed to “expand underserved students’ access to dual credit and provide a pathway to college” (Barnett et al., 2015, p. 41). Barnett et al. (2015) described a range of models, including an expensive effort to add a fifth year of high school for a segment of the population. The models include comprehensive systems, tracking progress, and providing tutoring and other supports to encourage continuation.

ECHS, an option that reaches larger student populations as early as Grade 9, creates built-in access for underserved students. ECHS and other high-credit count initiatives give an opportunity for traditionally underserved students to graduate high school with college credits up to a two-year college degree.

Impacts of Dual Credit

College readiness. Entry level college readiness is an ongoing impediment for both learners and postsecondary institutions, with the continued need for remediation before degree pursuit. Schulmerich and Hurley (2015) noted the struggles of progressing nursing students toward degree completion and certification, due to the need for remediation and foundational course repetition. The associated cost to students of remediation and repetition was \$287,165. Data drawn by ACT, Inc. (2016) revealed, of high school graduates taking the ACT, 39% fell short of ACT criteria for college readiness in English, 56% in reading, 59% in math, and 64% in science. The numbers demonstrated the need for first-year student remediation.

The state of Texas developed ECHS in response to state legislation incentivizing college readiness curriculum. The college and high school partnerships engaged in programs including up to two years of college credit during their high school years. In an ex-post facto Texas-based study of 2011–2012 first-year college students, comparing ECHS graduates with traditional high school graduates, results indicated ECHS students scored higher in reading readiness measures and had no significant advantage in math readiness (Chapa, Galvan-De Leon, Solis, & Mundy, 2014). Given the size of Texas ECHS implementation, positive results in reading are important to note. Lack of impact in math should lead to a re-examination of ECHS math coursework and sequence.

College readiness goes beyond academic readiness, with study skills, intrinsic motivation, and relevant social skills as necessary elements. Mechur Karp (2012) interviewed first-time dual credit students before and following their courses. She observed improvement in socialization skills and student understanding of which skills they needed to succeed in college coursework. Conley and French (2014), in an examination of two college readiness models, highlighted the importance of student ownership of learning. They considered clear goals and the recognition of the gap to navigate as pre-requisites to ownership. According to Conley and French (2014), metacognition, self-efficacy, and self-confidence are among the contributing factors to ownership.

Disadvantaged ECHS students were the focus of a study that examined academic, social, and personal preparedness (McDonald & Farrell, 2012). The students' self-perceptions indicated value in the ECHS toward all three areas of college readiness. Advancement Via Individual Determination (AVID) is a middle school and high school college readiness program which targets students defined as academic "middle" and who would be first-generation college students. In one study of AVID graduates, the AVID experience appeared to contribute to their interest in dual credit courses and four-year institutions (Huerta & Watt, 2015). Huerta and Watt's (2015) study also indicated students were likely to continue use of tools learned in the college readiness program such as Cornell notes, learning logs, collaborative study groups, and on-campus tutoring services.

College readiness in its most basic form would indicate a need for secondary work to align with postsecondary expectations, which is often not the case. The standards movement including the most recent broad acceptance of Common Core State Standards (CCSS) is a means to implement consistent standards nationwide, enhancing the ability to create a broad-based

secondary–postsecondary alignment. Venezia and Jaeger (2013), in their summary of national initiatives, concluded broad-based progress, which they speculated was due in part to CCSS. They also emphasized the need for capacity building, which ties directly to the complex funding and policy issues of dual credit programs. CCSS is important, according to Venezia and Jaeger, due to the elements of college readiness addressed.

Dual credit and advanced standing countering barriers. Getting a head start on college through earned credits while in high school likely reduces costs for individual students and their families. In the case of dual credit options within public education, taxpayers and other entities cover the associated cost. Utah taxpayers continue to fund the New Century Scholarship Program (Kearl et al., 2013). In 1987 the Texas legislature authorized taxpayer funding of the Texas Academy of Mathematics and Science (Sayler, 2015). When combined with funding from the University of North Texas, participating students do not pay for tuition and books. In a study of the City University of New York’s (CUNY) College Now dual credit program, students were found to accelerate their time toward a degree through a combination of early credits and greater credits earned following college entry (Allen & Dadgar, 2012). The first-time freshmen entering CUNY in Fall 2009 ($n = 22,962$) also improved their academic performance, as measured by grade point average. Jeanette Kim (2012), a College Now program administrator, described the factors contributing to program success. She pointed to a representative population at a younger age, small schools, and secondary–postsecondary partnership work as a key. Kim also emphasized the importance of continued growth as they sought to add additional secondary and postsecondary institutions.

Research indicates a positive impact of dual credit on college readiness. Kim (2014) found a significant effect on math college-readiness through tech prep dual credit in Florida and

Oregon. In a study of end-of-first-year college students, An and Taylor (2015) found students who had enrolled in dual credit offerings measured higher than those who did not participate in measures of college readiness of key content knowledge and key learning skills and techniques. They did not measure significantly higher in transition knowledge and skills.

Increasing dual credit offerings on high school campuses impacts limited resources. Implementing dual credit requires consideration of what instructors and students need available to have an equivalent experience to traditional college course offerings. Postsecondary librarians add outreach to high school campuses to their work. Stimpson (2016) raised questions about high-school dual credit instructors' understanding of the need for library instruction. At the same time, Stimpson (2016) pointed out the limited capacity of library services, including the difficulty in connecting with educators away from the college campus.

Dual credit and sex. A higher percentage of females participated in dual enrollment than males in Oregon (Pierson et al., 2017), Kentucky (Lochmiller et al., 2016), and Texas (Young et al., 2013). Additional research has been mixed determining significant differences between male and female dual credit participants and completers.

Female graduates of Utah's NCS completed their bachelor's degrees in an average of 3.31 years, which was significantly less than the 3.83-year average of male NCS graduates (Kearl et al., 2013). Male dual enrollment students were also found less likely to enroll at a four-year postsecondary institution than females (Lichtenberger, Witt, Blankenberger, & Franklin, 2014) and less likely to complete their bachelor's degree (Blankenberger et al., 2017).

In an analysis of the 2008 Wabash National Study of Liberal Arts, An and Taylor (2015) found females more college ready than males. Meanwhile, in the same study, females performed

higher academically, as measured by grade point average, than males at midselective postsecondary schools.

Ganzert's (2012) quantitative study of 15,527 North Carolina community college students focused specifically on race and sex. He found females had significantly higher first-year GPAs than their male counterparts in two different approaches to dual credit. However, when specifically focusing on the comparison between dual credit participants and non-participants, there was no significant difference in gain based on sex.

Haxton et al. (2016), in a longitudinal study of 10 early colleges, found significant result differences based on race, income, and prior achievement, but no significant difference based on sex. In a descriptive study of Virginia dual credit students, Pretlow and Wathington (2014) found an over-representation of female students relative to the high school population, without speaking directly to the difference in impact.

High school outcomes. High school completion is a universally accepted outcome goal of early colleges. The connection to postsecondary would seem to make early college a positive influence on high school completion. However, in a longitudinal study of student cohorts in 10 early colleges (EC) from 2005–2011 (Haxton et al., 2016), there was no significant difference in graduation rates of EC participants and a non-EC participant control group. Preliminary results of a North Carolina study found no significant difference in the dropout, attendance, and graduation rates between five treatment (early college) and five control (non-early college) schools (Naumenko et al., 2016). The studies indicate that the impact on high school completion cannot be assumed.

In contrast, a high school analysis of student cohorts from 2005–2009 in North Carolina, drawn from an 11-year longitudinal study of ECs, found an increase in the number of courses

taken (Glennie, Unlu, & Furey, 2016). Additionally, EC students were significantly more likely to take college-preparatory courses and to complete high school than non-EC students. EC programming positively impacted high school outcomes of subgroups, including low income, first generation college, underrepresented minorities and students below grade level. However, the impact was less than the impact on non-targeted populations. These initiatives serve the underserved well, while at the same time increasing the gap with their advantaged counterparts.

High school students in the state of Arkansas who took at least one more CTE course than the average were 3% more likely to complete high school and 1% more likely to enroll in a two-year college (Dougherty, 2016a). Dougherty's (2016a) study, which followed three cohort years, graduating classes 2012–2014, found two-year college enrollment was significantly greater for students who earned postsecondary credit as a part of their CTE program of study.

College outcomes. Early college, showing mixed results in high school outcomes, also carries mixed results in college outcomes. In an impact study by Haxton et al. (2016), ECHS was found to have positive results on college credit and college continuation. A study of the Running Start early college program in the state of Washington showed both a negative impact of on-time high school completion and a positive impact on college credit within one semester of high school graduation (Cowan & Goldhaber, 2015). A mitigating factor connecting the disparate results was the number of EC students who delayed high school completion to continue toward their associate's degree. Free and Appropriate Public Education (FAPE) provides an opportunity for students to access education at no direct cost. It is a common practice for special education students to delay credit in required courses to continue eligibility for FAPE. The EC student takes advantage differently, ultimately reducing their cost toward two-year degrees and beyond.

Academic success, as measured by GPA, is a common desired postsecondary outcome. A study of students in the North Carolina Community College System (NCCCS) assessed a cohort of students who graduated high school in Spring 2003 and entered NCCCS that fall (Ganzert, 2014). The study examined the effect of simple dual credit or dual credit community college courses funded by North Carolina (Huskins Bill Incentive Funds, 1998). The study found a positive impact on the first-year GPA of students who had engaged in dual credit, including those enrolled in technical and medical specialized program subgroups. In contrast, Jones' (2014) study of dual credit and non-dual credit students attending a community college and a research university showed no significant difference in first-year GPA.

Cognitive college readiness, another desired postsecondary outcome, was measured between three North Carolina dual credit approaches: Huskins courses, non-Huskins courses, and ECHS (Martin, 2013). Martin (2013) found that the college-based Huskins model exceeded non-Huskins and ECHS in cognitive college-readiness. Non-Huskins and ECHS included in the study shared the element of being high school based dual credit options.

Postsecondary institutions desire student continuation, wanting their students to persist beyond initial credit. A study of South Carolina technical college dual credit students (D'Amico, Morgan, Robertson, & Rivers, 2013) found college campus based programs increased persistence for students engaged in their career-based programs as compared to students transferring in. Workforce development was a key element in program development.

Further outcomes include the greater impact of dual credits compared to alternatively advanced coursework as a precursor to continuation in higher education in Texas (Giani et al., 2014) and dual credit as a positive influence on retention and completion in Wisconsin (Wang, Chan, Phelps, & Washbon, 2015). Perception of ECHS graduates, as gathered in a Texas

narrative study, indicated positive effects on their postsecondary academic and social experiences (Woodcock & Olson Beal, 2013).

Existing literature regarding secondary and postsecondary outcomes is mixed. Studies commonly articulate the range of variables to be considered, including student population, secondary institution culture, quality of training and delivery, and the broad range of postsecondary destinations.

Secondary and postsecondary program impacts. Secondary education, traditionally four years in length, considers the range of students in the breadth and depth of education it provides. A natural consequence of expanding choices available to students is reduced credit in longstanding programs. Through CTE programs, students enroll in a continuum from semester-long courses up to attending CTE-based schools for their full secondary career. The expansion of CTE programs beyond traditional trades-based training into areas requiring postsecondary degrees appeals to students engaged in high school college-preparatory tracks. In a national public education data analysis of the graduating classes of 2002 and 1988, students taking a minimum of four CTE credits enrolling in postsecondary education increased 18.6% as compared to a 7.2% increase for all graduates (Hudson & Boivin, 2016).

Like the pressures placed by CTE on pre-existing high school programs, dual credit from a single course to four-year early college high schools presents viable options for individual students in their credit decisions. As dual credit simultaneously fulfills secondary requirements and begins postsecondary work, the discussion is rising among college honors program providers regarding the impact on academic rigor and the future of college honors paths. Guzy (2016) noted an increased number of states legislating restrictions on higher education requirements relative to test scores and number of dual credits accepted. When combined with financial

savings for families, Guzy (2016) raised concerns about the ability for honors colleges to be effective, given their reduced credit hour access to students. A contrasting view is that honors education was built on flexibility and collaboration, adapting to the students that are served (Camp & Walters, 2016). Camp and Walters (2016) acknowledged the effects of AP and other dual credit while articulating the importance of the level of rigor of honors colleges.

Dual credit is a choice. Program development is a choice for individual schools and partnerships, along with regional and statewide initiatives. With an increase in dual credit access, individual students are simultaneously choosing to reduce their time available to access other secondary opportunities. As secondary and postsecondary schools invest in dual credit, they are simultaneously reducing their investment in existing programs, such as honors courses and honors college.

Summary

Dual credit continues to expand under a range of structures, policies, delivery models, and venues. Postsecondary barriers such as costs and socioeconomic status are reasons for dual credit expansion over time. Students may access a continuum of opportunities, from course-by-course dual credits to high credit count programs, including many ECHS consortiums where students can achieve their associate's degree by the time they complete high school. As dual credit continues to grow, the body of research grows as well.

Organizational structure varies in size and delivery, with research critiquing or validating current models, while informing future work. Studies indicate differing understandings and goals among stakeholders, including cultural differences between collaborating secondary and postsecondary institutions. Postsecondary institutions raise concerns around secondary instructor qualification, while secondary instructors raise concerns around dual credit work superseding

current high school academic, social, and personal goals. Conflict may exist based on a lack of mutual respect, failure to prioritize open and frequent communication, unclear roles, and limited or inadequate policy (Bush, 2016). Studies of organization and policies indicate wide differences in approach, organization structure, legislation, expectations, and results.

Quantitative and qualitative data continue to grow, including studies considering perceptions of those involved in planning and development, implementation, and perceptions of the student consumers of the programs. Student perception is important in the formation and development of dual credit initiatives, while analysis of existing systems define multiple factors of the successful student experience. Existing research includes mixed results, such as a five-student qualitative study in a California charter school, where students perceived a positive academic experience, countered by a negative social experience as they related to non-dual credit students (Kanny, 2015).

As dual credit consortiums expand their reach, the work extends beyond traditional high-level four-year college-bound AP students. With expansion comes the inclusion of previously underserved groups, including many who do not fit the traditional mold of higher education students. Contributing to the expansion is the increased role of community colleges, along with secondary and postsecondary CTE. Partnerships fade the lines between secondary and postsecondary and between technical and academic. With the growth of dual credit in its various forms, perceptions may also have changed, given the greater number and broader diversity of those enrolling in and completing programs.

Broadening college access puts more students in reach of postsecondary work. Academic self-efficacy is a measure of students' thoughts about their ability or aptitude, of how they see

themselves relative to their academic work. College academic self-efficacy is a means to consider whether students consider themselves to be college capable.

A significant body of research exists, analyzing qualitative and quantitative results of dual credit entry and completion. Research has considered dual credit connection to postsecondary readiness, credit, continuation, persistence, and degree completion. Research has included the impact of dual credit on postsecondary access of underserved populations, including ethnic minorities, low-income, and first-generation college students. Gaps remain in dual credit research, including the need to apply specific studies to various regions in the country, given the differences in models and population demographics. Research is limited in CTE dual credit programs, specifically in high school programs based on student perception.

CHAPTER THREE: METHODS

Overview

The purpose of this causal-comparative quantitative study was to examine current dual credit career technical education (CTE) students in the state of Vermont, to consider the impact of dual credit participation on their academic self-concept. This chapter presents the research question and hypothesis. The chapter also includes a description of the participants and setting, instrumentation, and procedures. Chapter Three concludes with a description of the data analysis.

Design

The researcher adopted a causal-comparative design to consider the impact of dual credit on academic self-concept of secondary CTE students. The researcher chose a causal-comparative design because the study did not manipulate the independent variable and was a study that considered the presence of a cause-and-effect relationship between the independent and dependent variables (Gall et al., 2007). The dependent variable was academic self-efficacy as measured by the Academic Self-Concept Survey (Reynolds et al., 1980). Self-efficacy is defined as “judgments of how well one can execute courses of action required to deal with prospective situations” (Bandura, 1982, p. 122). The independent variable was whether the student was enrolled in dual credit as a part of their CTE program.

Research Question

RQ: Is there a difference in academic self-concept between CTE students taking dual credit and CTE students not taking dual credit?

Null Hypothesis

H₀: There is no significant difference in academic self-concept between CTE students taking dual credit and CTE students not taking dual credit.

Participants and Setting

The population for this study was 11th- and 12th-grade students enrolled in dual credit CTE programs in six of the 17 CTE centers located in the state of Vermont. Vermont is a rural state, with the second lowest 2017 total state population of 623,657 (U.S. Census Bureau, 2018) and the lowest 2015 total state public school population of 87,866 including 12,849 in Grades 11 and 12 (U.S. Department of Education, 2017).

Act 77 of 2013 led to Vermont statute 16 V.S.A. § 941. Known as the Flexible Pathways initiative, the statute includes funding for up to six dual enrollment credits for Vermont students. While students access credits through high schools, CTE centers, and other secondary institutions, Act 77 specifically articulates the expectation of including CTE as a part of the flexible pathways offered by public schools.

As in other states, programs offered at CTE centers in Vermont vary by the regions that they serve. For example, there is only one Aviation and Aerospace program, which is located near Vermont's largest airport, while automotive, culinary arts, and medical fields are among those offered at 12 or more of the centers. In Vermont, CTE centers are separate from high schools, although many share a campus with a host high school. The centers serve all high schools in their assigned regions. Students may attend a CTE center outside of their region if their center does not offer their specific program of interest.

For this study, there were a total of 50 student participants, 36 enrolled in dual credit and 14 in non-dual credit programs, including 42 students in Grade 11, six students in Grade 12, and

two postgraduates. Participants included 14 low-income students, based on qualifying for free or reduced cost school meals, and 24 who had no immediate family members who had attended college. Programs of study with the highest number of respondents included medical-related and computer-related with 11 students each, followed by five students in cosmetology, four each in electrical, automotive and human services-related, and three in manufacturing-related.

Instrumentation

The researcher used Google Forms, a secure web-based survey tool. The demographic section of the web-based survey included questions for the general definition of participants along with questions specific to this study (see Appendix B). For example, current program enrollment and number of available dual enrollment credits were important to the analysis of results, along with adding to the integrity of the study. Following the demographics, students responded to a modified version of Reynolds et al.'s (1980) Academic Self-Concept Survey (ASCS; see Appendix C for permission to use and modify the survey). Self-concept is a broad construct. The purpose of using this instrument was to measure the academic aspect of self-concept. The instrument uses a 4-point Likert scale, from *strongly disagree* (1) to *strongly agree* (4) and was delivered using a secure web-based digital format. Eighteen of the 40 questions are reversed scored, from *strongly agree* (1) to *strongly disagree* (4). The total ASCS score ranges from a low of 40 to a high of 160, where a higher score indicates a higher academic self-concept. The survey-based instrument takes less than five minutes to complete. Strong reliability of the ASCS instrument was indicated by a Cronbach's coefficient alpha of .91 in its development (Reynolds, 1988). The researcher used a version as modified by Hamilton (2013) which adjusted the wording to apply to high school students, whereas the original instrument applied to college participants.

Procedures

The researcher began work with the Vermont Agency of Education's (VT-AOE) Deputy Secretary of Education and the Division Director for Personalization and Flexible Pathways, given Vermont Secretary of Education Rebecca Holcombe's recommendation for future analysis in her January 2018 dual enrollment programs report (Vermont Agency of Education, 2018). Initial discussion addressed clarifying Vermont's dual enrollment history and definitions, data gathering processes included in the Secretary's January 2018 report, and additional data sources needed. Further networking led to contacting the Career Pathways Coordinator, whose role includes the development, implementation, and communication of AOE research projects.

The resulting survey, with the written support of the VT-AOE, required approval by the directors of the participating CTE centers. The researcher presented the proposal to CTE Directors in January 2019 and secured written permission (see Appendix D). Information was sent for distribution to participants and parent permission secured prior to the survey window. The survey itself was conducted using Google Forms, a web-based tool, accessing features to assure the security of the data. The survey window of May and June 2019 was determined in consultation with CTE Directors following late April 2019 approval by the Liberty University Institutional Review Board (see Appendix A). To maximize participation, the survey remained open until the end of the school year of the majority of participating institutions.

Data Analysis

The purpose of this quantitative causal-comparative study was to examine current dual credit CTE students in the state of Vermont, to consider the possible impact of their dual credit participation on their academic self-concept. Study findings were based on the mean scores of

the survey data in total. The use of a Likert scale enables quantitative analysis of a survey-based study.

The researcher calculated mean scores of ASCS results between dual credit and non-dual credit participants to consider the impact of dual credit CTE participation on academic self-concept (RQ). Analysis used an independent samples *t*-test run at the 95% confidence level. The analysis compared dual credit CTE participation and academic self-concept. The choice to use an independent samples *t*-test was based on the samples being independent of each other, defined in a specific group (Warner, 2013, p. 190). The researcher screened the data for outliers using box-and-whisker plots. Normality was tested using the Shapiro-Wilk and Kolmogorov-Smirnov tests. Equality of variance was tested using the Levene's test. Effect size was measured using Eta squared. The researcher defined groups based on dual credit participation as self-reported by participants in the demographic portion of the survey. The researcher used the Statistical Program for the Social Sciences (SPSS Version 21 for Windows) for data analysis.

CHAPTER FOUR: FINDINGS

Overview

This quantitative study surveyed current career technical education (CTE) students measuring their academic self-concept using the Academic Self-Concept Scale (ASCS; Reynolds et al., 1980). An independent samples *t-test* was used to analyze results comparing dual credit CTE students with non-dual credit CTE students based on their ASCS responses. The choice of a *t-test* was based on the samples being independent of each other, defined in specific groups (Warner, 2013, p. 190). The researcher defined groups based on dual credit participation as self-reported by participants in the demographic portion of the survey. Chapter Four includes discussion of the descriptive statistics and assumption testing. It also presents the results for the null hypothesis.

Research Question

RQ: Is there a difference in academic self-concept between CTE students taking dual credit and CTE students not taking dual credit?

Null Hypothesis

H₀: There is no significant difference in academic self-concept between CTE students taking dual credit and CTE students not taking dual credit.

Descriptive Statistics

The convenience sample was drawn from currently enrolled students from six participating CTE centers in Vermont. There are 17 CTE centers in Vermont serving geographically-defined regions. Fifty students responded to the voluntary survey-based study. Thirty-six of the 50 respondents were in programs offering dual credit enrollment, including eight with up to three credits, 21 with four to six credits, and seven with more than six credits.

Among the 50 respondents, 84% were in Grade 12, and 12% were in Grade 11. Fifty-two percent of participants have immediate family members who had attended college, while 28% received free and reduced lunch, a measure indicating low household income as defined by the United States Department of Agriculture. The highest number of respondents, at 11 each, were students enrolled in medical-related and computer design-related programs. Others with three or more respondents included five cosmetology students, four students each in electrical-related and automotive-related programs, and three in engineering-related programs. Descriptive statistics drawn from the dependent variable Academic Self-Concept Score can be found in Table 1.

Table 1

Descriptive Statistics for Academic Self-Concept by Group: Test of Normality (N = 50)

Group	<i>n</i>	<i>M</i>	<i>SD</i>	<i>Std Error Mean</i>
Dual Credit	36	116.67	17.432	2.905
Non-Dual Credit	14	124.86	11.141	2.978

Results

Data Screening

CTE students taking dual credit who responded to the ASCS survey were scored based on the defined scoring criteria. All participants were verified by their schools as currently enrolled CTE students. The researcher examined each response and found no data irregularities. All responses included by the researcher contained complete data. box-and-whisker plots (see Figure 1) were used to identify outliers in each group. No outliers were found.

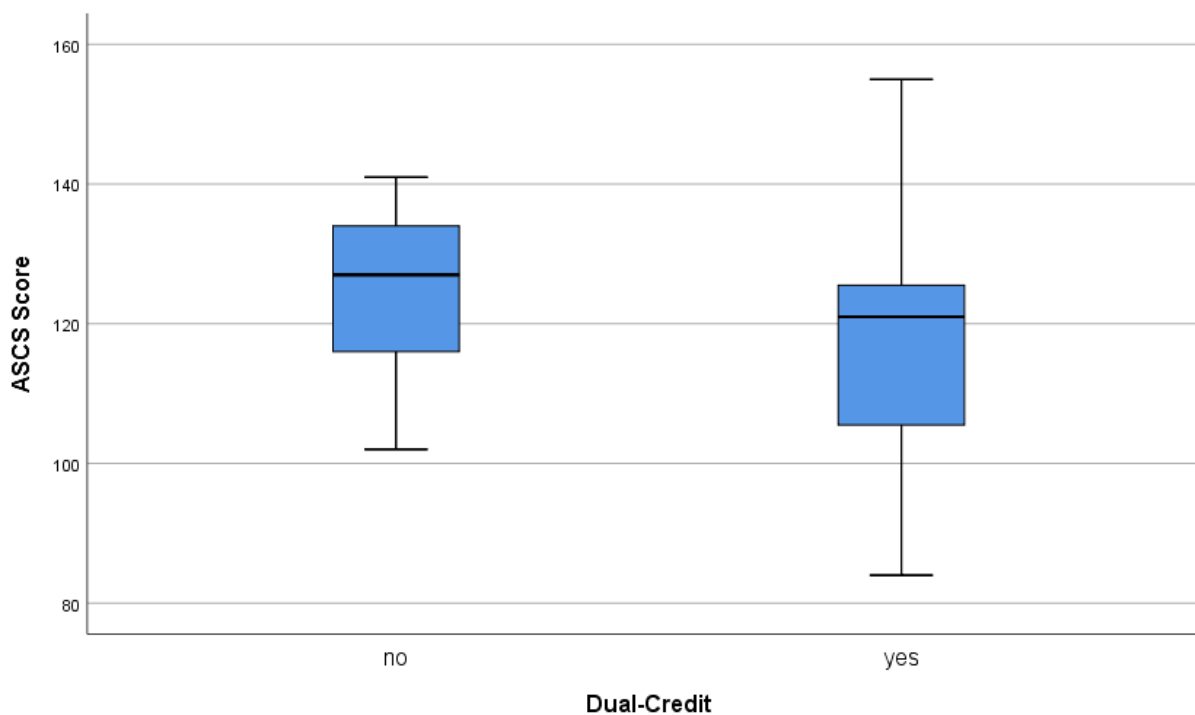


Figure 2. Box-and-whisker plot displaying normality of responses of two groups responding to the ASCS (Reynolds et al., 1980). Current CTE students taking dual credit and not taking dual credit are shown as yes and no, respectively.

Assumption Tests

The normality of data was assessed using both Shapiro-Wilk and Kolmogorov-Smirnov tests. Shapiro-Wilk test results indicated no violations of normality were found for the group taking dual credit ($p = .42$) and the group not taking dual credit ($p = .70$). Kolmogorov-Smirnov test results indicated no violations were found for the group taking dual credit ($p = .16$) and the group not taking dual credit ($p = .20$). See Table 2 for results of the Shapiro-Wilk test and Table 3 for Kolmogorov-Smirnov test of normality.

Table 2

Shapiro-Wilk Test (N = 50)

	Dual Credit	Statistic	<i>df</i>	Sig.
ASCS Score	No	0.959	14	0.699
	Yes	0.970	36	0.421

Table 3

Kolmogorov-Smirnov Test (N = 50)

	Dual Credit	Statistic	<i>df</i>	Sig.
ASCS Score	No	0.144	14	0.200*
	Yes	0.126	36	0.161

*This is a lower bound of the true significance. Lilliefors Significance Correction

Results of Levene's Test for Equality of Variances was ($p = .096$) indicating that equality of variances was met. See Table 4 for equal variance.

Table 4

Levene's Test for Equality of Variances

		<i>F</i>	Sig.
ASCS Score	Equal variances assumed	2.889	0.096

Results for Null Hypothesis

An independent t -test was used to test the null hypothesis regarding the difference in academic self-concept between students taking dual credit and students not taking dual credit in six secondary CTE schools in Vermont. Results of the independent t -test where $t(48) = -1.63$, $p = .11$, $\eta^2 = .052$ failed to show a significant difference in academic self-concept between CTE students taking dual credit and CTE students not taking dual credit. The effect size was medium. The null was not rejected at the 95% confidence level. The non-dual credit CTE group ($M =$

124.86, $SD = 11.14$) had higher academic self-concept scores than the dual credit CTE group ($M = 116.67$, $SD = 17.43$); however, the results were not significant. See Table 5 for the independent samples test.

Table 5

Independent Samples Test: t-Test for Equality of Means

<i>t</i>	<i>df</i>	sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of Difference	
					Lower	Upper
-1.628	48	0.11	-8.19	5.032	-18.307	1.926

CHAPTER FIVE: CONCLUSIONS

Overview

The purpose of this chapter is to discuss and summarize the findings of this quantitative study of career technical education (CTE) students in six schools in the state of Vermont. It also addresses the implications and limitations of the findings and offers recommendations for future research. Fifty students from six schools responded to the survey, including 34 enrolled in programs offering dual credit, and 16 enrolled in programs without dual credit.

Discussion

The purpose of this quantitative study was to examine data about dual credit CTE students in the state of Vermont, to consider the relationship between their dual credit participation and their academic self-concept. Discussion focuses on the research question, “Is there a difference in academic self-concept between CTE students taking dual credit and CTE students not taking dual credit?” Dual credit is continually expanding at a time when postsecondary degrees are highly valued and student debt has risen to crisis levels. Government and private industry has collaborated with secondary and postsecondary institutions to respond at local, regional, and state levels. Decades of dual credit history have resulted in widely varied approaches in governance, policies, capacity, and delivery models. Given the long history of dual credit, the body of existing research is extensive.

In the current study, the researcher surveyed CTE students in the state of Vermont, a rural state whose Agency of Education (AOE) is actively seeking to increase its body of data in multiple areas of public education. The Vermont Association of Career and Technical Education Directors expressed formal support of the study in January 2019. Following Liberty University Institutional Review Board approval in April 2019, eight of the 17 CTE centers gave local

approval. Six of those eight centers participated in the study. Results of the independent samples *t*-test failed to show a significant difference in academic self-concept between CTE students taking dual credit and CTE students not taking dual credit.

Past studies with a degree of connection to the current study varied in their results. In a descriptive study of Arkansas CTE students, Dougherty (2016b) found those who participated in dual enrollment as CTE concentrators were more likely to attend college right after high school than non-concentrators. As defined in Arkansas, concentrators are those focused within a specific program. Dougherty (2016b) clarified that the difference for all CTE was not measurably different than the general high school population, suggesting that the program concentration was a determining factor. The Dougherty (2016b) study overlaps with the current study by including CTE dual credit students. Both the Arkansas study and the current study included participants from communities differing in population densities. As a descriptive study using existing administrative data, the Dougherty (2016b) study was limited by the available data without the opportunity to connect to student self-concept.

A study of CTE students in Oregon and Florida (Kim, 2014) indicated a negative relationship between academic dual credit hours and total college credits earned by students in both states. The study relates to the current study in its focus on students enrolled in CTE. The Kim (2014) study differs from the current study as the students were high school graduates enrolled in community college and focuses on specific enrollment data without assessing student perception.

A study of 11th- and 12th-grade dual credit students (Mechur Karp, 2012) conducted semi-structured interviews of 26 students. Mechur Karp (2012) was interested in dual enrollment as a possible factor in postsecondary preparation. The study, which included

interviews with each student at the beginning, middle, and end of his or her dual credit semester, indicated a shift in student understanding of the role of a college student. Students at the end of their dual credit semester were better able to articulate what it means to be a college student. Mechur Karp also noted the amount of shift varied depending on the specific program experience. In the current study, the number of respondents varied by program of study. Both the current study and Mechur Karp's (2012) study examined 11th- and 12th-grade dual credit students with a self-assessment approach. However, participants in the Mechur Karp study participated in dual credit courses delivered on a community college campus, not through a CTE program on a secondary campus. The extent to which studies by Dougherty (2016b), Kim (2014), and Mechur Karp (2012) relate to the current study is limited given the lack of specific studies connecting academic self-concept with postsecondary data, such as initial enrollment, total credits earned, and understanding of the role of a college student.

Within the extensive body of dual credit research, there are limited secondary CTE studies and limited studies focusing on academic self-efficacy of dual credit students, minimizing the opportunity for detailed comparison between the current study and past research.

Implications

The failure to reject the null hypothesis implies that dual credit participation does not impact academic self-concept of secondary CTE students. Implications of the study may be more applicable for students in programs of study with the highest number of responses. Based on student responses to demographic questions, the specific program of study appeared to tie to the availability of student credit.

Other factors may cloud the differentiation between dual credit and non-dual credit CTE programs. Dual credit requirements integrate into the secondary curriculum to varying degrees.

Academic rigor may or may not relate to the presence of dual credit in CTE programs. Instructor backgrounds and academic strength vary, as do the socioeconomic mix of students, class size, and distance to postsecondary colleges and universities.

The current study can be a springboard to further dual credit CTE research in the state of Vermont. With the development of a State Longitudinal Data System, there will be an opportunity in the future to conduct similar studies that will be enhanced by the availability of relevant contextual and archival data. Work within the small Vermont CTE community through the current study builds connections for future work. In recent years Vermont has been working toward an education system that addresses a shrinking school-age population as well as personalized learning plans with flexible pathways for secondary completion (Vermont Statute 16 V.S.A. § 941). The educational shift includes a greater focus on CTE. The current study came at a time when the Vermont Agency of Education is seeking increased data in the areas of dual credit and CTE.

Limitations

The purpose of this survey-based quantitative study was to examine current dual credit CTE students in the state of Vermont, to consider the relationship between their dual credit participation and their academic self-concept. The timing of the study parallels Vermont AOE's efforts to create a Statewide Longitudinal Data System (SLDS). The lack of a fully implemented SLDS limits the contextual and archival data available for the current study. The low total number of responses limits the implications of the current study. The six participating schools were diverse in size and geography. However, the number of responses within each participating school may limit its predictability of future research. The limited number of programs of study represented may limit how the results apply to programs of study in Vermont with no

respondents. As a study of Vermont CTE students, the results are limited in relevance to other states, given varying populations, dual credit delivery models, and regulations.

Recommendation for Future Research

Changes continue in delivery models, policies, governance structures, and government level priorities relative to dual credit, expanding opportunity for future research. The following are recommendations for future research specific to dual credit delivered in secondary CTE programs.

1. The Vermont Agency of Education SLDS, when fully implemented, provides promise for future study, including research specific to dual credit. A study similar to the current study done in five or more years would have the SLDS historical data to expand on the findings. An increase in participating centers and individual participants could include group analysis between programs of study, grade levels, and gender.
2. Implementation models vary from state to state and region to region. Comparing academic self-concept of dual credit students between states may provide valuable data for participating states. Resulting data could be used to inform conversations between states to improve their practice and encourage collaboration.
3. Adding instruments to the survey would give a broader understanding of participating CTE students. For example, the study could add brief survey-based instruments measuring motivation and engagement.
4. CTE serves the dual purposes of preparing students for postsecondary education and careers. Another study of potential value could use an instrument or set of instruments that compare dual credit CTE students with non-dual credit students in the areas of academic self-efficacy and career readiness self-efficacy.

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APPENDIX A:**Liberty University IRB Permission****LIBERTY UNIVERSITY.**
INSTITUTIONAL REVIEW BOARD

May 8, 2019

Scott Griggs

IRB Approval 3694.050819: Academic Self-Concept of Dual Credit Career Technical Education Students: A Rural Statewide Correlational Study

Dear Scott Griggs,


We are pleased to inform you that your study has been approved by the Liberty University IRB. This approval is extended to you for one year from the date provided above with your protocol number. If data collection proceeds past one year or if you make changes in the methodology as it pertains to human subjects, you must submit an appropriate update form to the IRB. The forms for these cases were attached to your approval email.

Your study falls under the expedited review category (45 CFR 46.110), which is applicable to specific, minimal risk studies and minor changes to approved studies for the following reason(s):

Your study involves surveying or interviewing minors, or it involves observing the public behavior of minors, and you will participate in the activities being observed.

Thank you for your cooperation with the IRB, and we wish you well with your research project.

Sincerely,


G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
Research Ethics Office

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APPENDIX B:
Demographics Survey

Background:

- I currently attend (choose 1) – (participating CTE schools)
- What is your current high school grade level? (11th, 12th, Other ...)
- About where do you place yourself as compared to your peers in academic standing?
(Top 25%, Above Average, Below Average, Bottom 25%)
- Has anyone in your immediate family attended college? (yes, no)
- Are you currently receiving free or reduced lunch? (yes, no)
- In which career technical education program category are you currently participating?
(Choose the category that your current program most closely fits. If you are unsure, then choose “other” and enter the name of your current program)
(16 program categories, other)
- How many dual enrollment credits are available through your career technical education program (dual credits are college credits that may be earned as a part of your program)?
(My program does not have a dual credit option, up to 3 credits, 4-6 credits, more than 6 dual credits)
- How likely are you to earn all available credits for your program?
(Linear Scale: Highly Unlikely to Highly Likely)

APPENDIX C:**Permission to Use and Modify the ASCS**

William M Reynolds <william.reynolds@humboldt.edu>

Fri 12/21/2018, 12:14 PM

Griggs, Scott
Hello Scott,

My apology for the delay in responding to your request. Attached is the information you requested. You have my permission to use the ASCS. Also included is information on a new short form of the ASCS. You may also make minor changes to fit a high school sample if you wish. If you do use the short form, I would be grateful if you would share your results with me.

Let me know if you have any questions.

Good luck with your research.

Bill Reynolds



HUMBOLDT STATE UNIVERSITY

Department of Psychology

Dear Colleague:

Thank you for your interest in the *Academic Self-Concept Scale* (ASCS).

A copy of the ASCS is presented below. This form may be reproduced for use in **your** research. There is no charge for these materials and you may make as many copies as you need. However, I do ask that you do not disseminate copies of this scale to others. I also ask that you inform me if you decide to use the ASCS in your research.

I would appreciate receiving copies of any reports/research papers you prepare that use the ASCS. You will need to contact me for permission to modify the ASCS or translate the ASCS into another language.

To **score** the ASCS, reverse score the following items: 4, 5, 8, 11, 12, 14, 18, 19, 21, 22, 24, 26, 29, 30, 34, 38, 39, and 40, where, $SD=4$, $D=3$, $A=2$, $SA=1$. Sum the items, with a high score indicating a high or strong academic self-concept. To double check the scoring, it is advisable to enter the item data into the computer and run a reliability analysis checking the item-total scale correlations (all should be positive, with negative typically indicating an error in reverse scoring). For normative information you can compare your results with those reported in Reynolds (1988) "Measurement of academic self-concept in college students." *Journal of Personality Assessment*, 52, 223-240. I believe there have been other published studies using the ASCS although I do not have a list of these reports. You can also find a study by Zorich & Reynolds (1988, *Journal of Personality Assessment*, 52, 441-453) that used the ASCS.

If you have any questions please do not hesitate to contact me. I wish you well in your research endeavor.

Sincerely,

William M. Reynolds, Ph.D.
Professor
Department of Psychology
Humboldt State University
Arcata, California

William M Reynolds <william.reynolds@humboldt.edu>

Fri 12/21/2018, 12:14 PM

ASCS Permission Letter & Protocol.pdfASCS-SF.pdfASCS-SF WPA poster 4-2012.pdf

431 KB

410 KB

159 KB

Hello Scott,

My apology for the delay in responding to your request. Attached is the information you requested. You have my permission to use the ASCS. Also included is information on a new short form of the ASCS. You may also make minor changes to fit a high school sample if you wish. If you do use the short form, I would be grateful if you would share your results with me.

Let me know if you have any questions.

Good luck with your research.

Bill Reynolds

Griggs, Scott

Wed 12/19/2018, 12:39 PM

Good morning Dr. Reynolds,

In conversation with Chris Snyder in your department's office, I am discovering the high volume of emails that you are receiving along with the volume of papers you would be correcting at this time.

I appreciate how busy you are with the end of a semester last week, but also am hoping to get your approval of the use of the ASCS instrument prior to my early January proposal defense as described below.

Thank you for your consideration.

Best regards,

Scott

APPENDIX D:**Vermont Association of Career and Technical Education Directors Support****COLD HOLLOW CAREER CENTER**

184 Missisquoi Street
Enosburg Falls, VT 05450
Tele: (802) 933-4003 * Fax: (802) 933-2435

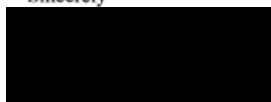
Institutional Review Board
Liberty University
Lynchburg, Virginia

To Whom it May Concern:

At the January 17, 2019 meeting of the Vermont Association of Career and Technical Education Directors (VACTED), Liberty University graduate student Scott Griggs presented his research proposal, *Academic Self-Concept of Dual Credit Career Technical Education Students: A Rural Statewide Correlational Study*.

This letter is to verify that VACTED supports Scott Griggs pursuing this student survey-based study through our member schools. Permission to conduct the research is a district-level decision. We directed that he connects with our individual directors as the next step in the permission process.

Sincerely



Nate Demar
CHCC Director
President of VACTED