COMPARING THE SELF-EFFICACY OF DUAL ENROLLMENT STUDENTS TAKING CLASSES AT THE HIGH SCHOOL, AT THE COLLEGE, AND ONLINE

by

Tyler Lewis Wallace

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

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ABSTRACT

This quantitative causal comparative study investigated how the modality of course content delivery impacts the self-efficacy of dual enrollment students. The problem was that it is unclear how the benefits of dual enrollment impact different student groups based on the location of the course. The purpose was to verify existing research linking higher college self-efficacy with participation in dual enrollment programs and to provide an initial understanding of how the benefit of higher levels of self-efficacy regarding college performance is distributed between students who take their dual enrollment courses in various modalities. Using the College Academic Self-Efficacy Scale (CASES), data was collected from a sample of 178 dual enrollment students across the state of Washington and a one-way ANOVA with four groups at the alpha < .05 level found the only significant difference between the groups was students taking classes at the high school reported higher levels of self-efficacy than students at the college. In addition, 235 traditional college students were surveyed to compare with the 178 dual enrollment students to determine how self-efficacy scores differed between the two groups. A *t*-test with independent groups at the alpha < .05 level found no significant difference, contradicting the majority of the research in the literature. Further discussion concluded that higher self-efficacy scores for students taking dual enrollment at the high school, rather than the college, may be a result of how self-efficacy is formed. Implications of the research for stakeholders along with study limitations and recommendations for future research are addressed.

Keywords: Dual enrollment, dual credit, self-efficacy, online, residential

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College Academic Self-Efficacy Scale (CASES)

College in the High School (CHS)

High Schoolers in the College (HSC)

Online (OL)

Washington State Board of Community and Technical Colleges (SBCTC)

CHAPTER ONE: INTRODUCTION

Overview

Dual enrollment programs have offered high school students the opportunity to earn college credits while simultaneously working to complete high school graduation since the 1950s (Taylor, 2015). Research into these programs began as early as 1962 (Jones & Baxter). Even with over 55 years of research, the issue has not yet been fully brought to a close. The present study addressed a gap in the literature by comparing dual enrollment students who take their classes at the high school, at the college, at both the high school and college, and online on the variable of self-efficacy. This chapter provides an overview of the study including a background, problem and purpose statements, significance of the study for stakeholders in light of the literature, and the research questions. The chapter concludes by defining special terms used in the present study.

Background

Dual enrollment programs offer high school students the opportunity to earn high school credit and college credit simultaneously (Kim, 2014). Some programs allow students to graduate with a completed associate's degree from a community college at the same time the student graduates from high school. These dual enrollment programs are increasing in popularity across the nation, and with this increase in popularity, there has been a call for more research into the benefits of such programs and the best practices of dual enrollment pedagogy (Pretlow & Wathington, 2014; Tinberg & Nadeau, 2013).

In recent years, numerous studies have found multiple benefits that are correlated with dual enrollment participation when compared to traditional high school and college students. These benefits include dual enrollment students showing increased performance (Pyzdrowski,

Butler, Walker, Pyzdraowski, & Mays, 2011; Taylor, 2015), college readiness (An & Taylor, 2015; Kim, 2014), college enrollment (Cowan & Goldhaber, 2015; Wang, Chang, Phelps, & Washbon, 2015), retention (Giani, Alexander & Reyes, 2014), degree completion (An, 2012), and college self-efficacy (Boazman & Sayler, 2011). In addition, dual enrollment students have the potential to reduce the achievement gap based on race and socio-economic status (An, 2013; Perna et al., 2015; Taylor, 2015). Karp (2012) and Ozmun (2013) developed pre/post-test research studies which suggested a cause and effect relationship between participation in dual enrollment programs and increased self-efficacy. Each of these studies focused on comparing dual enrollment students to traditional students. More research is still needed which disaggregates the dual enrollment students into subgroups based on the location of the class: in the high school, in the college, or online to determine if the benefits are equally spread out through the population or if they are concentrated in one area (Ozmun, 2013). For the purposes of this paper, modality of instruction will be defined as the location of dual credit course delivery: online, on a college campus, on a high school campus, or a blend of high school and college campuses.

There are several models of dual enrollment programs available to students. One common model is College in the High School where students take a course on their high school campus that allows them to earn college credit (Barnett, Maclutsky, & Wagonlander, 2015). The instructor may be a college professor or a high school teacher who has extra credentials to teach the course (Taylor, Borden, & Park 2015). A second model, one that is popular in the state of Washington and other parts of the country, is where high school students travel to a local college to take college courses along with traditional college students (Cowan & Goldhaber, 2015). Across the country, this model is called High Schoolers in the College. In the state of

Washington, it is known as Running Start. This opportunity provides the students with a true college experience. A newer model for delivering dual enrollment instruction that has not received much attention in the literature is online courses (Barnett et al., 2015; Zalaznick, 2015). These full college courses are available to students in their high schools or from anywhere in the world with an internet connection.

Dual enrollment programs are not a recent phenomenon. According to Taylor (2015), the first dual enrollment program began in some states and localities as early as the 1950s. Research on their benefits goes back as early as 1962 in a study by Jones and Baxter which considered the grades of students concurrently enrolled in both high school and college. Twenty years later, in the 1980s, state legislatures began to pass laws promoting programs in their states (Pretlow & Wathington, 2014; Taylor et al., 2015). By the 1990s, dual credit was becoming more common and in the years since then, dual enrollment programs have grown to over two million participants (Giani et al., 2014; Perna et al., 2015) out of a potential 21.2 million high school students nationwide in public or private institutions (U.S. Department of Education, National Center for Education Statistics, 2015). However, the research in recent years on the benefits of such programs often lacks a theoretical framework and does not account for self-selection bias (Boazman & Sayler, 2011; Giani et al., 2014; Wang et al., 2015).

The issue of dual enrollment impacts many different stakeholders in education. According to a study by Tinberg and Nadeau (2013), over 70% of high schools, over half of post-secondary institutions, and over 98% of community colleges participate in dual enrollment programs. With the growth in popularity, many programs, which started as local partnerships, are now controlled by state oversight and regulation. At least 37 state legislatures have passed laws around dual enrollment programs (Taylor et al., 2015). With stakeholders including high

school instructors, staff, and students; college instructors and staff; and members of state legislatures, students, and families, there is a need to better understand how the benefits of dual enrollment programs impact students. Owen and Froman (1988) emphasized the importance of studying self-efficacy of new college students as those with low academic self-efficacy may be at risk of dropping out of college or being put on academic probation. These students should be targeted for academic counseling and student support services. Ozmun (2013) proposed that student self-efficacy is a significant factor in the benefits of dual enrollment and called for further investigation into how different modalities of instruction impact the self-efficacy benefit. The question that needs to be answered is whether this self-efficacy benefit is concentrated in one delivery modality or if it is equally spread out between the different modalities.

The conceptual framework which supports and frames the current study is Bandura's (1986) social cognitive theory which focuses on a student's self-efficacy or belief that the student can be successful at various tasks. Self-efficacy is present in different contexts, and therefore must be measured in a specific context, such as college success (Betz & Hackett, 2006). According to Bandura (1997), self-efficacy is developed from four primary sources: personal accomplishments, vicarious experiences, verbal persuasion, and psychological states. Each of these factors are impacted by participation in dual enrollment programs, especially personal accomplishments which has the greatest impact on increasing self-efficacy (Bandura, 1986). If a student is able to successfully complete a college course while still in high school, it should positively impact the student's view of how successful he or she can be in college. The present study sought to determine if the impact of dual enrollment on college self-efficacy is concentrated in one modality or shared between several or all modalities.

It has been shown that academic self-efficacy is a significant predictor of a student's potential for academic success (Gore, 2006; Walker, Green, & Mansell, 2005). Understanding how different modalities of instruction impact student self-efficacy and predicting future academic success can help practitioners in the planning of dual enrollment opportunities and support.

Problem Statement

The literature has exhaustively compared dual enrollment students to traditional high school and college students (An, 2012; An, 2013; Boazman & Sayler, 2011; Brunch & Frank, 2011; Cowan & Goldhaber, 2015; Giani et al., 2014; Kim, 2014; Ozmun, 2013; Pyzdrowski et al., 2011; Smith, Fischetti, Fort, Gurley, & Kelly, 2012; Taylor, 2015; Tinberg & Nadeau, 2013; Wang et al., 2015). However, even with this extensive research, there is not enough research available to bring the issue completely to closure, including several opportunities to expand on the current knowledge of dual enrollment students such as comparing different program formats based on the location of the class: in the high school, in the college, a blend of both high school and college courses, or online.

Studies by An (2013) and Giani et al. (2014) called for further research which would consider how the benefits of dual enrollment are impacted by the modality of instruction such as face-to-face or online. Ozmun (2013) called for studies focusing on self-efficacy and how online instruction or face-to-face instruction may impact the self-efficacy benefits. Another unanswered question focuses on how the location of the face-to-face course, at the college, at the high school, or split between both, impacts college self-efficacy. If self-efficacy is dependent on the context where it is measured (Betz & Hackett, 2006), then this remains an important question that is not answered in the literature.

In addition to calls for research that disaggregates dual enrollment students by modality of instructional delivery, the literature also calls for studies on high school students in online programs (Corry & Stella, 2012; Simonson, Smaldino, Alright & Zvacek, 2012). One study (Bozkurt et al., 2015) lamented the fact that research on the benefits of online programs is disproportionately focused on college students. With the increase in high school students taking online courses, there is a need for research to consider how these students respond to the online instruction.

The problem is that while the literature clearly supports the claim that dual enrollment students have higher levels of self-efficacy than traditional students (Boazman & Sayler, 2011; Karp, 2012; Ozmun, 2013), it is unclear how the benefits of dual enrollment impact students who take courses face-to-face at the high school, face-to-face at the college, shared between the high school and the college, or through an online program.

Purpose Statement

The purpose of this quantitative causal-comparative research study was to confirm or contradict existing research (An & Taylor, 2015; Boazman & Sayler, 2011; Karp, 2012; Ozmun, 2013) which links higher college self-efficacy with participation in dual enrollment programs and to provide an initial understanding of how the benefit of a higher level of self-efficacy regarding college performance is distributed between students who take their dual enrollment courses in various modalities. This was accomplished by investigating the difference in mean levels of self-efficacy based on the type of student and the modality of instruction.

To confirm or contradict existing research on self-efficacy of dual enrollment students, the interval dependent variable of mean college self-efficacy score was measured for the two nominal categories on the independent variable of student type. The first type of students was

the traditional college student or a student who had previously graduated from high school and is currently taking college courses exclusively for a college degree (Wang et al., 2015). The second category of student was dual enrollment students which are defined by Stephenson (2015) as participants in a program which allows high school students to take courses for both high school and college credit simultaneously. This comparison is consistent with research by An and Taylor (2015), Boazman and Sayler (2011), Karp (2012), and Ozmun (2013). Confirming or contradicting existing research will strengthen any conclusions that can be made about the relationship between course modality and dual enrollment self-efficacy differences.

To gain an initial understanding of the relationship between course format or location and dual enrollment self-efficacy, the interval dependent variable of mean college self-efficacy score was measured for each of the nominal categories on the independent variable of course modality. The first modality that was considered in this study was college in the high school, where high school students earn college credit on the high school campus through a traditional high school course (Barnett et al., 2015). The course may be taught by a college professor or a high school instructor. These programs are often taught through local partnerships between high schools and post-secondary institutions (Taylor et al., 2015). The second modality that was considered in this study was high schoolers in the college. In this model, high school students travel to a local college or university and take college courses alongside traditional college students following the college calendar (Alfeld & Bhattacharya, 2012). The third modality considered in this study was students who split their dual enrollment courses between college in the high school and high schoolers in the college. The fourth modality was online instruction where students take a college course and can access it from either their high school or any location with an internet connection (Barnett et al., 2015; Zalaznick, 2015).

The population chosen to gain an initial understanding of the relationship between course format and dual enrollment self-efficacy was dual enrollment students in the state of Washington participating in either college in the high school, high schoolers in college (known as Running Start in Washington state), or online dual enrollment courses. The state is made up of 34 community and technical colleges, eight of which were asked to participate in the current study, and three agreed. According to the State Board of Community and Technical Colleges (SBCTC, 2016), during the 2014-2015 school year there were 26,410 dual enrollment students in the state of Washington. Those students enrolled in various types of dual enrollment, 4814 enrollments were in college in the high school programs, 21,090 enrollments were in high schoolers in the college programs, and 11,601 enrollments were in online courses (SBCTC, 2016).

Significance of the Study

This study extended on previous research concerning self-efficacy of dual enrollment students. Two studies (An & Taylor, 2015; Boazman & Sayler, 2011) found higher levels of self-efficacy for dual enrollment students than their traditional peers. An and Taylor (2015) identified self-efficacy as an essential element for college readiness. Boazman and Sayler (2011) found that students in dual enrollment programs not only had higher self-efficacy levels, but were also more satisfied with their lives. The present study attempted to confirm the results of these research studies and addressed the call from both researchers to investigate if this self-efficacy benefit was equally distributed among different dual enrollment modalities.

Many studies do not account for self-selection bias (An, 2012; Giani et al., 2014). In response, recent research designs have begun to address this issue and make the case that the increase in college self-efficacy is an actual cause-and-effect relationship with dual enrollment programs, and not a result of self-selection bias. Ozmun (2013) found that students entering dual

enrollment programs did not express higher levels of self-efficacy. Karp (2012) found similar results when dual enrollment self-efficacy was measured at the start of the semester and the end of the semester. The conclusion of the study was that while students did not begin with higher levels at the start of the semester, by the end of the semester the dual enrollment students were expressing increased self-efficacy. These studies imply that the self-efficacy benefit of dual enrollment programs occurs during the first term of study while excluding the possibility of a self-selection bias.

In a quantitative study by Scheffel, McLemore, and Lowe (2015), students' interviews revealed a similar theme. After taking dual enrollment courses they could see the benefits in their lives in areas around self-efficacy, such as believing they knew what tasks were required to be successful in college and that they were able to complete those tasks. The present study has built on this body of research to address the question proposed by Ozmun (2013) and Giani et al. (2014) concerning how disaggregating the data by course delivery modality or location would reveal if this growth in self-efficacy is equally distributed among the various subgroups of dual enrollment students or concentrated in one area.

In another qualitative study, Enyart (2011) learned that dual enrollment students who took courses online were excited about the opportunity for increased access to college coursework. Additionally, students described how the course helped them learn the level of effort required to be successful in college. Students in a study by Rapposelli (2012) expressed online courses helped them feel comfortable and competent using college resources such as online learning management systems. These qualitative studies need to be followed up with quantitative investigation to understand the extent of the impact online classes have on variables such as self-efficacy as compared to traditional, face-to-face courses.

Research Questions

RQ1: Is there a difference among the mean self-efficacy scores of dual enrollment students and traditional college students, as measured on the College Academic Self-Efficacy Scale (CASES)?

RQ2: Is there a difference among mean the self-efficacy scores of dual enrollment students who take their courses face-to-face at a high school, face-to-face at a college, a blend between high school and college, or in an online environment?

Definitions

1. *College in the high school* - College in the high school is a type of dual enrollment program where students take a course on their high school campus that allows them to simultaneously earn college credit (Barnett et al., 2015)
2. *College self-efficacy* - College self-efficacy is a student's confidence in his or her ability to successfully perform college tasks (Solberg et al., 1998).
3. *Common course* - A common course is a course offered by one of the 34 community or technical colleges of Washington State in which the official catalog description is similar enough to be accepted as equivalent at a receiving community or technical college for transfer purposes (SBCTC, 2009).
4. *Dual enrollment* - Dual enrollment is a program which allows high school students to take courses for both high school and college credit simultaneously (Stephenson, 2015).
5. *Hidden curriculum* - Hidden curriculum is the unwritten rules of college describing how students can successfully navigate the college system. This "curriculum" includes items such as where to find support in the face of academic obstacles, how financial aid works,

the advantages of working closely with an academic advisor, and how to appropriately engage with faculty (Booth et al., 2013).

6. *High schoolers in the college* - High schoolers in the college is a type of dual enrollment program where high school students travel to a local college to take college courses along with traditional college students (Cowan & Goldhaber, 2015).
7. *Modality of instruction* - Modality of instruction is the location of course delivery: online, on a college campus, or on a high school campus (Ozmun, 2013).
8. *Running Start* - Running Start is Washington State's dual enrollment program where high school students (16-18 years old) attend a local community college. The program offers tuition-free courses to students, allowing them to earn a full associate's degree while still in high school completing their high school graduation requirements (Cowan & Goldhaber, 2015).
9. *Self-efficacy* - Self efficacy is "a belief in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p. 3)
10. *Traditional college student* - A traditional college student is a student who has graduated from high school and is taking college courses exclusively for a college degree but is not a dual enrollment student (Wang et al., 2015).

CHAPTER TWO: LITERATURE REVIEW

Overview

Dual enrollment programs allow high school students to take courses for both high school and college credit simultaneously (Stephenson, 2015). This review of the literature will begin with an analysis of a theoretical framework for investigating the self-efficacy of students. Next, a general analysis of dual enrollment programs is presented. This analysis will include the benefits and drawbacks of dual enrollment, a comparison of dual enrollment in the high school and in the college, a comparison of online and face-to-face instruction, an analysis of research related to high school students in online coursework, and an analysis of self-efficacy as it relates to dual enrollment. Finally, a summary will be presented which identifies remaining gaps in the literature which justify the current study in light of the purpose to provide an initial understanding of how the benefit of a higher level of self-efficacy regarding college performance is distributed between students who take their dual enrollment courses in various modalities.

Theoretical Framework

Social Cognitive Theory

Bandura's (1997) social cognitive theory is the primary theory of this study. The same theory framed the development of the instrument used in this study. According to Bandura (1997), human behavior is influenced by many factors, external and internal to the self, which means people are contributors to, rather than the sole determiners or sole products of, what happens to them. According to social cognitive theory, people are self-organizing, proactive, and self-regulating agents of their own lives (Bandura, Barbaranelli, Caprara, & Pastorelli, 2001). In the development of this theory, Bandura became interested in what would lead individuals to build resilience to adverse experiences. This interest led to the discovery of self-

efficacy (Bandura, 2004). Since this discovery, self-efficacy has become a key component of social cognitive theory (Bandura et al., 2001).

This analysis of self-efficacy and its role in social cognitive theory will begin with an overview of self-efficacy, what it is, and what it is not. Next, there will be an investigation into the sources of self-efficacy and the impact self-efficacy beliefs have on the individual. Finally, the theoretical framework will conclude with an analysis of the impact self-efficacy has on students and the educational environment.

Self-Efficacy

Bandura (1997) defined self-efficacy as "a belief in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). Variations of this definition can be found throughout the literature. In general, self-efficacy is described as a person's belief in their capability or effectiveness to produce a given result, perform a certain task, or produce a desired level of performance (Bandura, 1994; Bandura, 2006b; Zimmerman & Cleary, 2006). This belief has significant impact on people's lives. It impacts their aspirations, personal goals, dedication to those goals, level of motivation, quality of analytic thinking, amount of effort put into chosen endeavors, the course of actions chosen, how much and how long they persevere in the face of adversity, their resilience in the face of obstacles, and their ability to overcome challenges in order to succeed (Bandura, 1994; Bandura, 2006b; Bandura, Barbaranelli, Caprara, & Pastorelli, 1996). In summary, whether they are accurate or not, people's self-efficacy will influence their choice of activities and ultimately contribute to performance accomplishments (Bandura, 1982; Bandura, 2004).

In 2004, Bandura wrote on an experiment which lead to the development of the theory of self-efficacy. Bandura observed that people with a phobia of dogs could make great progress in

overcoming their fears, but then if a negative experience occurred it could quickly reinstate the phobia. To investigate the impact of past experiences on future expectations, Bandura provided a group of former snake phobics with self-directed performance accomplishments with different types of snakes and a control group was not given these experiences. He discovered those with the positive performance accomplishments were more likely to maintain their therapeutic gains and became more confident in other areas of their lives as well. This study lead to the development of his theory of self-efficacy and its impact on motivation, self-regulation, and goal-setting (Bandura, 1993; Bandura, 1994; Bandura, 1997; Bandura, 2004).

Performance accomplishments, also referred to as mastery learning, became a foundation to Bandura's theory as he hypothesized that early success or failure within a specific domain would have a significant impact on long term beliefs (Bandura, 1977; Bandura, 1994). Bandura (1997) concluded that these performance accomplishments and higher self-efficacy beliefs would result in strong student self-regulation of learning. Self-regulation is defined in a three-step process: monitoring personal behavior, considering how behavior is determined, and the effects of one's behavior. Self-efficacy plays a central role in each step, especially due to its impact on thought, motivation, and action (Bandura, 1991). Zimmerman (2000) agreed; Zimmeran concluded that students with higher levels of self-efficacy are more likely to set higher goals for themselves, monitor their own progress towards those goals, implement successful learning strategies, and ultimately produce higher academic achievement. In a meta-analysis of nine studies, Bandura and Locke (2003) concluded that high levels of self-efficacy and personal goals enhance a student's motivation and ability to achieve one's goals.

The research on self-efficacy has resulted in it being misused or misrepresented in several different ways. First, self-efficacy theory has incorrectly been accused of stating that people can

accomplish tasks beyond their ability simply by believing they can. This is not accurate; rather, it states that there is a harmony between self-belief and the skills required to be successful (Pajares, 2006). A second error is to assume that self-efficacy is a single global trait. While self-efficacy beliefs touch every aspect of a person's life, it is linked to specific domains of functioning (Bandura, 2006b; Pajares, 2006). For example, a person could have a high level of self-efficacy when changing the oil in their car, but a low level of self-efficacy when solving a crossword puzzle. Third, self-efficacy is not the same as self-esteem. Bandura (2006b) clearly made this distinction, describing self-efficacy as a judgement of capability and self-esteem as a judgment of self-worth. According to Bandura (1997), there is no connection between the two. While self-efficacy is a belief about what a person can do, it is not a judgment about one's actual physical capabilities (Zimmerman & Cleary, 2006). For example, a person could feel very good about themselves, yet believe they are incapable of rock climbing. However, while the two are not the same, Hajloo (2014) suggested that the two are related as self-efficacy levels can predict self-esteem levels; however, the reverse does not appear to be true. This conclusion is in direct contrast to Bandura's (1997) statement that there is no connection between the two. The resolution to this conflict may be found in the definition of self-esteem as an overarching trait of a person's outlook on life, while self-efficacy is focused in a specific domain of functioning, such as belief in one's ability to be successful in the college environment or at rock climbing (Bandura et al., 1996; Bandura, 1997).

Sources of self-efficacy. Self-efficacy is derived from four primary sources: performance accomplishments, vicarious experiences, verbal persuasions, and physiological states (Bandura, 1977; Zimmerman & Cleary, 2006). The first source, performance accomplishments, is the most influential of the four, as it is based on personal successes and

failures (Lent, Brown, Gover, & Nijer, 1996; Zimmerman & Cleary, 2006). Self-efficacy and personal accomplishments can become cyclic with higher levels of self-efficacy resulting in successful performances, which in turn will lead to higher levels of self-efficacy in a given domain (Bandura, 1997; Bandura, 1982). Some types of performance accomplishments seem to have a greater impact on self-efficacy. Failure which occurs early or severely can greatly undermine self-efficacy (Bandura, 1977; Bandura, 1994). In addition, easy success followed by a single failure can quickly discourage an individual and reduce their level of self-efficacy (Bandura, 1997; Bandura, 2004). Conversely, personal successes in one area can quickly transform and improve the self-efficacy beliefs of an individual (Bandura, 1997). Bandura (1977) observed the advantages of using performance accomplishments in psychological treatment around the area of phobias. Individuals with phobias of snakes were provided with several positive experiences around snakes. After the experiences, their phobia behaviors decreased as a result of the increase in self-efficacy based on the positive performance accomplishments.

Bandura (1977) defined vicarious experiences as seeing others succeed or fail in performing a task, especially in the face of threatening challenges, and responding with a personal belief that the observer can also achieve a similar level of success. The person modeling the behavior can have a significant influence on the impact made on personal self-efficacy. Bandura (1977) described a study in which individuals were asked to perform a task that the individual viewed as dangerous. Once the individuals observed a variety of other people complete the task, they were less likely to view the task as dangerous and were more willing to attempt the task themselves. The greater the similarity between the individual and the model the greater the impact will be on the individual's self-efficacy (Bandura, 1994; Bandura, 1997;

Bandura, 2004). In addition, vicarious experiences can be used to compare ability to determine if one's performance is adequate, superior, or sub-par (Bandura, 1997). Zimmerman and Cleary (2006), in discussing this second source of self-efficacy, noted that while vicarious experiences can be influential on self-efficacy, because the experience is not personal it is not nearly as impactful as performance accomplishments.

The last two sources are important, but still less impactful (Zimmerman & Cleary, 2006). Verbal persuasion is when a suggestion or encouragement is offered to the individual to overcome challenges that have been difficult in the past (Bandura, 1977). To expand on this topic, Bandura (2004) stated that with social persuasion the individual will be more likely to persist when faced with challenges and personal self-doubts and therefore, exert more effort to be successful. Bandura (1977) conducted psychological studies where he told patients they would benefit from a treatment to investigate the impact of this verbal persuasion on self-efficacy. It was concluded that while the suggestion may have helped, prior experiences with similar treatments made a more significant impact.

The final source, physiological state, is an acknowledgement that anxiety, stress, vulnerability, tension, or depression can all negatively impact self-efficacy and people's belief that they can succeed in a particular domain (Bandura, 1977; Bandura, 2004; Zimmerman & Cleary, 2006). People often read their ability to be successful in stressful or taxing situations. These situations can increase feelings of vulnerability and can reduce the confidence a person has in his or her ability to be successful at a task (Bandura, 1997). Bandura (1997) noted that physiological states are not limited to just stressful situations, but bodily status such as fatigue, aches, and pains can also impact people's judgement of ability. Bandura (1977) tested this source in a group of phobic individuals by leading them to believe their anxiety was caused by

another external, nonemotional source. It was concluded that it is possible to reduce mild fears by this means, but the reductions in fear were short-lived and unreliable.

The four sources of self-efficacy work together in various weights and combinations, depending on the domain a particular task falls in, to determine an individual's overall sense of self-efficacy (Bandura, 1997). Some studies have considered if there could be fewer than or more than four significant factors influencing self-efficacy. Lent, Lopez, Brown, and Gore (1996) compared a two-, three-, four-, and five-factor model of self-efficacy sources. They found Bandura's model was best for college students, but high school students reflected a five-factor model which split vicarious learning into two categories: peers/friends and adults/teachers/parents. This may suggest that as students transition into adulthood, the difference between peer and adult influences begins to blur into a single factor. In a second study, Lent et al. (1996) considered as many as nine different potential sources of self-efficacy. Agreeing with Bandura, they found personal performance was the key influencer of self-efficacy and suggested that, especially in adulthood, all the other factors may not contribute significantly to efficacy levels.

Impact of self-efficacy. Bandura, in several studies (1993, 1994, 1997, 2004), described the impact of self-efficacy through four major processes: cognitive, motivation, affective, and selection. Cognitive processes impact personal goal setting and commitment to those goals. Those with high levels of self-efficacy visualize success scenarios and set their goals accordingly, often reaching for more challenging aims, viewing obstacles as something they can overcome. When individuals set higher goals for themselves, self-efficacy influences performance accomplishments both directly and indirectly (Zimmerman & Bandura, 1994; Zimmerman, Bandura, & Martinez-Pons, 1992). Those with lower levels of self-efficacy

visualize failure scenarios and what elements could go wrong, and they set lower goals resulting in lower outcomes. Motivation levels are clearly impacted by self-efficacy by determining the amount of persistence people will exert based on the expectation that they will achieve their goals. Affective processes are impacted by self-efficacy because people will make decisions based on their perception of control over stressors and their perceived ability to manage those stressors. Tasks will either cause individuals to experience stress over the task or to experience confidence that they can overcome disturbing thought patterns. Selection processes are impacted by self-efficacy as people will naturally choose activities and environments where they feel they are competent and are within their capability. This selection process will contribute to the acquisition of knowledge and development of some skills over others.

People are more likely to act if they believe they have control over the outcome; without this belief it is unlikely they will act or persevere through challenges (Bandura, 1997; Bandura, 2004). Pajares (2006) and Bandura (2006a) both considered people with low self-efficacy. They expressed that such individuals are unlikely to act or persevere in the face of the difficulties or challenges that will inevitably arise. In fact, Bandura (2004) stated that people with low self-efficacy are quickly convinced that any efforts to overcome obstacles are futile. This is contrasted with a group of people who have high levels of self-efficacy. They are more likely to persist through difficulties and failures, viewing them as challenges to be mastered, and expand more effort to succeed (Bandura, 1982, 1997; Zimmerman & Bandura, 1994; Zimmerman & Cleary, 2006). The impact of self-efficacy on the two groups is contrasted even further by Bandura (1994) when he found that individuals with high levels of self-efficacy attribute failure to lack of effort while those with low levels of self-efficacy attribute failure to low ability. This distinction is similar to Heider's (1958) attribution theory as students with high levels of self-

efficacy within a particular domain of functioning, such as college success, believe their success is internal, or within their control, as it is based on the effort put forward. In contrast, students with low self-efficacy are likely to claim their failure is external or situational and not within their control.

It is important to note that levels of self-efficacy are not static, but rather dynamic. With experience, individuals can increase their ability to predict and manage potential threats which will allow them to have confidence to master future challenges (Bandura, 1982).

Self-efficacy and student performance. Zimmerman and Cleary (2006) found self-efficacy to have a direct effect on academic performance, even more than actual ability. High levels of self-efficacy have been shown to increase scholastic achievement and academic aspirations (Bandura et al., 1996). This increase in performance for students is likely a result of the impact of self-efficacy on personal goal setting, engagement, and level of commitment in the face of obstacles (Zimmerman & Bandura, 1994; Zimmerman & Cleary, 2006). This was indicated in a study by Bandura (1997), which found students with higher levels of self-efficacy beliefs would pursue greater academic challenges and exhibit greater intrinsic motivation in their education. This motivation helps students when faced with academic and social obstacles (Pajares & Zelden, 1999; Tezer, 2015). Pajares (2006) clearly stated the advantage students with high self-efficacy have over their peers: they work harder, persist longer, and persevere in the face of challenges while having greater optimism and lower anxiety. Barrows, Dunn, and Lloyd (2015) found a similar result; in their study they discovered that higher levels of self-efficacy are correlated with lower levels of anxiety.

Bandura et al. (2001) investigated the impact of self-efficacy on students' career goals. The study tested 272 students and considered variables such as individual self-efficacy, gender,

family socioeconomic status, and academic ability. It was concluded that the children's self-efficacy was more influential on career goals than any of the other variables, though gender did play a role in the children's goals as well. A similar study of Bandura's in 1992 included 116 ninth and tenth grade students. While this study also concluded that the student's personal perceived self-efficacy had the greatest impact on student goals and achievements, parent goals were also a strong influence, suggesting the importance of verbal persuasion on self-efficacy is particularly important for younger individuals.

In considering student and academic self-efficacy, an interesting finding is that there is a progressive decline in self-efficacy from elementary school to junior and senior high school (Caprara et al., 2008; Tezer, 2015; Usher & Pajares, 2008). This is likely a result of the new experiences at each stage in life. In a new school structure, students will have to reestablish their sense of self-efficacy as they move from the personalized school environment to the impersonal college preparatory track (Bandura, 1997, 2006a). While there may be a temporary reduction in self-efficacy at each stage of life, adolescents who are faced with unfamiliar events are challenged to strengthen their sense of self-efficacy as they learn to deal with the changes successfully (Bandura, 1994). Having stronger self-efficacy at the start of the term is advantageous because of its impact on goal setting for the term and then, consequently, final academic achievement in the course (Zimmerman et al., 1992).

Particularly for college students, the ability to regulate one's own learning is extremely important. High levels of motivation, strategic thinking, and endurance through challenges is a consequence of high levels of self-efficacy (Bandura et al., 1996). Higher levels of self-efficacy have been connected with students' perceived ability to regulate their own learning and has contributed to higher academic achievement (Bandura et al., 1996; Caprara et al., 2008). By

becoming aware of their own thought process, or metacognition, students are able to focus their strategic thinking around the learning process. This self-regulatory efficacy is essential in college to combat distractions that can take away from important academic work (Zimmerman & Bandura, 1994). In 1996, anticipating the future of technology in education, Bandura et al. stated that a student's ability to engage in self-regulated learning would become even more important with multimedia instruction by instructors who are not present at the same time or place as the student. Successful college students need to develop self-directed learning based on strong motivation and cognitive strategies. Both of these are a direct result of strong self-efficacy (Bandura, 1993).

Students attend high school and college to prepare for a career. With many options available to them, students engage in activities and courses in which they believe they will be successful (Pajares, 2006). Self-efficacy has a greater impact on the types of career pursuits, college programs, and career options considered by students than actual academic achievement (Bandura et al., 2001). In summary, Bandura (2006a) concluded that higher student self-efficacy beliefs resulted in greater academic achievement, fulfilled educational requirements, wider consideration of career options, and persistence in the face of challenges in college and career pursuits.

Related Literature

Dual Enrollment Programs

The present study investigated the impact various dual enrollment programs had on a student's college self-efficacy. Dual enrollment programs, which give high school students the opportunity to earn college credit often for free or at least a reduced tuition rate, are an idea that has been around for years and a practice that is becoming more common. Currently, over 70%

of high schools offer college courses, more than half of postsecondary institutions in the United States allow high school students to take college courses, and over 98% of public community colleges report having high school students at their institutions (Tinberg & Nadeau, 2013). These programs, called dual enrollment programs, come in many forms and have been active in some states or localities since the 1950s (Taylor, 2015) and studies around their benefits have been conducted since as early as 1962 (Jones & Baxter). These forms include colleges running classes in the high school, high schools allowing students to take courses at the local college, and schools that are redesigned into early college high schools, and may include programs such as Advanced Placement (AP) courses or International Baccalaureate (IB) programs. The common theme of each program is that high school students earn credits toward high school graduation while simultaneously earning college credits towards a college degree.

Benefits of dual enrollment programs. The literature is filled with examples of the benefits of dual enrollment for students who participate in the program. Four themes that were identified in the literature include stronger performance of dual enrollment students in their courses, increased student retention and persistence through college resulting in increased degree completion rates, increased probability of college enrollment after completing high school, and student-perceived benefits. Individual studies had slight variations in results, but the clear theme of the literature is that dual enrollment programs are good for students.

***Stronger academic performance*.** GPA is commonly used to compare dual enrollment students to traditional college freshman. Wang et al. (2015) surveyed 15,449 first year college students at a community college in Wisconsin and disaggregated the data into two groups: those who participated in dual enrollment while in high school and those who did not. It was found that dual enrollment students attempted more credits and had a stronger academic performance

than their traditional college peers. An (2013) found similar results using a large nationally representative sample of 17,170 postsecondary students; dividing up students by whether they participated in dual enrollment led to the conclusion that dual enrollment students had a mean GPA that was 0.23 points higher than traditional college freshman. However, all studies focused on GPA did not find similar results. One study (Smith et al., 2012) found similar GPAs between the two groups over two semesters. During the fall semester, the dual enrollment students performed slightly, though not significantly, better than traditional students. During the spring semester the opposite occurred, with dual enrollment students performing slightly, though not significantly, lower than traditional students. This difference could be because the study focused on an early college high school where dual enrollment students were in a traditional high school setting earning college credits.

Another possible explanation for this variation is the type of post-secondary institution considered in the study. More exclusive institutions would be expected to have students with higher GPAs, regardless of dual enrollment status. A public community college with open access would be expected to have students with lower GPAs. An (2015) considered this possibility in a study on student academic performance at mid-selective and highly selective institutions. The dual enrollment students at the mid-selective institution outperformed traditional students. However, at the highly selective institutions there was no difference in academic performance or GPA. According to the studies above, academic performance of dual-enrolled students is sometimes higher than the average, traditional college freshman, though, as suggested by An (2012) and Giani et al. (2014), this may be a result of self-selection bias.

Increased retention and degree completion. Success in college courses over several quarters and several years is required for successful degree attainment. For this reason, many

studies have focused on how dual enrollment programs impact student retention rates. Increased academic performance in individual courses has been positively correlated with student retention (Wang et al., 2015). As expected, studies have shown that the dual enrollment students' increased academic performance resulted in an increase in student persistence and retention over time in college courses (Giani et al., 2014; Kim, 2014). One study (Kim, 2014) did contradict these findings by investigating 612 high school graduates in community colleges of Oregon and Florida. Kim (2014) found a a significant, weak negative relationship between dual enrollment and the total college-level credits earned, but this result seemed to be the single exception to the rule.

The goal of college enrollment, course success, and retention in a program is to earn a college degree or certificate. Again as expected, studies which focused on degree attainment have found that dual enrollment students are more likely to complete college and earn either a bachelor's degree or an associate's degree (An, 2012; Wang et al., 2015). One study (Giani et al., 2014) even broke down what dual enrollment courses correlated with increased degree attainment. The study concluded that the most influential dual-credit subject in terms of promoting baccalaureate attainment was a college-level mathematics course. Earning college-level math credits was correlated with the increase of a student's odds of attaining a bachelor's degree within six years between 60% and 90%. The same study also found the subjects of English, science, and social studies to be statistically significant indicators of degree attainment, though not as strong as the mathematics courses. This conclusion is consistent with Kim's (2014), who found a significant positive relationship between dual enrollment and college readiness in mathematics. D'Amico, Morgan, Robertson, and Rivers (2013) conducted a research study with 2607 students and found that community college, dual enrollment students in

professional technical rather than transfer programs were more likely to persist to the second year of course work. They also found when classes were taken at the college, students were more likely to persist to completion. Another study by Wang et al. (2015) found that dual enrollment students who enrolled in summer term were more likely to persist to their fourth term of enrollment than dual enrollment students who skipped a summer term. This research suggested that while dual enrollment programs are important to increase retention and completions, advisors should be aware of what courses a student is taking and when to maximize opportunities for success.

Increased college enrollment. The research on college entry after high school graduation for dual enrollment students is slightly mixed. The overall message is positive; students with college credits earned in high school are more likely to enroll in college immediately after high school graduation (Wang et al., 2015) and are less likely to need to take a remedial course (An, 2013). But Cowan and Goldhaber (2015), who studied Running Start students in Washington State community colleges, found that students are not any more likely to enroll as a full-time student and are more likely to enter a two-year college at the expense of four-year colleges. It appears that students who enroll in a local university do not feel any level of commitment to the university and often transfer to another college or university after high school graduation.

It does not appear that the college awarding the credit impacts the decision of what college a student chooses to attend after high school graduation. Student interviews in one study (Fischetti, MacKain & Smith, 2011) suggested that dual enrollment students do not feel as strong of an attachment to the credit-granting institution as traditional freshmen. This difference may be because several dual enrollment programs take place in the traditional high school classroom

with a high school teacher. This experience, which does not include college professors or classrooms, would not create a strong attachment between the student and the college. Another possible explanation from Cowan and Goldhaber (2015) is that students only choose to attend the dual enrollment college based on convenience of location. These students, who are usually more advanced students, often have plans to transfer to more prestigious institutions.

Student-perceived benefits. Many qualitative studies have examined why dual enrollment students are more successful. Most of these studies included surveys and interviews with dual enrollment students and have found that students who participate in these programs are more academically motivated (An & Taylor, 2015), have greater satisfaction with their lives, express stronger feelings of self-efficacy (Scheffel et al., 2015), and can see the value of dual enrollment in their college and career goals (Boazman & Sayler, 2011).

A grounded theory study by Kanny (2015) interviewed five high school seniors who participated in dual enrollment with their school in Los Angeles, California. The dual enrollment students expressed that the perceived benefits of dual enrollment programs include exposure to the college environment and learning the "hidden curriculum" needed for college success. Booth et al. (2013) defined the "hidden curriculum" of college as the unwritten rules of college describing how students can successfully navigate the college system. This "curriculum" includes items such as where to find support in the face of academic obstacles, how financial aid works, the advantages of working closely with an academic advisor, and how to appropriately engage with faculty. This "hidden curriculum" is often a challenge for underrepresented groups and first-generation students. As most dual enrollment programs are either free or offered at a reduced cost, they allow students to express an earlier interest in college and provide a low cost opportunity to experience this hidden curriculum (Stephenson, 2015). Students are allowed to

make mistakes and learn from them while in high school, while traditional college students must navigate the hidden curriculum during their freshman year when the stakes are much higher.

Drawbacks of dual enrollment programs. While the literature is full of examples of the benefits of dual enrollment programs, studies which describe the disadvantages of the program and how they negatively impact schools, colleges, or students are limited. Below is an analysis of some to the drawbacks that researchers have identified.

Inequity of course format and support. All dual enrollment programs are not designed equally. In some programs, dual enrollment students earn college credit by going to actual college classes, taught by college professors, on a physical college campus. In other programs, students remain in the high school, have extra in class support in the high school than they would in college, and follow the high school calendar which gives students more time to earn the same amount of credit (Pyzdrowski et al., 2011; Gardner, 2011). This dual credit college in the high school experience may be successful at increasing academic performance because of these extra variables, not as a result of the dual enrollment variable.

Instructor credentials and course quality concerns. Many dual enrollment programs are conducted in the high school through partnerships with local community colleges or universities. The courses are taught by a high school instructor who has received the approval of the credit-granting institution. Gaining this approval is a challenge for many school districts. Collegiate faculty are very concerned with quality control (Gardner, 2011; Jensen, Mattheis & Loyle, 2013) and often require the same credentials for instructors as are required for teaching at the post-secondary institution. This often means a master's degree in the subject area being taught. As high school teachers are not required to have this credential, it is often difficult to find instructors

who are qualified to teach the college-level courses in the high schools (Gardner, 2011; Lukes, 2014).

This extra requirement is not always a matter of college faculty and administration preference; for most states with dual enrollment programs it is a requirement in state law. Taylor et al. (2015) researched state laws on dual enrollment teacher credentials. They found 37 states (74%) required some extra provision for high school teachers to teach dual enrollment programs. Of those states, 31 required that the teachers have the same credential required of faculty appointed at the institution which granted the credit. In addition, 17 states required that the instructor has earned a master's degree in the specific discipline they are teaching. This requirement has become a significant frustration for high school administrators according to Scheffel et al. (2015). When surveyed, the administrators clearly stated that they wanted to offer the benefits of dual enrollment programs to their students, but were unable to because their instructors, who may produce positive outcomes, do not have the required credentials for teaching a college course.

***Equity gap in participation*.** There is a clear underrepresentation of minorities, first-generation, and low socio-economic families participating in dual enrollment programs (An, 2012; An, 2013; Perna et al., 2015; Pretlow & Wathington, 2014; Taylor, 2015). A possible reason for the participation gap is transportation challenges, which tend to impact minorities, as some students are unable to attend courses at a college or university for lack of reliable transportation (Khazem & Khazem, 2012). In a qualitative case study, Locke, Stedrak & Eadens (2014) interviewed low-performing Latina students and found that they felt reasons for their lack of success in dual enrollment programs included their non-school responsibilities were competing for their time and that there was a lack of a college narrative at home.

High Schoolers in the College or College in the High School

The learning needs of high school students are very different than the learning needs of college students. College students, with higher maturity and life experience learn best when andragogy is used in the course design rather than pedagogy, which is designed for children (Knowles & Shepherd, 1980). Knowles and Shepherd (1980) defined four assumptions of andragogy that describe why adult learners are different than younger learners. First, adults are independent, self-directed human beings while children are dependent on adults for many of their needs. Second, adults have larger reservoir of experience that is useful in learning and for making important connections. Third, adult learners direct their learning to the tasks of their social roles while younger learners allow the teacher to direct their learning. Fourth, adult learners desire immediate application of their learning that is problem-centered while younger learners are more apt to accept postponed application that is subject-centered.

If younger students are not used to courses designed for adults based on the assumptions of andragogy, the question becomes if they are able to be successful in the new environment of the college or if it would be most beneficial to stay in the high school environment. Dual enrollment programs can take place either on the college campus or on the high school campus. A review of the literature reveals no studies that directly compare these two modalities. There are several studies that describe the benefits and drawbacks of high schoolers in the college programs. Similarly, there are several studies that describe the benefits and drawbacks of college in the high school programs. A review of these studies can provide an initial understanding of how the different modalities of instruction can impact dual enrollment success.

High Schoolers in the college programs. High schoolers in the college programs provide the most authentic college experience possible to the high school students. This is

accomplished by providing students the opportunity to travel to the local college where they will complete coursework with college professors and traditional college students (Cowan & Goldhaber, 2015). This model provides several clear advantages to the high school students, yet there are also several potential drawbacks in the literature that must be considered. These are each investigated in detail below.

Benefits of high schoolers in the college. High schoolers in the college allows students to gain a running start on the college experience by taking classes at the college campus alongside college students while still completing their high school requirements. This model provides the students certain benefits over those who do not travel to the campus in their dual enrollment programs. These benefits include college cost savings, experience with college success strategies, and student self-efficacy gains (Fischetti et al., 2011; Giani et al., 2014; Gilbert & Heller, 2013).

As many of these on-campus dual enrollment programs are done with partnerships through community colleges, one study (Cowan & Goldhaber, 2015) found dual enrollment students are more likely to attend a community college and earn an associate's degree before transferring to a four-year institution. Tuition at community college tends to be less than half of public, four-year institutions and about 10% of private, four-year institutions (Gilbert & Heller, 2013). This results in significant college cost savings over the student's educational career.

A second benefit of students attending classes on the college campus is that the student will gain a more authentic college experience. Giani et al. (2014) found that when dual enrollment students were taking their classes on a college campus there was a significantly larger impact on increased degree completion and college persistence when compared with students who took advanced coursework at their high school campus. First-time freshmen often struggle

to learn the "hidden curriculum" of college including successful study strategies and what resources are available to help them be successful in college courses. Dual enrollment students who are able to take courses on the college campus are able to learn these skills at the same rate as traditional college freshmen, but while still in high school (Kanny, 2015). Students who complete dual enrollment courses in their high schools do not have the opportunity to learn this valuable lesson.

When considering college self-efficacy gains, it would seem that taking classes on the college campus would have the largest impact. While this has not been directly measured, Fischetti et al. (2011) conducted a qualitative study which found that taking class on a college campus led students to feel they had the same academic readiness as college freshman. Another study (Tinberg & Nadeau, 2013) found that when students took courses at the high school they felt they were at a disadvantage compared to other college freshman. These two studies suggest that the self-efficacy of the students who took their classes at the college was higher than those who took their dual enrollment courses at the high school. As this was not directly measured, the present study will attempt to clarify this important difference in course modality and its impact on self-efficacy.

Drawbacks of high schoolers in college. High school students traveling to the college to take courses can have many disadvantages. Having students as young as 16 years old on a college campus causes several concerns. One concern expressed by students and high school leaders is that the students have fewer opportunities to participate in electives or other extracurricular activities that are part of the high school experience; students are forced to grow up much quicker to participate in college courses (Fischetti et al., 2011; Howley, Howley, Howley, & Duncan, 2013). Student safety is also a concern with minors attending college

campuses (Smith et al., 2012). These safety concerns include potential for romantic or improper relationships, unrestricted web access, or drug and alcohol exposure and use. In addition, student surveys report many negative interactions on college campuses including being judged by other students or not feeling welcome by college faculty and staff (Kanny, 2015).

An unexpected drawback was identified by Cowan and Goldhaber (2015) when studying dual enrollment students who take college classes on the college campus. Students who earn dual enrollment credit are more likely to drop out of high school or complete a college credential through the GED exam than similar non-dual enrolled peers. One reason for this could be lower course grades from more rigorous college level work that negatively impact the students' high school GPA (Kanny, 2015). Another possibility is once students experience success in college, they no longer see the benefit of a high school credential once they are able to complete a college credential. Several of the studies on the drawbacks of dual enrollment seem to contradict the studies on the benefits of dual enrollment; it is clear that more research is needed, especially research that controls for self-selection bias, to better understand the complete picture of dual enrollment.

College in the high school programs. College in the high school programs provide high school students the opportunity to earn dual credit without having to leave the local high school. Through partnerships with local colleges and universities, high school instructors teach a regular high school course for college credit (Brunch & Frank, 2011). Usually the college provides the high school instructor with expectations that must be met in order to award the college credit. The benefits and drawbacks of this mode of dual enrollment are discussed below.

Benefits of college in the high school. College in the high school programs have several advantages over programs that take place on the college campus (Karp, 2012; Khazem &

Khazem, 2012). The first advantage is a slower transition to the college environment. High school students do not initially understand the work required to be a successful college student; however, by the end of a high school dual enrollment course they will have an increased understanding of their role (Karp, 2012) without the risk of failing an expensive course in the actual college environment (Stephenson, 2015). In addition, college in the high school programs often operate at a much slower pace, providing students with extra time with their high school on-campus instructor in what is often a smaller class size (Pyzdrowski et al., 2011). This environment gives students experience with more rigorous coursework while providing extra time to be successful with the course content. In this way, Pyzdrwoski et al. (2011) argued the dual enrollment course in the high school classroom is a transition between high school coursework and college coursework.

A second benefit of college in the high school program centers is access. Students whose family come from a lower socio-economic background often do not have the ability to secure transportation to a college campus (Khazem, & Khazem, 2012). If the dual credit program is brought to the high school where the students are at, they will have greater access to higher education. Two studies (An, 2012; An, 2013) found dual enrollment programs run as college in the high school programs increased access to students from low socio-economic backgrounds and the students were able to perform equally as well as their peers from higher socio-economic backgrounds. The programs were able to make progress to modestly reduce the equity gap based on socio-economic status.

Drawbacks of college in high school. Dual enrollment programs that take place on high school campuses come with many drawbacks and disadvantages. One drawback is the strain on funding and other resources (Shumer & Digby, 2013). Dual enrollment programs require extra

preparation time and professional development for the instructors. Often, extra class supplies are needed. In addition, advisors need to remain current on college requirements. These extra stresses on the high school are likely a reason that high school students often report that they receive limited support from their local high school in navigating dual enrollment programs (Kanny, 2015).

A second concern of high school dual enrollment programs is that of instructor credentials and course quality. High school programs have been accused of being focused on throughput and awarding as many college credits as possible rather than student learning outcomes (Schwalm, 2012). Jensen et al., (2013) found this to be a significant concern of college faculty and high school administrators. In response, the majority of programs require extra credentials, such as a master's degree in order to teach for a college in the high school program. According to Lukes (2014), very few high school instructors have the extra credentials needed to teach courses for college credit. Over time the instructor could retire or move to another position at another school which could cause a college in the high school program to suddenly cease to exist.

Dual enrollment students who take classes in the high school often encounter challenges when they graduate and transfer to a college or university. For example, in a study by Brunch and Frank (2011), it was discovered that students who took the first course of a college composition series in their high school did not reflect the same understanding of research techniques as traditional students who took the entire series on the college campus. In summary, the concern of a dual enrollment program that takes place on the high school campus is that it does not provide the students with a true college experience and puts extra strain on the limited high school resources.

Face-to-Face versus Online Courses

Online dual enrollment programs. There is very little research which divides dual enrollment into subgroups to compare how the benefits of dual enrollment are distributed between online and face-to-face instruction. Barnett et al. (2015) suggested that new modalities for dual enrollment have the potential to increase opportunities to more students and that it will be important that future research begin to consider the benefits of these various modalities. Initial research is limited with the majority of studies being qualitative in nature and focuses more on the potential benefits of online courses for dual enrolled students. Policy makers are interested in online dual enrollment courses which can increase student access to programs that would otherwise be unavailable to students who could not secure transportation to the local colleges where the classes are offered (Khazem & Khazem, 2012).

One study (Tomory & Watson, 2015) concluded that online dual enrollment could be a potential solution to the course integrity concern. Many college professors are concerned that dual enrollment courses taught at the high school by a high school instructor without the credentials to teach college credit may not provide an equivalent experience to students nor produce the same level of performance on learning outcomes. However, with online videos produced by college professors who can ensure the quality of content delivery and course content developed by the college, the issue of course integrity will virtually disappear (Schwalm, 2012).

Interviews with students have revealed mixed yet generally positive reactions to the idea of online dual credit courses. The research details several themes of student responses to the opportunity of online dual enrollment courses. The students reported that online courses gave them the flexibility to take a mixture of college courses and made them more independent learners (Zalaznick, 2015). Even though the course was at a distance, the students still reported

feeling part of the college community (Enyart, 2011). Rapposelli (2012) found that a significant experience for students was gaining familiarity with college learning management systems.

A few negative themes emerged from student interviews. The most prevalent themes were that the online courses were more difficult than expected (Harris & Stovall, 2013) and extra effort was required to be successful in an online college course (Enyart, 2011). While these complaints were common, the students in both studies indicated that the experience made them feel more ready for the rigor of college courses after high school graduation.

A single quantitative study (Pyzdrowski et al., 2011) described an online dual enrollment course. In this study the online, dual-enrolled students out performed their on-campus peers. However, there were many other variables that could have impacted the results, such as the online students having support from on campus high school instructors, extra time to complete the course requirements, and smaller class sizes. These differences make it difficult to determine if the online modality or the other variables are what attributed to the increase in success rates. More research is needed to determine the exact extent of online or face-to-face benefits for dual enrolled students.

Self-efficacy in online and face-to-face courses. Self-efficacy in online courses and face-to-face courses has been the subject of many research studies. Some of these studies have found a preference for face-to-face instruction. Tsai, Liang, Hou and Tsi (2015) investigated male self-efficacy in class discussions. In a traditional classroom, males had similar levels of self-efficacy as females in class discussion, leading them to be more confident to participate and elaborate on ideas discussed throughout the course. But in an online course the males had lower levels of self-efficacy. This lower level of self-efficacy resulted in males being less active in online discussion boards. This may be a result of students not feeling online discussion forms

are equivalent to in-class discussions (Tichavsky, Hunt, Driscoll, & Jicha, 2015). This perceived difference could explain the lower levels of self-efficacy. A study by Johnson and Palmer (2015) supported this idea, confirming that face-to-face students felt more engaged and part of the academic community than online students. Increased engagement is a symptom of stronger self-efficacy, which is developed in the face-to-face classroom.

Contrasting the previous studies are several which indicated online courses are more successful at increasing student self-efficacy levels. Stedman and Adams (2014) found that students experienced higher self-efficacy gains when their critical thinking skills were challenged and that online students showed greater gains than face-to-face students in these critical thinking behaviors. The increase in self-efficacy in an online course could be a result of the ability to repeat online activities and videos to review the course content at a pace that is comfortable for the students. A study by McCutcheon, Lohan, Traynor, and Martin (2014) investigated this phenomenon and found online student self-efficacy scores increased significantly after the use of online video clips. The benefits of self-efficacy in the online environment are also seen in students with disabilities, as one study found students with neurological conditions demonstrating significant improvements in self-efficacy when enrolled in an online course when compared with their face-to-face peers (Ghahari & Packer, 2012).

The research is split on which modality is best for gains in self-efficacy. Some research suggested that face-to-face instruction can make a larger impact (Johnson & Palmer, 2015; Tichavsky et al., 2015; Tsai et al., 2015), while other research suggested that online instruction can make a larger impact (Ghahari & Packer, 2012; McCutcheon et al., 2014; Stedman & Adams, 2014). One possible explanation for these differences is the fact that self-efficacy must be measured against a certain context (Betz & Hackett, 2006). It is possible that face-to-face

courses can increase self-efficacy in one context and online courses can increase self-efficacy in a different context. The present study is concerned with the impact of self-efficacy in the ability to complete tasks required to be successful in college. The current literature does not provide a definitive answer on this context.

Student grades face-to-face and online. Self-efficacy and academic achievement are closely related (Alci, 2015). Improvements in self-efficacy can predict levels of student participation and exam performance, resulting in an impact on overall class performance (Ackerman & DeShields, 2013; Gaylon, Blondin, Yaw, Nalls, & Williams, 2012). Linear regression and correlation studies have been conducted and found a strong positive and predictive relationship between self-efficacy levels and exam grades (Al-Harthy & Was, 2014; Barrows et al., 2015). Hoigaard, Kovac, Overby and Haugen (2015) determined that 46% of the variance in academic achievement is explained by academic self-efficacy. As the variables of self-efficacy and grades on exams or the course are closely related, a review of the literature comparing online and face-to-face course grades can provide meaningful insight to the present study.

A majority of the literature describes face-to-face students earning higher course grades than online students. Amro, Mundy and Kupczynski (2015) found face-to-face students were less likely to fail than online students, and Xu and Jaggars (2014) found face-to-face students earned higher grades than students in online sections. Students in traditional sections consistently demonstrate better learning outcomes, higher scores on the course final, higher completion rates, and are more likely to graduate on time (Motii & Sanders, 2014). In contrast, some studies have shown online students demonstrating better outcomes. Cavanaugh and

Jacquemin (2015) conducted a study where students in online sections earned slightly higher grades than the face-to-face sections.

Consistent with Simonson's (1999) equivalency theory, several studies found no significant difference when comparing the two groups on performance, assignment scores, or test scores (Ali & Smith, 2014; Motii & Sanders, 2014). Service learning courses, according to McGorry (2012), also showed no significant difference in outcomes between online and face-to-face sections. McCutcheon et al. (2014) found equally effective critical thinking gains in online and face-to-face sections of similar courses.

Some research suggested that face-to-face students perform better (Amro et al., 2015; Motii & Sanders, 2014; Xu & Jaggars, 2014); other research suggested that online students perform better (Cavanaugh & Jacquemin, 2015; Hughes, Zhou, & Petscher, 2015), while other research suggested that there is no difference between the two modalities in terms of student outcomes (Ali & Smith, 2014; McCutcheon et al. 2012; McGorry, 2012; Motii & Sanders, 2014). A possible explanation for the difference in results is that other variables may have explained the various results. Xu & Jaggars (2014) found the lower academic preparedness of students can increase the performance gap between online and face-to-face instruction.

Driscoll, Jicha, Hunt, Tichavasky and Thompson (2012) conducted a quantitative study which found face-to-face students performed better on course outcomes than online students. However, when controlling for GPA, the effect was eliminated. It was determined that GPA accounted for 13 percent of the variation in student performance while course modality (online verses face-to-face) only accounted for 1.7 percent of the variation in student performance. Cavanaugh & Jacquemin (2015) extended this study and found an interaction effect between GPA and modality. They concluded that students with lower GPAs performed even worse in

online courses than face-to-face courses. Similarly, students with higher GPAs performed even better in online courses than face-to-face courses.

In general, online students have lower cumulative GPAs than face-to-face students, which may explain why these students miss more assignments and are more likely to fail their courses than face-to-face students (Helms, 2014). A qualitative study conducted by Driscoll et al., 2012 found that students perceived online courses as easier than face-to-face courses. This may explain why stronger students tend to register for face-to-face courses, to seek a more enriching experience, and why weaker students are attracted to online courses, to seek a smaller workload and lower instructor expectations for their students. Johnson and Palmer (2015) confirmed this theory in a study of college student enrollment patterns. They found that the GPA of students registering for online classes was lower than that of students registering for face-to-face classes. The online students performed worse on course exams and final course grades. The greatest influential source of self-efficacy is experiences with performance accomplishments where a person's belief of her or his ability can be improved or diminished based on success or failure in previous experiences (Bandura, 1997). Based on this theory, the present study attempted to address the question of whether online dual enrollment students have stronger or weaker college self-efficacy.

Other variables have been studied to determine if they can explain the gap between online and face-to-face academic achievement. Age, gender, ethnicity, and year in school have been found to not be a significant predictor of performance in the gap between online and face-to-face performance (Amro et al., 2015; Driscoll et al., 2012). A study by Xu and Jaggars (2014) contradicted this conclusion where the authors reported that males, younger students, and black students were more likely to perform at lower levels in online classes than face-to-face classes.

However, none of these variables seem to be as significant of a predictor variable as GPA on the gap between online and face-to-face grades.

Student perception of face-to-face verses online. Qualitative studies have revealed a mixed bag of results for students in online courses. As faculty design online courses, there is an expectation that students take responsibility for their own learning (Chiasson, Terras, & Smart, 2015). Students are rising to this challenge by putting in, from what they perceive, a significantly higher effort to be successful in their online courses (Young & Duncan, 2014). Enyart (2011) reported that dual enrollment students are excited about the opportunity to earn college credits online.

While the previous studies discussed some student perceived advantages, the majority still seem to prefer face-to-face classes, possibly because of the preference for interaction with the professor that can increase course motivation (Tichavsky et al., 2015). This may be a result of a common perception, as described by Platt, Raile, and Yu (2014), that online courses are not equivalent to face-to-face courses. Students reported that online courses are more flexible yet have fewer opportunities to interact with instructors and classmates. There is also a belief by students that they will gain less knowledge in online classes. Online activities, such as discussion boards, are not considered equivalent to in-class experiences, such as classroom discussions. It is very possible that many of these negative opinions are based on old views of distance education as a correspondence course, rather than an online learning experience as this bias seems to diminish with experience in online courses (Tichavsky et al., 2015).

Student evaluations of courses and professors provide quantitative data that can be compared, especially when the same instructor teaches the same course both face-to-face and online. While one study found no difference in course satisfaction (Dutcher, Epps, &

Cleaveland, 2015), the majority of studies comparing student evaluations for face-to-face and online students found traditional courses rated better than online courses (Ganesh, Paswan, & Sun, 2015; Young & Duncan, 2014). However, this gap in student evaluations may again be a symptom of student grades in the course, GPA, and expectations that online courses should be easier when they actually require more work to be successful (Johnson & Palmer, 2015; Platt et al., 2014).

High School Students in Online Courses

When high school students enroll in online college courses, many of the same andragogy verses pedagogy concerns surface again. High school students do not have the time management skills or personal maturity that is often required for the independence of online college courses (Entrekin, 2007). The research for high school students in online courses is much more limited than college online courses (Arnold, 2015); however, high school dual enrollments for online courses are increasing over time (Lochmiller, Sugimmoto, Muller, Mosier, Williamson, 2016). What follows is a summary of this limited body of literature, including the increased access online courses provide students, the success of online dual enrollment courses and how they were designed, and a summary of the differences between online high school courses and online college courses along with the implication for dual enrollment programs.

Online dual enrollment increases access for students. Online dual enrollment courses have the potential to solve many of the challenges and concerns that surround dual enrollment programs. However, less than 1% of students take all their dual enrollment courses online (Cowan & Goldhaber, 2015). While students give many reasons to avoid online courses such as face-to-face classes providing increased motivation to avoid falling behind (O'Niell & Sai, 2014), the benefits of such programs are worth more exploration. The most significant benefits

are around scheduling challenges and instructor-credentialing challenges. While studies on the success of such programs are limited, initial results are promising, yet more research is needed before any definitive conclusions can be made.

Students who wish to take dual enrollment courses from a college or university are often unable to because of inflexible high school schedules or the location of the credit-granting institution (Alfeld & Bhattacharya, 2012). An online program can overcome these challenges by bringing the course to the student, regardless of location. Students who participate in online dual enrollment programs have increased access, reduced transportation issues, and more flexibility with their schedules to take advantage of dual enrollment opportunities (Barnett et al., 2015; Zalaznick, 2015). This access can reduce the participation gap and achievement gap for minority students or students from low-income backgrounds by giving all high school students access to college readiness (Khazem & Khazem, 2012; Zalaznick, 2015).

In addition, dual enrollment programs can increase course offerings available to students that would otherwise not be options for students in the traditional high school curriculum while giving the students an important college experience, including the use of a learning management system (Rapposelli, 2012). This benefit becomes a simple solution to the credential requirement that is an issue for many schools. With most colleges requiring a master's degree in the subject area taught (Taylor et al., 2015), online programs can bring college courses to the high school student that are the actual college courses taught by the credentialed college instructor who has a master's degree in her or his field (Schwalm, 2012).

Success in online dual enrollment in high schools. While online programs have the potential to overcome dual enrollment challenges such as scheduling, transportation, instructor credentials, course quality, and participation gap for minorities, an important question remains

about whether or not high school students can be successful in online college courses. There is virtually no research on purely online college courses offered to dual enrollment students that provide an equivalent experience to that of traditional college freshmen. However, some variations of online programs have been used by researchers with significant success.

Harris & Stovall (2013) conducted a case study on an online dual enrollment program that offered credit in college algebra, trigonometry, and statistics. The overall success rate of the program was 95%, with 98% of college algebra students passing, 80% of trigonometry students passing, and 73% of statistics passing. While the high success rates are important data, the methodology of the study limits the external validity to other online dual enrollment programs. The courses were each spread out over two semesters, rather than the traditional, fifteen weeks of a college course. In addition, students who did not pass the first semester were not enrolled in the dual-credit section of the course, which reduced the failure rate of the dual credit section. In addition, while a traditional online course requires students to be more independent, individual and self-motivated learners to complete course assignments (Zalaznick, 2015), the students in this study were assigned a face-to-face class with a high school instructor to support them in the course work. This model provides a potential solution to the instructor-credentialing concern expressed by Lukes (2014).

A second study by Pyzdrowski et al. (2011) considered a web-enhanced dual credit course taught on the high school campus. Web-enhanced courses are a hybrid of online and face-to-face instruction, with much of the web content developed by the college instructor. Dual enrollment students in the web-enhanced section were compared to traditional, face-to-face freshman. When external variables were held constant, both groups showed similar gains on the ACT pre- and post-tests, and the web-enhanced dual enrollment students outperformed the

traditional students on grades earned in the course. However, the external validity was limited in this study as well, and similar to the study by Harris & Stovall (2013), students benefited from a supplemental on-campus instructor and significantly smaller class sizes.

Student feedback on online dual enrollment programs is very positive. Themes arising from student surveys and interviews include excitement about gaining a college experience that would otherwise be unavailable while learning about the rigor level of college-level assessments in the online environment, using the college's learning management system, and the amount of effort required to be successful in a college level course (Enyart, 2011; Harris & Stovall, 2013; Rapposelli, 2012). However, the question still remains as to whether online dual enrollment programs experience the same benefits as other traditional, face-to-face dual enrollment programs, especially if they were delivered in the same format as traditional online college courses.

Online high school courses are different than online college courses. According to Knowles and Shepherd (1980), secondary students and adult students have very different needs in learning. Adults need andragogy while students need pedagogy in the classroom. It is unclear whether high school students have the maturity and time management skills necessary for success in an online class designed for adult learners (Entrekin, 2007). If the learning needs of adults and secondary students are different, then putting high school students in an online course would not be beneficial for students. There is very little research available exploring the phenomenon of dual enrollment students in online courses (Arnold, 2015).

Brahler (2015) described an online course designed for high school students to earn college credit. While many students were able to successfully earn college credits in the online course, there were many difficulties that were encountered along the way that were related to

high school students not being ready for a college level online course. Students were accustomed to high school counselors or support staff to hold them accountable to completing assignments on time. When the counselors and support staff were not actively engaged with the course, students were not reminded about important deadlines and some even became inactive in the course. Another concern was that the high school students were unable to successfully navigate and use the course syllabus, resulting in missed assignment deadlines or instructors having to do extra work to remind students about course expectations. The final recommendation of the study was that high school students need extra support in online classes that college courses and programs are not used to providing.

The literature describing successful online courses for high school students revealed that the courses are structured very differently than college online courses. Successful high school courses often come with a face-to-face orientation to the learning management system where students learn about the daily expectations and how to access important course information (Lewis, Whiteside, & Dikkers, 2014). Varre, Keane and Irvin (2010) found that high school programs that addressed the feeling of isolation in online courses were successful. This intentional community building could include having several students from the same school enroll in the same class (Entrekin, 2007) or providing students with a virtual buddy or student volunteer who works one-on-one with students (Lewis et al., 2014). A common strategy for many programs is to have a course facilitator for online programs (Entrekin, 2007). In such programs, students have a time in their course schedule where they would go to the classroom of the facilitator. The students work on their online assignments while the facilitator is available to answer questions, keep students on track to finish, and provide extra motivation.

In general, these extra support structures are not available for students taking online courses in dual enrollment programs. However, it could be argued that because dual enrollment students tend to be higher achievers (Kirby, Barbour, & Sharpe, 2012), they are ready for the individualized environment of the online college classroom. The present study attempted to shed light on the readiness of high school students to take these online college courses.

Self-Efficacy in Dual Enrollment

Studies on student self-efficacy or perceptions of their ability to be successful in college as a result of dual enrollment programs are very inconsistent. Student responses on a survey distributed by An and Taylor (2015) demonstrated that students are more college ready than traditional students in skills such as goal setting, self-efficacy, and study skills. However, these results were based on a quantitative Likert-scale survey. In one qualitative survey (Fischetti et al., 2011), students reported that they perceived themselves to have the same academic readiness of traditional freshmen. In contrast to these first two studies which show equal or better self-efficacy for dual enrollment student, Ozmun (2013) found that students entering dual enrollment programs often did not express higher levels of self-efficacy or confidence in their ability to perform college-associated tasks. A possible explanation for this difference may rest in when the instrument was administered, at the beginning, middle, or end of the students dual enrollment studies.

Students who reported low levels of self-efficacy also expressed low levels of self-advocacy when they needed help in college courses (An & Taylor, 2015; Tinberg & Nadeau, 2013). Those who felt unprepared for college courses, especially around the area of research and writing, did not feel comfortable asking an instructor for help on an assignment as they felt it would mean they were asking for special treatment. The major conclusion of Tinberg and

Nadeau (2013) was that dual credit students lack the confidence and experience to perform at a similar level as their traditional peers.

Summary

This review of the literature explored dual enrollment programs which allow high school students to take courses for both high school and college credit simultaneously (Stephenson, 2015). The theoretical framework of Bandura's social learning theory built on self-efficacy of students was initially explored. Next, a general analysis of dual enrollment programs was presented which included the benefits and drawbacks of dual enrollment, a comparison of dual enrollment in the high school and in the college, a comparison of online and face-to-face instruction, an analysis of research related to high school students in online coursework, and an analysis of self-efficacy as it relates to dual enrollment.

In reviewing the literature, a gap was identified which the present study addressed in order to provide initial insight. Dual enrollment has been shown to increase student self-efficacy (An & Taylor, 2015; Scheffel et al., 2015). However, the dual enrollment group has not been disaggregated into groups to determine the significance of the impact on various partitions of dual enrollment (Ozmun, 2013; Giani et al., 2014). In addition, there has been a call for studies to compare different modalities of instruction. In this paper, the term modality of instruction is defined by Ozmun (2013) as the location of the course delivery. This comparison is requested in the literature to contrast between online and face-to-face (Corry & Stella, 2012; Simonson et al., 2012) and between college in the high school and high schoolers in the college (Giani et al., 2014; Ozmun, 2013). In response to this call for further investigation, the current study explored how modality of dual enrollment impacted student perceived self-efficacy in the domain of college academic success. Four modalities were considered in response to the literature (Corry

& Stella, 2012; Giani et al., 2014; Ozmun, 2013): online, college in the high school, high schoolers in the college, and students enrolled in a blend of high school and college dual enrollment courses.

CHAPTER THREE: METHODS

Overview

To provide an initial understanding of how the benefit of a higher level of self-efficacy regarding college performance is distributed between students who take their dual enrollment courses in various modalities, a quantitative causal comparative research design was used to address two research questions and their corresponding null hypotheses. This chapter describes the methods used to address the research questions and corresponding null hypotheses. The details of the design, the participants, the setting, and the procedures, including the data analysis, are described below.

Design

To gain an initial understanding of the impact instructional modality has on dual enrollment self-efficacy, a causal comparative research design was used. Causal-comparative research designs are used when "researchers seek to identify cause-and-effect relationships by forming groups of individuals in whom the independent variable is present or absent – or present at several levels – and then determining whether the groups differ on the dependent variable" (Gall, Gall, Borg, 2007, p. 306). The present study addressed two aims. The first aim was to confirm or contradict existing research which claims there is a difference between dual enrollment students and traditional college student in the mean level of college self-efficacy. The second aim was to determine if there is a difference between course modalities in the mean level of college self-efficacy. A *t*-test and one-way ANOVA between groups was used to analyze the data which is analogous to regression analysis with dummy coding (Starkweather, 2010).

To address the first research question and hypothesis to confirm or contradict existing research on self-efficacy of dual enrollment students, the interval dependent variable of mean college self-efficacy score was measured for the two nominal categories on the independent variable of student type. The first type of student was the traditional college student or a student who has graduated from high school and is taking college courses exclusively for a college degree (Wang et al., 2015). The second category of student was dual enrollment students which are defined by Stephenson (2015) as participants in a program which allows high school students to take courses for both high school and college credit simultaneously. This comparison is consistent with research by An and Taylor (2015), Boazman and Sayler (2011), Karp (2012), and Ozmun (2013).

Both independent and dependent variables were identified to address the second research question and hypothesis regarding course modality impacting dual enrollment student self-efficacy. The independent variable is the modality of instruction that was present at four levels: college in the high school, high schoolers in the college, a blend of taking dual enrollment courses at both the high school and the college, and online dual enrollment courses. This disaggregation of the dual enrollment population is in response to Giani et al. (2014), who found many benefits of dual enrollment, including increased likelihood of students accessing, persisting through, and completing a postsecondary degree. The authors' called for future research as to whether courses taught at the high school, at the college, or online could influence the impact of the various benefits.

The researcher determined whether the groups differ on the dependent variable of mean self-efficacy score, as measured on the College Academic Self-Efficacy Scale (CASES). Owen and Froman (1988) twice tested the CASES for reliability. The first internal consistency

estimate found a Cronbach's alpha of .90. The second internal consistency estimate found a Cronbach's alpha of .92 with an eight-week stability estimate of .85. This suggests strong reliability for the instrument. Self-efficacy is context dependent, such as academics or higher education, and must be measured against that context (Betz & Hackett, 2006). College self-efficacy was defined by Solberg et al. (1998) as a student's confidence in his or her ability to successfully perform college tasks. This study on college self-efficacy sought to confirm and expand on the findings of several studies (An & Taylor, 2015; Boazman & Sayler, 2011) which found self-efficacy was higher for dual enrollment students when compared with traditional students by providing insight as to whether or not the phenomenon is present at equal levels for different modalities of instruction or concentrated in one or more instructional modalities.

Research Questions

RQ1: Is there a difference among the mean self-efficacy scores of dual enrollment students and traditional college students, as measured on the College Academic Self-Efficacy Scale (CASES)?

RQ2: Is there a difference among mean the self-efficacy scores of dual enrollment students who take their courses face-to-face at a high school, face-to-face at a college, a blend between high school and college, or in an online environment?

Null Hypotheses

$H_0$1: There is no significant difference among the mean self-efficacy score of dual enrollment students and traditional college students, as measured on the CASES.

$H_0$2: There is no significant difference among the mean self-efficacy score of dual enrollment students who take their courses face-to-face at a high school, face-to-face at a college, a blend between high school and college, or in an online environment.

Participants and Setting

The participants for this study were drawn from a convenience sample of dual enrollment students from the state of Washington. The state is made up of 34 community and technical colleges, six public universities, and 27 private universities that have the option to participate in dual enrollment programs. Twenty-three of the colleges and universities have college in the high school programs, 17 of which are community colleges, four are public universities, and two are private universities (Stetter, 2016). Running Start, the Washington state version of high schoolers in the college, is available at all 34 community and technical colleges and four of the universities (State Board of Community and Technical Colleges, 2016). There are 885 public schools in the state which have the option to participate in dual enrollment programs. According to the State Board of Community and Technical Colleges (2016), during the 2014-2015 school year there were 26,410 unduplicated dual enrollment students in the state of Washington. Of those students enrolled in various types of dual enrollment, with some students enrolled in multiple modalities, there were 4814 enrollments were in college in the high school programs, 21,090 enrollments were in high schoolers in the college programs, and 11,601 enrollments were in online courses (State Board of Community and Technical Colleges, 2016).

Dual enrollment students fall into all demographics. In the state of Washington in 2016, they were 40% male, 58% female (2% did not report gender) and ranged in age from 16-18 years old in their junior or senior year of high school. The ethnicity of the population was slightly diverse, with 61% white, 9% multi-racial, 9% Asian, 3% Hispanic or Latino, 2% Black, and 4% other race (11% did not report race). This compared with public school enrollments across the state which were 57% white, 7.1% multi-racial, 7.2% Asian, 21.7% Hispanic or Latino, 4.5% Black, and 2.5% other race (Office of Superintendent of Public Instruction, 2016). The

noticeable difference between the state population and the dual enrollment population was the Latino subgroup. This underrepresentation of Latinos in dual enrollment courses was consistent with the literature (Perna et al., 2015; Pretlow & Wathington, 2014; Taylor, 2015). A possible reason for the participation gap is transportation challenges, which tend to impact minorities, as some students are unable to attend courses at a college or university for lack of reliable transportation (Khazem & Khazem, 2012). In a qualitative case study which interviewed low performing Latina students, Locke et al. (2014) found that Latina students felt reasons for their lack of success in dual enrollment programs included that their non-school responsibilities were competing for their time and that there was a lack of a college narrative at home.

The sampling procedure was conducted as a convenience sample to ensure a sufficient number of participants were included in the study. All 34 community and technical colleges were considered for inclusion in the study. The list was reduced to 12 colleges which offered at least one course with the exact same course outcomes in all three modalities considered in the present study: college in the high school, high schoolers in the college, and online dual enrollment courses. As the students in the same course could be measured in all three modalities, this allowed a sample to be collected while reducing external variables such as course difficulty or interest. This list was further reduced by eliminating courses that were only offered in all three modalities at one college which allowed multiple colleges to be used in this study while comparing a small number of courses. This left 12 courses at nine colleges.

While some of the literature has focused on dual enrollment students in specific courses such as mathematics (Giani et al., 2014) or English (Tinberg & Nadeau, 2013), the large majority focused on students in all dual credit courses regardless of subject area (Boazman & Sayler, 2011; Fischetti et al., 2011; Karp, 2012). This general focus included authors who called for

further research into the disaggregation of the data based on instructional modality (An, 2013; Ozmun, 2013). For this reason, the decision was made to reduce the list of nine courses down to three courses to reflect the same pattern as the literature: an English course, a mathematics course, and a third general studies course. The highest enrolled general studies course, based on 2014-2015 enrollment numbers (State Board of Community and Technical Colleges, 2016), was a history course which was selected for the third course. The final list of three courses were offered at eight colleges. Instructors of each of these courses at the participating colleges were asked to participate in the study, and of these, 23 instructors from three colleges agreed to have their classes participate in the study.

The three colleges chosen for the present study were labeled with pseudonyms A, B, and C. All three are community or technical colleges located in the state of Washington. College A is located in an urban area of the state. Colleges B and C are located in more rural areas. Geographically, Colleges B and C are located on the eastern side of the state, while College A is located on the western side of the state. Enrollments during the 2014-2015 school year show the three colleges vary in size. Colleges B and C are smaller with fewer than 10,000 students while college A is a larger college with enrollments over 10,000 students. In order by size, the smallest college is College B, followed by College C, and the largest is College A.

The courses selected for the study are described in Table 1. The table describes the colleges that offer each course along with enrollments by category in those individual courses at the colleges included in the study from the 2014-2015 school year. These numbers provide a snapshot of the population from which the sample will be drawn.

Table 1

Enrollment by modality and course number

		2014-2015 Enrollment		
Course Number	Course Name	CHS[a]	HSC[b]	OL[c]
ENGL&101	English Comp I	57	1054	77
HIST&146	US History I	69	553	154
MATH&141	Pre-Calculus	11	636	41

Notes. [a] CHS = College in the High School. [b] HSC = High Schoolers in the College.
[c] OL = Online Dual Enrollment.

According to the State Board of Community and Technical Colleges (2009), common courses have been defined as courses in which the college catalog descriptions are similar enough to be accepted as equivalent at a receiving college for transfer purposes. These common courses are marked with an ampersand (&) in the course number and are used by all 34 community colleges in the state of Washington. All three courses selected for the present study carried this designation which will ensure that students who took the same course number at any of the colleges in this study received a common experience. This further reduced the influence of external variables of different colleges teaching different content.

The sample of dual enrollment students was drawn from 30 courses sections. A total of 178 dual enrollment students participated. This number exceeds the required minimum sample size of 144 dual enrollment students for the ANOVA with four groups required for the second research question, according to Gall et al. (2007), for a medium effect size with a statistical power of .7 at the .05 alpha level.

According to Karp (2012), the dual enrollment benefit of higher self-efficacy is not present until after the student has gone through the dual enrollment course or courses. Therefore, this study focused on students at the end of their dual enrollment studies who were near the point

of transition to college. To ensure the sample of students is near transition, only 18-year-old dual enrollment students were surveyed. The entire sample of dual enrollment students was 35% male and 64% female. They were 69% white, 19% Latino, and 8% other races. The breakdown of demographic information for each subgroup is in Table 2. The survey instrument was administered during the last three weeks of the term to ensure the students had the opportunity to gain the maximum self-efficacy benefits possible (Karp, 2012; Ozmun, 2013).

Table 2

Demographics of Sample Subgroups – Dual Enrollment Students

	N	Male	Female	White	Latino	Other
College in the High School	48	46%	52%	69%	15%	8%
High Schoolers in the College	52	33%	67%	67%	23%	6%
Online Dual Enrollment	43	21%	79%	67%	16%	14%
Blend of High School/College	35	43%	57%	71%	20%	6%
All Dual Enrollment	178	35%	64%	69%	19%	8%

Note. Percentages do not add to 100% as some students did not report a gender or race.

The courses marked as high schoolers in college and online dual enrollment courses were made up of a mix of traditional college students and dual enrollment students. The traditional college students in these sections were also surveyed to answer the first research question. This made the total sample size increase to 413 students. This sample size exceeded the required minimum sample size of 100 for a *t*-test with medium effect size and a statistical power of .7 at the alpha = .05 level (Gall et al., 2007). The entire sample of students was 38% male and 61% female. They were 61% white, 25% Latino, and 6% other races. The breakdown of demographic information for each subgroup is in Table 3.

Table 3

Demographics of Subgroups – All Students

	N	Male	Female	White	Latino	Other
Dual Enrollment Students	178	35%	64%	69%	19%	8%
Traditional Students	235	40%	58%	56%	30%	3%
All Dual Enrollment	413	38%	61%	61%	25%	6%

The groups for the present study were predefined; the four groups chosen for this study were college in the high school students, high schoolers in the college students, dual enrollment students taking a blend of courses at both the high school and college, and online dual enrollment students. College in the high school courses are designed for the students to take a course on their high school campus that allows them to earn college credit (Barnett et al., 2015). The instructor could be a college professor or a high school teacher who generally has extra credentials to teach the course (Taylor et al., 2015). The second group was high schoolers in the college where students in high school travel to a local college to take college courses along with traditional college students (Cowan & Goldhaber, 2015). This provides the students with a true college experience. Some students take a blend of both college and the high school and high schoolers in the college courses; these students compose the third group. A newer model for delivering dual enrollment instruction that has not received much attention in the literature is online courses (Barnett et al., 2015; Zalaznick, 2015). These full-college courses are then available to students in their high schools or from anywhere in the world with an internet connection. Technically, an online college course qualifies as a high schoolers in the college course; however, because the student experience is significantly different between the two

modalities and the research has called for further investigation into the differences (Giani et al., 2014; Ozmun, 2013), the online students will be considered as a separate group for this study.

Instrumentation

In order to accurately measure self-efficacy, it must be measured against a certain context (Betz & Hackett, 2006). Bandura (1997) and Bandura et al. (1996) claimed that the human experience is made up of many different capabilities, and as a result, self-efficacy cannot be a single overarching trait but rather a set of beliefs that vary based on the domain of functioning, such as college success or rock climbing ability. Therefore, self-efficacy must be measured using an instrument designed for the specific domain of interest, in this case, college success. For this reason, the College Academic Self-Efficacy Scale (CASES) (Owen & Froman, 1988) was selected for the present study (see Appendix A). The authors stated the purpose of the instrument is to measure college students' confidence in the area of college-level academics. There are no subscales to the CASES instrument. A two-subscale version was tested on 21 data sets with confirmatory factorial analysis, and it was determined that the instrument as a whole, rather than two subscales, was the best fit for the data (S. V. Owen, personal communication, March 27, 2016). There are 33 questions on the CASES, and it is estimated that the instrument takes students about five minutes to complete (Owen & Froman, 1988). The instrument is well established in the literature and has been used in numerous studies (Hanley, Palejwala, Hanley, Canto, & Garland, 2015; Hao, 2015; Taat & Rozario, 2014). Each of the questions on the instrument asks how confident the participant believes he or she *can do* a task rather than *will do* to ensure the responses are focused on perceived self-efficacy rather than actual ability (Bandura, 2006b).

Owen and Froman (1988) described the instrument development. Three faculty members from the departments of education and psychology developed a list of routine and frequent activities of college students. Next, construct validity was established by seven graduate teaching assistants who provided feedback as the list was reduced and several questions reworded based on their suggestions. Finally, the remaining questions were given to 93 undergraduate, educational psychology students who rated each item on a five point Likert scale to determine how important each activity was in order to achieve academic success. Those items whose mean importance was below 3.0 were removed from the list. This left a 33-item list of statements which are not ordered in any type of hierarchical arrangement.

In describing how self-efficacy should be measured, Bandura (2006b) stated that items should be presented which portray different tasks and levels of demands and the survey respondents should be asked to rate the strength of their belief in the ability to complete a stated activity. Consistent with this requirement, the instrument used a five-point Likert scale that ranges from A to E. The poles were labeled with "A" representing "quite a lot" of confidence and "E" representing "very little" confidence. The responses of "B," "C," and "D" were not labeled but represented as a continuum between the responses of "A" and "E". The terms "lots" and "little" were below the continuum as a guide but are not directly connected to the individual responses of "B," "C," and "D."

The data was downloaded from the online survey tool and analyzed using PSPP version 0.10.1. After results were downloaded, scoring of the instrument was conducted as advised by the author (S. V. Owen, personal communication, March 27, 2016). To make data entry quick, as the mind is used to reading left to right, "A" was initially scored as 1, "B" = 2, "C" = 3, "D" = 4, and "E" = 5. Then, using a computer, the values were recoded so that A became 5, B became

4, C remained 3, D became 2, and E became 1. Next, each student had a mean self-efficacy score calculated based on the responses given to the statements of the instrument. Using a mean score rather than a total score allowed one to compensate for missing data as the responses were averaged over the number of questions answered. This method does not disadvantage a participant who answers 31 questions when compared to a participant who answers all 33 questions. A score of five is the highest possible score meaning the student has a very high level of college academic self-efficacy. A score of one is the lowest possible score meaning that the student has a very low level of college academic self-efficacy. Owen (personal communication, March 27, 2016) administered the CASES to 3149 undergraduate students at the University of Connecticut. The mean student score was 2.8 with a standard deviation of .65 (see Appendix B for complete instructions for how to administer the CASES).

Owen and Froman (1988) twice tested the CASES for reliability. The first internal consistency estimate found a Cronbach's alpha of .90. The second internal consistency estimate found a Cronbach's alpha of .92 with an eight-week stability estimate of .85. This suggested strong reliability for the instrument.

Permission to use the CASAS in the present study was requested and received on March 27, 2016 (.see Appendix C).

Procedures

Approval for conducting the current study was received from Liberty University Institutional Review Board (see Appendix D). After approval was received, instructors for the courses identified were contacted to obtain consent from both the instructors and students (see Appendix E) Only 18-year-old dual enrollment students were used in the study so parent permission was not required.

Courses were identified for inclusion using the method described above. All 34 community and technical colleges were considered for inclusion in the study. The list was reduced to 12 colleges which offered at least one course in all three modalities considered in this study: college in the high school, high schoolers in the college, and online dual enrollment courses. This list was further reduced by eliminating courses that are only offered in all three modalities at one college. This left 12 courses at nine colleges. In response to the literature (Giani et al., 2014; Ozmun, 2013; Tinberg & Nadeau, 2013) the final three commonly numbered courses were selected to use for sampling. This process sought to hold as many variables consistent as possible by focusing on the same courses across different colleges using a common system and similar course outcomes taught in all three modalities by each school. In addition, this method allowed for minimum sample size thresholds to be met (Gall et al., 2007) and is consistent with the literature (Giani et al., 2014; Ozmun, 2013; Tinberg & Nadeau, 2013).

All instructors of the three courses at the three colleges who agreed to participate were contacted to be included in the study. The colleges were all community colleges located in the state of Washington. Two colleges are located in rural areas and one is located in an urban area. The schools vary in size from very small to large. Of those instructors willing to participate, cluster sampling was used to select which instructors will have their students as part of the final sample. Each section of the three courses at the three colleges with instructors willing to participate were considered a cluster. Clusters were randomly selected using a systematic random sampling technique to create similar sample sizes. This method sought to provide the largest possible sample size while creating groups of similar size for final analysis. According to Keppel (1991), an ANOVA is generally robust with unequal sample sizes, yet a significant departure from equal sample sizes could affect the assumption of equity of variance, though

there is no clear standard for when unequal sample sizes become a problem. To avoid this problem, sample sizes for each group were kept as close to equal as possible.

Once the list of participating instructors was identified, the instructors were individually trained on how to administer the instrument. The instrument was placed in an online survey tool such as Survey Monkey or Zoho. The online college instructors placed a link to the survey in the course online learning management system, such as BlackBoard or Canvas. Face-to-face classes did the survey in class with a hard copy print out or used the online tool in a computer lab. Students were encouraged to participate with an entry into drawings for coffee gift cards and a tablet computer. The survey was made available to both dual enrollment and traditional college students in each of the sections.

For online students, when a student clicked the link for the survey, they were first presented with a consent page that explained the purpose of the survey and that participation was voluntary. In addition, instructions for completing the survey were included. Completing the online survey took each student approximately five minutes.

For face-to-face students who took the paper version of the survey in both college in the high school and high school in the college modalities, the first page of the survey instrument was a consent page that explained the purpose of the survey and that participation is voluntary. In addition, instructions for completing the survey were included. These instructions were identical to the online instructions found in Appendix F. Completing the paper survey took each student approximately five minutes. The responses from the paper survey were then manually added to the online survey tool so all the data would be stored in one central location.

Data Analysis

After all students completed the survey, the data was downloaded from the online survey tool to be analyzed using PSPP version 0.10.1. Each research question and its corresponding null hypothesis were addressed separately. The first research question was analyzed with a *t*-test comparing the dual enrollment group as a whole to the traditional college students at the alpha $p < .05$ level. When considering a relationship between a dichotomous variable, either dummy coding with regression or a simple independent *t*-test can be used as the results are identical (Starkweather, 2010). Gall et al. (2007) recommended a *t*-test for a single mean when comparing the mean scores of two groups. The first research question and hypothesis compared two groups on the independent variable of type of student. The two groups were dual enrollment students and traditional college students. The dependent variable was the mean student scores on the CASES. Effect size was calculated as Cohen's *d* as recommended by Howell (2011).

The second research question was analyzed with a one-way ANOVA with four groups at the alpha $p < .05$ level. When considering a relationship between a categorical variable with more than two categories, either dummy coding with regression or a one-way ANOVA can be used as the results are identical (Starkweather, 2010). Gall et al. (2007) recommended the one-way ANOVA for comparing more than two groups on a single dependent variable. The one-way ANOVA is used to "analyze mean differences between two or more groups on a between-subjects factor" (Green & Salkind, 2011 p. 182). The second research question and hypothesis compared four groups on the independent variable of course delivery modality. The four groups were college in the high school, high schoolers in the college, a blend of dual enrollment in the high school and in the college, and online courses. The dependent variable or between subjects

factor was the mean student scores on the CASES. Effect size was calculated as eta squared (η^2) as recommended by Howell (2011).

Assumptions were tested for both research questions and hypotheses before the ANOVA or *t*-test was conducted to ensure the parametric test was appropriate. Data was screened by sorting it to look for unusual scores or inconsistencies. Extreme outliers were identified using a box-and-whisker plot for each group. Outliers that fell more than two standard deviations from the mean were excluded from the data analysis (Larson & Farber, 2015). Assumptions were tested with two statistical tests. First, Kolmogoreov-Smirnov was used to test for normality due to the large sample size. Next, Levene's Test of Equality of Error Variance was used to test the assumption of equal variance. For the ANOVA, after a significant result was found, the Tukey procedure was used as a multiple comparison procedure, due to having four groups, to keep the familywise error rate below .05 (Howell, 2011).

CHAPTER FOUR: FINDINGS

Overview

The present study addressed the gap in the literature considering how the benefits of dual enrollment, such as increase in self-efficacy score, are distributed between students who take courses at the high school, at the college, shared between the high school and the college, or through an online program. This chapter will describe the results from the research. First descriptive statistics for each group are presented. Then, organized by null hypothesis, results are presented to compare traditional students to dual enrollment students and then comparing the different modalities of dual enrollment programs.

Research Questions

RQ1: Is there a difference among the mean self-efficacy scores of dual enrollment students and traditional college students, as measured on the College Academic Self-Efficacy Scale (CASES)?

RQ2: Is there a difference among mean the self-efficacy scores of dual enrollment students who take their courses face-to-face at a high school, face-to-face at a college, a blend between high school and college, or in an online environment?

Null Hypotheses

$H_0$1: There is no significant difference among the mean self-efficacy score of dual enrollment students and traditional college students, as measured on the CASES.

$H_0$2: There is no significant difference among the mean self-efficacy score of dual enrollment students who take their courses face-to-face at a high school, face-to-face at a college, a blend between high school and college, or in an online environment.

Descriptive Statistics

The first research question and hypothesis compared dual enrollment students and traditional college students on the dependent variable of mean college self-efficacy score. A total of 420 students were surveyed. After incomplete surveys were removed, a total of 413 students were used in the initial data analysis. Not all students reported complete demographic information, these responses remained in the data set. Reported demographic data revealed that the entire sample of students were 38% male (n = 158) and 61% female (n = 250). They were 61% white (n = 253), 25% Latino (n = 104), and 6% other races (n = 21). When broken down by subgroups, male students represented a smaller proportion of the dual enrollment subgroup (35%; n = 63) than female students (64%; n = 114). A majority of the dual enrollment students were Caucasian (69%), followed by Latino (19%) and other races (8%). A similar trend was found with traditional students: males represented a smaller portion of the subgroup (40%; n = 95) than female traditional students (58%; n = 136). A majority of the traditional students were Caucasian (56%), followed by Latino (30%) and other races (3%).

The CASES was used to measure the self-efficacy score for each student. On the CASES, a score of five is the highest possible score meaning the student has a very high level of college academic self-efficacy. A score of one is the lowest possible score meaning that the student has a very low level of college academic self-efficacy. The mean self-efficacy score for dual enrollment students (M = 3.65, SD = .49) was slightly higher than the mean self-efficacy score for the traditional student group (M = 3.63, SD = .48). The entire sample had a mean self-efficacy score of 3.64 (SD = .48).

The second research question and hypothesis compared dual enrollment students who took classes at the high school, at the college, a blend of both high school and college, and online

on the dependent variable of mean college self-efficacy score. A total of 181 students were surveyed. After incomplete surveys were removed, a total of 178 students were used in the data analysis. Not all students reported complete demographic information; these responses remained in the data set. Reported demographic data revealed that the male dual enrollment students represented a smaller proportion of the entire sample (35%; *n* = 63) than female dual enrollment students (64%; *n* = 114). A majority of the dual enrollment students were Caucasian (69%), followed by Latino (19%) and other races (8%). The demographic information, broken down by the four subgroups is found in Table 4.

Table 4

Demographics of Sample Subgroups – Dual Enrollment Students

	N	Male	Female	White	Latino	Other
College in the High School	48	46%	52%	69%	15%	8%
High Schoolers in the College	52	33%	67%	67%	23%	6%
Online Dual Enrollment	43	21%	79%	67%	16%	14%
Blend of High School/College	35	43%	57%	71%	20%	6%
All Dual Enrollment	178	35%	64%	69%	19%	8%

Note. Percentages do not add to 100% as some students did not report a gender or race

The mean self-efficacy score for dual enrollment students was 3.65 (*SD* = .49). In order from largest to smallest, the mean scores for the subgroups were 3.77 (*SD* = .47) for college in the high school, 3.69 (*SD* = .52) for students in the blend of high school and college dual enrollment programs, 3.64 (*SD* = .44) for students in online programs, and 3.44 (*SD* = .49) for high schoolers in the college. The mean for each group and the sample sizes are found in Table 5 below.

Table 5

Descriptive Statistics – Dual Enrollment Students

	N	Mean	St. Dev.
College in the High School	47	3.77	.47
High Schoolers in the College	51	3.44	.49
Online Dual Enrollment	41	3.64	.44
Blend of High School/College	35	3.69	.52

Results

Null Hypothesis One

The first hypothesis stated that there is no significant difference among the mean self-efficacy scores of dual enrollment students and traditional college students, as measured by the CASES. This hypothesis was analyzed with an independent samples *t*-test comparing the dual enrollment group as a whole to the traditional college students at the alpha $p < .05$ level. When considering a relationship between a dichotomous variable either dummy coding with regression or a simple independent *t*-test can be used as the results are identical (Starkweather, 2010). Gall et al. (2007) recommended a *t*-test for independent samples when comparing the mean scores of two groups.

Data screening included constructing box-and-whisker plots for each group to identify potential outliers. Outliers that fell more than two standard deviations from the mean were excluded from the data analysis (Larson & Farber, 2015). Figure 1 shows the box and whisker plot for the two groups.

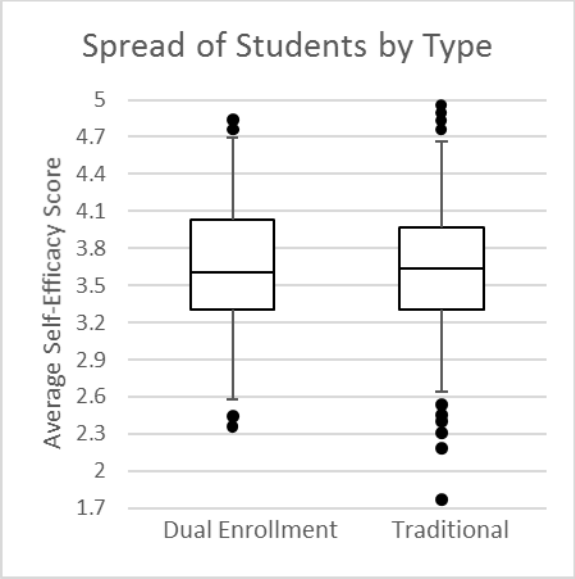

Figure 1. Box-and-Whisker Plot of Dual Enrollment and Traditional Enrollment Mean Self-Efficacy Scores

After removing outliers, the assumptions of the *t*-test were checked with two statistical tests. The first assumption of the *t*-test was that the two groups have equal variances. This was tested with Levene's test for equity of variances which yielded an insignificant result, $F(396) = .35$, $p = .557$, suggesting the equity of variance can be assumed. The second assumption was normality of the sample and the two groups. Kolmogoreov-Smirnov was used to test normality due to the large sample size. The non-significant results found in Table 6 suggest that normality can be assumed.

Table 6

Kolmogoreov-Smirnov Test for Normality – All

	D	*P*
Population	.93	.346
Dual Enrollment Students	.71	.693
Traditional Students	.75	.630

Once the data passed the required assumptions tests, an independent sample *t*-test at the alpha $p < .05$ level was conducted. There was no significant difference between the mean scores of dual enrollment students and traditional students, $t(396) = .24$, $p = .807$, two tailed. There was a small effect size, $d = .0412$. As there was not a statistically significant difference in the mean self-efficacy score of dual enrollment students ($M = 3.65$, $SD = .49$) and traditional college students ($M = 3.63$, $SD = .48$), the null hypothesis was not rejected and it was concluded that that there is no significant difference among the mean self-efficacy score of dual enrollment students and traditional college students, as measured on the CASES.

Null Hypothesis Two

The second null hypothesis stated that there is no significant difference among the mean self-efficacy score of dual enrollment students, as measured on the CASES, who take their courses face-to-face at a high school, face-to-face at a college, a blend between high school and college, or in an online environment. This hypothesis was analyzed with a one-way ANOVA with four groups at the alpha $p < .05$ level. When considering a relationship between a categorical variable with more than two categories either dummy coding with regression or a one-way ANOVA can be used as the results are identical (Starkweather, 2010). Gall et al. (2007) recommended the one-way ANOVA for comparing more than two groups on a single dependent variable. The one-way ANOVA is used to "analyze mean differences between two or more groups on a between-subjects factor" (Green & Salkind, 2011 p. 182).

Data screening included constructing box-and-whisker plots for each group to identify potential outliers. Outliers that fell more than two standard deviations from the mean were excluded from the data analysis (Larson & Farber, 2015). Figure 2 shows the box and whisker plot for the four groups.

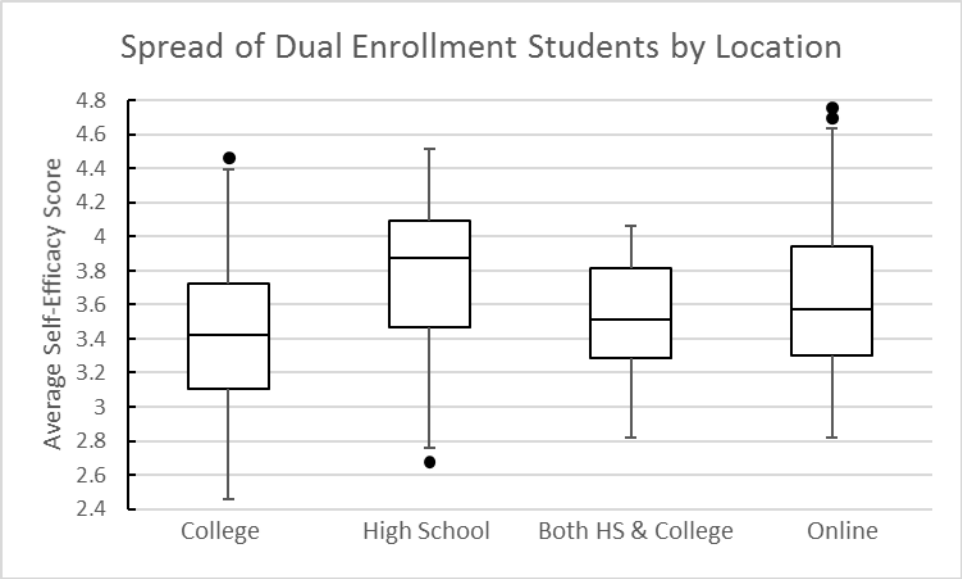

Figure 2. Box-and-Whisker Plot of Dual Enrollment Subgroups Mean Self-Efficacy Scores

After removing outliers, the assumptions of the ANOVA were checked with two statistical tests. The first assumption of the ANOVA is that the two groups have equal variances. This was tested with Levene's test for equity of variances which yielded an insignificant result, $F(3, 170) = .35$, $p = .793$, suggesting the equity of variance could be assumed. The second assumption was normality of the sample and the four groups. Kolmogoreov-Smirnov was used to test normality due to the large sample size. The non-significant results found in Table 7 suggested that normality can be assumed.

Table 7

Kolmogoreov-Smirnov Test for Normality – Dual

	D	*P*
Population	.73	.654
College in the High School	.71	.700
High Schoolers in the College	.63	.819
Online Dual Enrollment	.68	.752
Blend of High School/College	.59	.877

Once the data passed the required assumptions tests, a one-way ANOVA with four groups at the alpha $p < .05$ level was conducted. The ANOVA indicated a significant difference between the mean self-efficacy scores across the four course modalities, $F(3, 170) = 4.11$, $p = .008$. A small effect size ($\eta^2 = .0676$) was found between the groups, suggesting that course modality explained 6.76% of the variance in self-efficacy scores on the CASES. The statistically significant difference in the mean self-efficacy score of college in the high school ($M = 3.77$, $SD = .47$), high schoolers in the college ($M = 3.44$, $SD = .49$), a blend of high school and college dual enrollment programs ($M = 3.69$, $SD = .52$), and online dual enrollment ($M = 3.64$, $SD = .44$) allowed the null hypotheses to be rejected leading to the conclusion that there is no significant difference among the mean self-efficacy score of dual enrollment students, as measured on the CASES, who take their courses face-to-face at a high school, face-to-face at a college, a blend between high school and college, or in an online environment.

Additional Analysis

In order to determine where the difference existed between the subgroups, post hoc multiple comparisons were conducted using the Tukey procedure. This procedure is ideal for more than three groups to keep the familywise error rate below .05 (Howell, 2011). The six comparisons and their corresponding *p*-values are listed in Table 8. The only significant difference between groups was the college in the high school program ($M = 3.77$, $SD = .47$) which was significantly higher than the high schoolers in the college program ($M = 3.44$, $SD = .49$). Both modalities showed no statistically significant difference between any of the other groups. Online dual enrollment students ($M = 3.64$, $SD = .44$) were not statistically different than any other modality. Similarly, students who were enrolled in a blend of college in the high

school and high schoolers in the college programs (M = 3.69, SD = .52) were not statistically different than any other modality.

Table 8

Tukey HSD p-values based on location of the course

	High School	*Both*	*Online*
College	.005*	.093	.187
High School	-	.876	.620
Both	-	-	.979

Note. * $p < .05$.

CHAPTER FIVE: CONCLUSIONS

Overview

This study was conducted to address a gap in the literature by comparing dual enrollment students based on modality of instruction. Based on the results of the previous chapter, the major sections of this chapter provide a discussion on how the gap in the literature was addressed and proposes conclusions based on the review of the literature. In addition, implications for stakeholders, cautions based on limitations of the study, and recommendations for future research are discussed.

Discussion

The purpose of this quantitative causal-comparative research study was to confirm or contradict existing research (An & Taylor, 2015; Boazman & Sayler, 2011; Karp, 2012; Ozmun, 2013), which links higher college self-efficacy with participation in dual enrollment programs, and to provide an initial understanding of how the benefit of a higher level of self-efficacy regarding college performance is distributed between students who take their dual enrollment courses in various modalities. This was accomplished by investigating the difference in mean levels of self-efficacy based on the type of student and the modality of instruction.

Self-Efficacy of Dual Enrollment versus Traditional Students

The first null hypothesis stated that there is no significant difference among the mean self-efficacy score of dual enrollment students and traditional college students, as measured on the CASES. To confirm or contradict existing research on self-efficacy of dual enrollment students, the interval dependent variable of mean college self-efficacy score was measured for the two nominal categories on the independent variable of student type. An independent samples *t*-test was conducted at the alpha $p < .05$ level. There was no statistically significant difference

found between the mean self-efficacy score of dual enrollment students (M = 3.65, SD = .49) and traditional college students (M = 3.63, SD = .48), $t(396) = .24$, $p = .807$, two tailed.

Numerous studies have found multiple benefits that are correlated with dual enrollment participation when compared to traditional high school and college students, including increased performance (Pyzdrowski et al., 2011; Taylor, 2015), being more college ready (An & Taylor, 2015; Kim, 2014), increased college enrollment (Cowan & Goldhaber, 2015; Wang et al., 2015), increased retention (Giani et al., 2014), increased degree completion (An, 2012) and has the potential to reduce the achievement gap based on race and socio-economic status (An, 2013; Perna et al., 2015; Taylor, 2015). However, the first null hypothesis was particularly interested in the variable of self-efficacy. Bandura (1997) defined self-efficacy as "a belief in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). It is an important variable to consider as self-efficacy has been shown to have a direct effect on academic performance (Zimmerman & Cleary, 2006), and higher levels of self-efficacy have been shown to increase scholastic achievement and academic aspirations (Bandura et al., 1996). Self-efficacy can lead to increase performance through improved personal goal setting, engagement, and the level of commitment in the face of difficult obstacles (Zimmerman & Bandura, 1994; Zimmerman & Cleary, 2006). Pajares (2006) found that students with higher levels of self-efficacy work harder, persist longer, and persevere in the face of challenges while having greater optimism and lower anxiety. For these reasons, it is useful to be aware of how dual enrollment programs impact student self-efficacy.

The results of the present study, which found no difference between traditional and dual enrollment students, contradict many of the findings in the literature (An & Taylor, 2015; Boazman & Sayler, 2011). The pre/post-test experiment conducted by both Karp (2012) and

Ozmun (2013) suggested a cause-and-effect relationship between students involved in dual enrollment programs and an increase in self-efficacy. While the dual enrollment students in the present study had a slightly higher self-efficacy score than traditional students, the results were not significant.

A few isolated studies were identified that support the conclusion that there is not a significant difference between dual enrollment students and traditional students. Fischetti et al. (2011) interviewed students who reported that they perceived themselves to have the same academic readiness as traditional freshman, as the current study also found. Another study (Smith et al., 2012) confirmed these results, and focusing on GPAs rather than self-efficacy, found insignificant differences between the two groups, with one group performing slightly better one term and the other group performing slight better in the next term. However, neither result was significant as was the case in this study. While GPA is a different variable than self-efficacy, Bandura et al. (1996) stated that there is a close relationship between scholastic achievement and self-efficacy.

Self-Efficacy of Dual Enrollment Students in Different Modalities

The second null hypothesis stated that there was no significant difference amongst the mean self-efficacy score of dual enrollment students, as measured on the CASES, who take their courses face-to-face at a high school, face-to-face at a college, a blend between high school and college, or in an online environment. To gain an initial understanding of the relationship between course format or location and dual enrollment self-efficacy, the interval dependent variable of mean college self-efficacy score was measured for each of the nominal categories on the independent variable of course modality. A one-way ANOVA with four groups was conducted at the alpha $p < .05$ level. A significant difference was found between the course

modalities, $F(3, 170) = 4.11$, $p = .008$, and post hoc test for multiple comparisons using the Tukey procedure found a significant difference ($p = .005$) between students taking their courses at the high school ($M = 3.77$, $SD = .47$) and at the college ($M = 3.44$, $SD = .49$). No other pairs of modalities yielded a significant difference.

The location of the differences in mean self-efficacy scores based on modality may be a result of how self-efficacy is developed in students. Two studies by Bandura (1997) and Zimmerman and Cleary (2006) stated that self-efficacy is built from four primary sources: performance accomplishments, vicarious experiences, verbal persuasion, and physiological states. The most influential of the four is performance accomplishment or mastery learning (Bandura, 1977; Bandura, 1994; Lent et al., 1996). The time of the success or failure can be very important to forming self-efficacy as early or severe failure can greatly undermine self-efficacy and have a significant impact on long term beliefs (Bandura, 1977; Bandura, 1994). For this reason, the amount of support a student receives in their dual enrollment programs may impact the level of self-efficacy the student reports as it could be directly tied to the amount of initial success the student experienced. Furthermore, Bandura (1977) states that the second largest factor in the development of self-efficacy is vicarious experiences or seeing others succeed or fail in a task, especially in the face of challenges. The amount of role models available to students in the different modalities could have played a significant role in the results of this study.

High schoolers in the college vs. college in the high school. The significant result ($p = .005$), suggesting high schoolers in the college students ($M = 3.44$, $SD = .49$) have lower college self-efficacy scores than college in the high school students ($M = 3.77$, $SD = .47$), is consistent with several quantitative and qualitative studies in the literature. Karp (2012) found

that high school students are initially unaware of the amount of work required to be a successful college student and that dual enrollment programs, such as college in the high school, can help them increase their understanding of their role. Stephenson (2015) added that this lesson can be learned without the risk of failing an expensive course in the actual college environment. This is because college in the high school programs often operate at a slower pace, which gives the student more time with their instructor in what may be a smaller class size (Pyzdrowski et al., 2011; Gardner, 2011). These studies suggested several possible reasons for the higher self-efficacy scores for the college in the high school group.

Bandura (1977, 1994), in the theoretical framework around self-efficacy, stated that early failure in an area can greatly undermine self-efficacy. This is why studies such as Kanny's (2015) are particularly relevant to the results of the present study. Kanny (2015) found dual enrollment students reported many negative interactions when on college campuses such as being judged by other students, not feeling welcome by college faculty and staff, and lower course grades from more rigorous college level work. These early negative experiences could have led to lower self-efficacy scores by the high schoolers in the college.

One study (Tinberg & Nadeau, 2013) provided a strong contradiction with the results of the present study. It was found that students taking dual enrollment courses at the high school felt they were at a disadvantage compared to other college freshman taking classes on the college campus, resulting in lower levels of self-efficacy. These lower levels of self-efficacy lead to lower levels of self-advocacy (An & Taylor, 2015), and students did not feel comfortable with college tasks such as asking instructors for help on assignments. Tinberg and Nadeau (2013) concluded that dual enrollment students taking classes at the high school lack the confidence and experience to perform at a similar level as other students.

Online dual enrollment. There is very little research available exploring the phenomenon of dual enrollment students in online courses (Arnold, 2015) to compare the results of the present study. Research in online instruction is an area that is beginning to gain interest as online instruction can provide a potential solution to the course integrity and instructor credential concerns with college in the high school programs (Tomory & Watson, 2015). There is, however, some research which seems to support the lack of significant difference between online dual enrollment students (M = 3.64, SD = .44) and the face-to-face groups of high schoolers in the college (M = 3.44, SD = .49), college in the high school (M = 3.77, SD = .47), and students enrolled in a blend of the two programs (M = 3.69, SD = .52), p = .187, p = .620, p = .979, respectively. Simonson's (1999) equivalency theory supports the results by stating that there is no difference in outcomes between online and face-to-face instruction, though the learning activities may differ. The theory is supported by several studies finding no difference in comparing the two on performance, critical thinking gains, assignment scores, or test scores (Ali & Smith, 2014; Motii & Sanders, 2014; McCutcheon et al., 2014).

The research contradicting the findings of the present study go two different directions. Parts of the literature support face-to-face instruction making a more positive impact on self-efficacy (Johnson & Palmer, 2015; Tichavsky et al., 2015; Tsai et al., 2015). While other studies (Ghahari & Parker, 2012; McCuthcheon et al., 2014; Stedman & Adams, 2014) suggested that online instruction can make a greater impact. Studies by Enyart (2011) and Harris and Sovall (2013) suggested a reason for the mixed reviews may be a result of online courses being more difficult than students expected and students are surprised by the extra effort required to be successful. However, with these common complaints, students also stated that online courses made them feel more prepared for rigorous college courses after high school graduation. Harris

and Sovall (2013) provided a possible reason high school students may do better: having dual enrollment students take online classes while at the high school can provide opportunities for supplemental on-campus instructors to provide the students with the support needed to be successful. The presence or absence of this support, depending on the study, could make a significant impact on self-efficacy results based on the influence that vicarious experiences and verbal persuasion have on overall self-efficacy (Bandura, 1997; Zimmerman & Cleary, 2006).

Conclusions

This quantitative causal comparative study investigated how the modality of course content delivery impacted the self-efficacy of dual enrollment students. The problem was that while the literature clearly supports the claim that dual enrollment students have higher levels of self-efficacy than traditional students, it was unclear how the benefits of dual enrollment impact different student groups who take courses at the high school, at the college, or through an online program. Data was collected from a sample of 178 dual enrollment students across the state of Washington and a one-way ANOVA with four groups and post hoc Tukey tests at the alpha $< .05$ level found the only significant difference between the groups was students taking classes at the high school reported higher levels of self-efficacy than students taking classes at the college. In addition, 235 traditional college students were surveyed to compare with the 178 dual enrollment students to determine how self-efficacy scores differed between the two groups. A *t*-test with independent groups at the alpha $< .05$ level found no significant difference, contradicting the majority of the research in the literature (An & Taylor, 2015; Boazman & Sayler, 2011; Karp, 2012; Ozmun, 2013).

Self-efficacy is derived from four primary sources: performance accomplishment or mastery learning, vicarious experiences, verbal persuasions, and physiological states (Bandura,

1977; Zimmerman & Cleary, 2006). There may be a fifth source of self-efficacy, especially for high school students, by splitting vicarious learning into two categories: peers or friends and adults including teachers, parents, and coaches (Lent et al., 1996). Performance accomplishments are the most influential factor in the level of self-efficacy as it is based on personal success and failure (Bandura, 1977; Lent et al., 1996; Zimmerman & Cleary, 2006). Vicarious experiences are the second largest impactor of self-efficacy, and the impact can vary in influence based on how similar the student is to the role model demonstrating the behavior (Bandura, 1977, 1994, 1997, 2004). While verbal persuasion and physiological state are not as influential (Zimmerman & Cleary, 2006), they can be important in the short term formation of self-efficacy as they can determine if an individual will persist in the face of challenges, self-doubt, feelings of vulnerability, or stressful situations (Bandura, 1997, 2004). Conclusions based on the results of the present study must be based on this understanding of self-efficacy and how it can be influenced.

Dual Enrollment Students versus Traditional Students

The literature overwhelmingly suggests dual enrollment students have higher levels of self-efficacy than their traditional peers (An & Taylor, 2015; Boazman & Sayler, 2011; Karp, 2012; Ozmun, 2013). However, the results of the current study suggest that there is no significant difference in mean self-efficacy score between the two groups, as measured on the CASES. This result is more closely related to a lone outlier study by Fischetti et al. (2011) that found dual enrollment students perceived they had the same academic readiness as traditional students.

It is important to note that the results did not show dual enrollment students had a lower level of self-efficacy, but rather very similar levels of self-efficacy. Based on the results of this

study and the results of other studies in the literature (An & Taylor, 2015; Boazman & Sayler, 2011; Fischetti et al., 2011; Karp, 2012; Ozmun, 2013), it can be concluded that dual enrollment students have similar or higher levels of self-efficacy when compared to traditional students. This is an important conclusion in the discussion of high school students' readiness for college coursework as higher levels of self-efficacy have been shown to have a stronger relationship on academic performance than actual ability (Zimmerman & Cleary, 2006). Caprara et al. (2008) and Bandura et al. (1996) suggested there is a connection between high levels of self-efficacy and students' perceived ability to regulate their own learning which contributes to higher academic achievement. This is likely because students with high levels of self-efficacy work harder, persist longer, persevere in the face of challenges, are more optimistic about their work, and experience lower anxiety (Barrows et al., 2015; Pajares, 2006). Therefore, high school students do possess a level of self-efficacy that is at least equivalent to traditional college students and there should be little reservation about enrolling in dual enrollment programs.

College in the High School Dual Enrollment Positively Impacts Self-Efficacy

Initially it may seem that the more authentic the college experience is for students, the greater the impact on self-efficacy the modality should have. Kanny (2015) found dual enrollment students taking courses on a college campus learned the "hidden curriculum" of college, including how to be successful in classes, how to get help when needed, and what resources are available to students. However, the present study presents a different picture. Students who take their dual enrollment courses at the high school rather than at the college have a stronger perceived self-efficacy ($p = .005$). The reason for this may be rooted in the structure of different dual enrollment programs and how those structures impact self-efficacy.

Students participating in high schoolers in the college programs travel to a local college to take college courses along with traditional college students (Cowan & Goldhaber, 2015). This provides the students with a true college experience. However, the research and the results of this study suggest that the experience is not always positive. Kanny (2015) described many of the negative experiences dual enrollment students have on college campus. In another study, some students reported that they are unprepared for the pace and rigor of a college level course (Karp, 2012). College courses move at a faster pace, require more work completed outside of class, take place in an environment that the student is not familiar with, and have fewer support systems in place.

When the structure of high schoolers in the college is interpreted through a self-efficacy lens, it may not be the best model for a student's first dual enrollment experience. Self-efficacy can be greatly impacted by initial failure (Bandura, 1977, 1994). As students have very few past experiences on which to rely, the shock of the rigor and pace in a course at the college may result in negative initial experiences. Surrounded by college level students, a lack of role models similar to the dual enrollment student makes positive, vicarious experiences difficult to find. In addition, being removed from the support system in the high school and lacking the confidence to approach an instructor in their office reduces the opportunities for verbal persuasion to improve a student's view of their ability to be successful at college-related tasks. The unfamiliar environment of the college campus could also create additional stress for the students. Negative interactions on college campuses including being judged by other students or not feeling welcome by college faculty and staff (Kanny, 2015) can increase the stress experienced by high schoolers in the college students. Stress can impact a student's physiological state and further

reduce self-efficacy (Bandura, 1997; Zimmerman & Cleary, 2006). This may result in lower perceived self-efficacy for students in high schoolers in the college programs.

This experience is contrasted with college in the high school. In this model, high school students earn college credit on the high school campus through a traditional high school course (Barnett et al., 2015). The course may be taught by a college professor or a high school instructor. These programs are often taught through local partnerships between high schools and post-secondary institutions (Taylor et al., 2015). The environment is familiar to the students. The pace of the course is slower, following the high school calendar. More work is completed in class and more time is spent with the instructor receiving instruction and support on difficult concepts.

Interpreting College in the High School through a self-efficacy lens provides a strong contrast to the High Schoolers in the College program. Dual enrollment students tend to be better high school students (An, 2012; Giani et al., 2014). They have many mastery experiences or performance accomplishments from their past on which to draw confidence in their ability to be successful. These experiences are the strongest influencers of self-efficacy (Bandura, 1977, 1994). In addition, a college in the high school classroom is exclusively made up of peers who are going through the same experience together (Barnett et al., 2015). This structure provides many examples and role models on which to draw positive, vicarious experiences. Also, the established relationships with adult role models at the high school includes teachers, counselors, coaches, advisors, and tutors. These role models can provide the verbal persuasion and respected adult, vicarious experiences required to overcome obstacles, set high goals for success, and instill in the students a belief that they can be successful in the challenging dual enrollment course work (Lent et al., 1996). It seems likely that these elements create a synergy for students to feel

they can be more successful in college-related tasks and increase their perceived college self-efficacy scores.

Effect of Blending Dual Enrollment Modalities on Self-Efficacy

The previous analysis comparing college in the high school and high schoolers in the college appears to suggest that the latter should not be recommended for students. However, the additional analysis comparing students enrolled in both programs paints a different picture. Students enrolled part time in dual credit courses at both the high school and the college were not statistically different from the other modalities in self-efficacy scores.

These students are learning how to be in transition between high school and college (Pyzdrwoski et al., 2011). Taking some classes at the high school provides students the benefit of a slower paced calendar, being surrounded by peers, having access to positive role models, knowing how to advocate for themselves, and being in a familiar place where they have a history of past successes (An & Taylor, 2015; Karp, 2012; Pyzdrwoski et al., 2011). Taking some classes at the college provides students the benefit of learning about the true college experience, including the rigor, speed, and homework expectations of full college courses. Not taking classes exclusively at the high school can help students avoid feeling they are at a disadvantage from students on the college campus (Brunch & Frank, 2011; Tinberg & Nadeau, 2013). Not taking classes exclusively at the college can help reduce students feeling judged by other students or not feeling welcome by college faculty and staff (Kanny, 2015). Students in both modalities are allowed to experience the best of both worlds while learning to adapt to the challenges of the new world with the supports of the old world still in place. Blending college and high school dual enrollment classes is about learning the pros and cons of both locations, and

this is likely a contributor as to why self-efficacy scores between the various groups were not statistically different.

Online Dual Enrollment and Self-Efficacy

With online dual enrollment courses being increasingly attempted by high school students (Lochmiller et al., 2016), there is need for more research around this subgroup. Online dual enrollment students (M = 3.64) and students taking a blend of both high school and college dual enrollment courses (M = 3.69) had the smallest difference in means of all the comparisons made in post hoc multiple comparisons of groups. The Tukey procedure found that there is a 97.9% chance that any difference between the two groups was due to chance rather than an actual difference between the groups. This finding is particularly interesting in light of the previous discussion of students enrolled in both modalities.

Online instruction provides a similar experience to the blended dual enrollment strategy. Students are taking college courses from college instructors, but they are allowed to access the courses from their high school campus (Harris & Soval, 2013; Khazem & Khazem, 2012). The students may not even need to go to a college campus for the course. The same benefits of the blended model might apply to the online modality. Students are surrounded by peers, have access to positive role models, learn about the true college experience, and experience reduced feelings of being judged by other students or not feeling welcome by college faculty and staff (Brunch & Frank, 2011; Kanny, 2015; Karp, 2012; Pyzdrwoski et al., 2011).

Students may still be surprised by the amount of work required to be successful in an online college course (Enyart, 2011; Harris & Sovall, 2013), yet they have more support structures in place at the high school than they would at the college (Harris & Sovall, 2013).

Similar to blending college and high school dual enrollment, online dual enrollment classes also allow students to experience the best of both worlds.

Implications

Before the results of this study are applied broadly, one must be careful of the limitations present in this study that can impact external validity. These are discussed in detail in the next section. Recognizing the limitation that this study only interviewed dual enrollment students at three community colleges in the state of Washington, the results still may have some important implications. Stakeholders in students' dual enrollment choices should consider this result along with other research studies found in the literature and weigh them against the individual needs of specific students.

This study is a first step in addressing a significant gap in the literature. Modality of instruction, such as face-to-face or online, and its impact on dual enrollment students was described as area of dual enrollment that was in need of further research by An (2013) and Giani et al. (2014). Ozmun (2013) specifically called for research investigating dual enrollment classes taught online, face-to-face at the high school, and face-to-face at the college and their impact on self-efficacy. Additional research (Corry & Stella, 2012; Simonson et al., 2012) called for studies that compare high school students in online programs.

The problem has been that while the literature clearly supports the claim that dual enrollment students have higher levels of self-efficacy than traditional students (Boazman & Sayler, 2011; Karp, 2012; Ozmun, 2013), it has been unclear how the benefits of dual enrollment impact students who take courses face-to-face at the high school, face-to-face at the college, shared between the high school and the college, or through an online program. The results of this study are an important first step in this conversation. The gap in the literature has begun to

close; however, as will be discussed later, it is not yet completely closed as there is still much to be learned and explored.

The results of this study have added to the existing body of knowledge and can be useful to stakeholders in dual enrollment programs. Stakeholders include students, parents, teachers, counselors, administrators, and other student service specialists. Given the importance of building self-efficacy with performance accomplishment and avoiding early success or failure within the domain of college success (Bandura, 1977, 1994), dual enrollment stakeholders should be intentional in selecting a dual enrollment strategy for students. Students who plan to enroll in multiple terms or years of dual enrollment courses could plan a "phase in" approach to taking classes at the college. Pyzdrwoski et al. (2011) argued that dual enrollment courses in the high school classroom are a first step in the transition between high school coursework and college coursework. This experience can provide initial success with earning college credits which should increase college self-efficacy. The next transition students can make is to taking a few courses on a college campus while still taking other dual enrollment classes at the high school or online. This incremental success is similar to Bandura's methods to help individuals with phobias overcome their fears in incremental steps made up of positive experiences (Bandura, 2004). During this time, students learn about the college environment and establish a support system and learn the "hidden curriculum" of what it takes to be successful in the college environment (Kanny, 2015). Once this framework is established, they can be ready for a full load of dual enrollment courses taken at the college campus. A strategy such as this could be particularly relevant in Washington State where high school in the college courses start as early as freshman year and the Running Start Program, Washington's version of high schoolers in the college, begins in students' junior year. However, even dual enrollment programs, which start as

late as students' senior year of high school, could consider adapting the "phase in" strategy to fit the requirements and timeline of the particular program.

Limitations

Caution is needed in interpreting the results of this study and broadly applying the results. The results of the study described three community colleges in Washington state and may not be representative of other colleges or university dual enrollment partnerships. In addition, threats to internal and external validity must be considered along with any other limitations.

When considering external validity, there are several potential threats that must be considered. First, generalizing the results of the study from a local, experimentally-accessible population to a larger target population is risky (Gall et al., 2007). At best, the results can only be generalized to the students enrolled at the three colleges used in the investigation. A second threat to external validity could be the presence of the Hawthorne effect. Students filling out the CASES survey instrument were made aware of the focus on different modalities of dual enrollment programs. According to Gall et al. (2007), this could result in students reflecting higher or lower responses than are actually true reflections of their beliefs. The time period the data was collected could be a third threat to external validity. Data was collected near the end of the term, with finals approaching. The impending threat of final exams, papers, and projects could impact student survey responses and other groups of students may report different survey responses if the survey had been given at the start or middle of the term. These threats to external validity of the experiment signify that one should use caution when applying the results of the study to other populations.

One must also consider threats to internal validity to ensure any difference in self-efficacy scores is truly a result of the course modality and not the result of other extraneous

variables. Every attempt was made in the research design to ensure the threat of other variables was minimized, but when human beings are the focus of the experiment, these threats can never be fully eliminated (Gall et al., 2007). For this reason, every effort was made to make the different sections, courses, and colleges as comparable as possible. Surveys were administered during the same three-week period, the courses selected were common across the college system, and only a few key courses were identified to be included in the present study. However, one possible threat to internal validity could be compensatory rivalry which "involves a situation in which control group participants perform beyond their usual level because they perceive they are in competition with the experimental group" (Gall et al., 2007, p. 387).

In addition to concerns around validity, there were also certain assumptions and limitations in this study. The first assumption was that all procedures were followed by instructors administering the survey with absolute fidelity. Another limitation stems from the lack of a true random sample. As this study was not a true experimental design, one cannot generalize the findings of the study beyond the population considered.

Recommendations for Future Research

This study took the first step in attempting to close the gap in the research around course modality for dual enrollment students. Yet, many questions remain that warrant further research and analysis to help bring the issue to a close. Questions that future research could address include:

1. What is the effect (if any) of the different modalities of dual enrollment on other variables such as student performance, college readiness, retention, or degree completion?

2. Is there an interaction effect for dual enrollment students between modality of instruction and other variables such as gender, race, or socioeconomic status?
3. Once students graduate from high school and enroll in college courses full time, is there a noticeable difference between students who took their dual enrollment courses online, at the college, or at the high school?
4. Qualitative studies need to investigate deeper into the results of the present study by investigating phenomenon such as those found in the current study as to why college in the high school students seem to demonstrate higher levels of self-efficacy than high schoolers in the college. Questions that could be considered include the following:
    a. How do dual enrollment students respond to the anxiety of transitioning to college level coursework?
    b. How does a student's home environment or background impact a student's view of dual enrollment programs and their personal self-efficacy?
    c. Case studies could be conducted of students participating in each different modality to investigate how students respond to the context through which the dual enrollment course is delivered, whether online, at the high school, or at the college.

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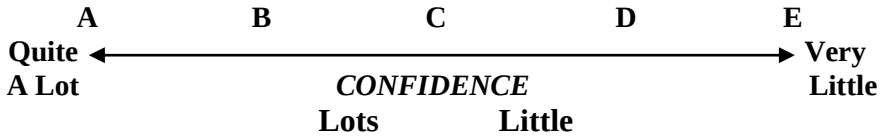
APPENDIX A: College Academic Self-Efficacy Scale

From Owen & Froman (1988), reproduced with permission.

College Questionnaire

DIRECTIONS. We are interested in learning more about you to help us improve our program. Your responses are strictly confidential and will not be shown to others. Do not sign your name. We hope you will answer each item, but there are no penalties for omitting an item.

How much confidence do you have about doing each of the behaviors listed below? Circle the letters that best represent your confidence.



A B C D E 1. Taking well-organized notes during a lecture.
A B C D E 2. Participating in a class discussion.
A B C D E 3. Answering a question in a large class.
A B C D E 4. Answering a question in a small class.
A B C D E 5. Taking "objective" tests (multiple-choice, T-F, matching)
A B C D E 6. Taking essay tests.
A B C D E 7. Writing a high quality term paper.
A B C D E 8. Listening carefully during a lecture on a difficult topic.
A B C D E 9. Tutoring another student.
A B C D E 10. Explaining a concept to another student.
A B C D E 11. Asking a professor in class to review a concept you don't understand.
A B C D E 12. Earning good marks in most courses.
A B C D E 13. Studying enough to understand content thoroughly.
A B C D E 14. Running for student government office.
A B C D E 15. Participating in extracurricular events (sports, clubs).
A B C D E 16. Making professors respect you.
A B C D E 17. Attending class regularly.
A B C D E 18. Attending class consistently in a dull course.
A B C D E 19. Making a professor think you're paying attention in class.
A B C D E 20. Understanding most ideas you read in your texts.
A B C D E 21. Understanding most ideas presented in class.
A B C D E 22. Performing simple math computations.
A B C D E 23. Using a computer.
A B C D E 24. Mastering most content in a math course.
A B C D E 25. Talking to a professor privately to get to know him or her.
A B C D E 26. Relating course content to material in other courses.
A B C D E 27. Challenging a professor's opinion in class.
A B C D E 28. Applying lecture content to a laboratory session.
A B C D E 29. Making good use of the library.
A B C D E 30. Getting good grades.
A B C D E 31. Spreading out studying instead of cramming.
A B C D E 32. Understanding difficult passages in textbooks.
A B C D E 33. Mastering content in a course you're not interested in.

Thanks for your help!

APPENDIX B: CASES Instructions

From Owen & Froman (1988), reproduced with permission.

Scoring Considerations. Many measurement specialists suggest creating a total scale score by summing the item responses. But whenever there are missing data, the sum score is incorrect. That is, a person who omits an item or two gets a lower score, but it is simply an artifact of missing data and not actually "less" of whatever the scale is measuring.

There are two reasons to prefer a mean score, averaging across the items. One, it compensates for missing data. On a 33-item scale, the person who skips two items has her mean calculated on 31 items, and there is no penalty for missing data. Second, it puts the overall score in the same metric as the original response scale, usually 1-5. I have a pretty good sense what an overall score of 4.0 means on a 5-point scale, but it is confusing to think of what a total score of 132 refers to on the 33-item scale. (Those two scores are actually equivalent if there are no missing data).

A couple of years ago, a doctoral student using CASES doubted that there was only one overall dimension. I combined 21 data sets and did a series of exploratory factor analyses. A 2-factor structure looked good, implying two subscores. However, when I tested both the 1-factor model and the 2-factor model with confirmatory factor analysis, it was the 1-factor model that showed the best fit with the data.

So, we stick with the original scoring protocol, which is to calculate mean scores across all the items. Below are some summary data from our large CASES data file, so you can get a sense of how University of Connecticut undergraduate students scored across a 5-year period.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
c1	3147	1	5	2.72	1.130
c2	3143	1	5	2.89	1.155
c3	3141	1	5	3.13	1.177
c4	3139	1	5	2.59	1.188
c5	3142	1	5	2.56	1.126
c6	3141	1	5	2.82	1.092
c7	3135	1	5	2.89	1.070
c8	3140	1	5	2.78	1.047
c9	3140	1	5	3.10	1.083
c10	3138	1	5	2.83	1.073
c11	3144	1	5	2.91	1.087
c12	3141	1	5	2.79	1.042
c13	3142	1	5	2.72	1.025
c14	3130	1	5	3.40	1.301
c15	3141	1	5	2.74	1.350
c16	3133	1	5	2.63	1.117
c17	3147	1	5	2.34	1.500
c18	3142	1	5	2.45	1.335
c19	3124	1	5	2.55	1.169
c20	3135	1	5	2.70	1.056
c21	3128	1	5	2.65	1.076
c22	3137	1	5	2.46	1.423
c23	3134	1	5	2.87	1.254
c24	3133	1	5	2.83	1.204
c25	3128	1	5	2.87	1.132
c26	3126	1	5	2.86	1.110
c27	3134	1	5	3.14	1.193
c28	3109	1	5	3.03	1.012
c29	3134	1	5	2.75	1.144
c30	3130	1	5	2.72	1.115
c31	3137	1	5	2.93	1.083
c32	3131	1	5	2.91	.904
c33	3135	1	5	2.95	.916
CASES	3149	1.19	4.91	2.8041	.65143
Valid N (listwise)	2911				

APPENDIX C: Permission to use CASES Instrument

27 March 2016

Dear Researcher,

Thank you for your inquiry about the College Academic Self-Efficacy Scale (CASES). You are welcome to use CASES, and to print a copy in your dissertation. I've included a copy of the scale below. Here are a few summary points about the scale.

Items are scored as A ("quite a lot") = 5…E ("very little") = 1. On the other hand, because we read from left to right, data entry is faster letting A = 1, and E = 5. If you enter data with A = 1, then let the computer recode the values so that A becomes 5, B becomes 4, etc.
In calculating an overall CASES score, we prefer calculating a mean rather than a sum.

You may wish to modify questionnaire instructions to best fit your application. For example, if you need informed consent, you might say something like "Filling out this questionnaire is completely voluntary and confidential. There are no penalties for not participating, and you may quit at any time."

The next page shows the CASES items. Following that is a conversation about scoring CASES, plus some normative data.

Best wishes in your research.

Sincerely,

Steven V. Owen, Professor (retired)
Department of Epidemiology & Biostatistics
University of Texas Health Science Center at San Antonio
7703 Floyd Curl Dr., MC 7802
San Antonio, TX 78229-3900

APPENDIX D: IRB Permission

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

October 19, 2016

Tyler Wallace
IRB Exemption 2617.101916: Comparing the Self-Efficacy of Dual Enrollment Students Taking Classes at the High School, at the College, and Online

Dear Tyler Wallace,

The Liberty University Institutional Review Board has reviewed your application in accordance with the Office for Human Research Protections (OHRP) and Food and Drug Administration (FDA) regulations and finds your study to be exempt from further IRB review. This means you may begin your research with the data safeguarding methods mentioned in your approved application, and no further IRB oversight is required.

Your study falls under exemption category 46.101(b)(2), which identifies specific situations in which human participants research is exempt from the policy set forth in 45 CFR 46:101(b):

> (2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless:
> (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation.

Please note that this exemption only applies to your current research application, and any changes to your protocol must be reported to the Liberty IRB for verification of continued exemption status. You may report these changes by submitting a change in protocol form or a new application to the IRB and referencing the above IRB Exemption number.

If you have any questions about this exemption or need assistance in determining whether possible changes to your protocol would change your exemption status, please email us at irb@liberty.edu.

Sincerely,

G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
The Graduate School

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APPENDIX E: Student Consent Form

The Liberty University Institutional Review Board has approved this document for use from 10/19/2016 to --
Protocol # 2617.101916

CONSENT FORM

Comparing the Self-Efficacy of Dual Enrollment Students Taking Classes at the High School, at the College, and Online

Tyler Wallace
Liberty University
School of Education

You are invited to be in a research study of student's beliefs on their ability to be successful in college. This study will compare results of dual enrollment students and traditional students based on the location of the course deliver (online or face-to-face). You were selected as a possible participant because you are 18 years or older and are enrolled in a key course that students commonly take as part of a degree/program. I ask that you read this form and ask any questions you may have before agreeing to be in the study.

Tyler Wallace, a doctoral candidate in the School of Education at Liberty University, is conducting this study.

Background Information: The purpose of this study is to gain an initial understanding of students' views of their own abilities to be successful in college based on the type of courses they are enrolled in.

Procedures: If you agree to be in this study, I would ask you to do the following things:

1. Fill out a five to ten minute, 33 question, multiple-choice survey on how confident you are at completing various tasks that are common to the college experience

Risks and Benefits of being in the Study: The risks involved in this study are minimal, no more than you would encounter in everyday life.

There are not any personal benefits to participating in this study. However, the results of the study will be helpful to administrators and instructors as they design future courses similar to the one you are enrolled in.

Compensation: If participants wish, they may enter into a drawing for one of five $5 coffee cards or one grand prize drawing of a tablet. The drawing will take place after all surveys are completed.

Confidentiality: The records of this study will be kept private. In any sort of report I might publish, I will not include any information that will make it possible to identify a subject. Research records will be stored securely and only the researcher will have access to the records. All electronic information will be password protected and paper information will be kept secure in a locked file cabinet. Upon completion of the study and publication of the results, all the data will be deleted or shredded after a required three-year retention period.

Voluntary Nature of the Study: Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with Liberty University, your college, or your status in your course. If you decide to participate, you are free to not answer any

question or withdraw at any time prior to submitting your survey without affecting those relationships.

Contacts and Questions: The researcher conducting this study is Tyler Wallace. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact him at twallace31@liberty.edu. You may also contact the researcher's faculty advisor, Dr. Putney, at nputney@liberty.edu.

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board, 1971 University Blvd, Green Hall 1887, Lynchburg, VA 24515 or email at irb@liberty.edu.

APPENDIX F: Student Survey Instructions

From Owen & Froman (1988), reproduced with permission.

We are interested in learning more about you to help us improve our program. Your responses are strictly confidential and will not be shown to others. Do not sign your name. We hope you will answer each item, but there are no penalties for omitting an item.

For each question you will indicate how much confidence you have about doing each of the college related behaviors. Mark the letter that best represent your confidence with "A" indicating "Quite a lot of confidence" and "E" indicating "Very Little Confidence" as demonstrated in the scale below.