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Dual Enrollment's Impact on Completion

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Dual Enrollment's Impact on Completion

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ABSTRACT

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The purpose of this study was to determine if there is a relationship between dual enrollment engagement and the completion of a certificate or diploma at a Tennessee College of Applied Technology. Other factors such as demographics of race and age was considered as well. This study is useful in providing further information on the transition from secondary to postsecondary education. Information was gathered to determine the relationship between high school dual enrollment students who attend a Tennessee College of Applied Technology and the likelihood of graduating with a diploma. The participants consist of high school dual enrollment students from each of the 27 Tennessee College of Applied Technology institutions across the state of Tennessee. The findings of this study were that there is a correlation between increased levels of dual enrollment engagement and the completions of a certificate or diploma.

DEDICATION

As I complete such a significant chapter in the story of my life I am overjoyed to declare that I have completed my dissertation along with the necessary requirements to graduate with my Doctorate of Education in Postsecondary and Private Sector Leadership from East Tennessee State University. However, I cannot take all of the credit for completing such an accomplishment on my own. I have heard it said that when you see a turtle sitting on a fencepost you know that it didn't get there on its own. My receiving this diploma is no different.

I would first like to thank the good Lord almighty through whom all things are possible for giving me the skills, ability, and determination to complete this process. On my own I can accomplish nothing, but through him there is nothing that I cannot do.

To my wife, Miranda: I would like to say thank you for the extensive list of things you have done over the years to support my efforts to continue my education. You have continually sacrificed your time and efforts to assist me in completing this diploma so that we can ensure our family has a bright future ahead of us and that our baby girl has opportunities in life that are second to none.

To my baby girl, Macy Victoria: I hope you one day truly understand the dedication and sacrifice that your mother and I have displayed before you and hope that you can one day do the same for your children. You are loved beyond measure and I thank the good Lord for you often.

To my parents, James and Linda: I thank you for working hard your entire live to make sure that me and my sister never went without. I thank you for assisting me financially in my pursuit of education, but even more I thank you for being there for me over the years and encouraging me each step of the way.

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Chapter 1. Introduction

Dual enrollment provides an opportunity for high school students to get a head start on their post-secondary education while still enrolled as high school students (Zinth, 2014). Dual enrollment is expanding in programs of career and technical education. The National Council on Education Statistics found that 82 % of high schools had students who were participating in dual enrollment programs and of those dual enrollment students, nearly half of them were participating in programs with a career and technical education focus (Zinth, 2014). Career and technical education programs provide hands on training of interest to students. Gaining the interest of the students keeps the student focused on continuing and completing their educational pursuits. Zinth found that career and technical education students are more likely to earn a high school diploma.

The popularity of dual enrollment has led to the study of its impact on a national level (Gewertz, 2016). Dual enrollment programs allow students to try college-level coursework while still in high school. Some questions remain as to the benefit of this approach. Some dual enrollment students had negative experiences such as credits that do not transfer. Growing pains such as this one have led to progress. With a little bit of planning and preparation dual enrollment opportunities can result in many well-documented benefits. As popularity of these programs continues to rise, so does enrollment. According to Gewertz (2016), “About 1.9 million students – 11.4 % of the secondary school population were taking some form of dual enrollment course in 2010-11.” (p. 1). At that time dual enrollment had increased by 700,000 since the 2002-03 calendar year. This increase in enrollment continued regardless of some negative experiences that have been reported in the past (Gewertz, 2016).

Despite the negatives noted by Gewertz (2016), dual enrollment provides many opportunities to high school students (Karp et al., 2012). Dual enrollment opportunities provide students with a better understanding of expectations at the college level. Students who take advantage of this opportunity are more likely to graduate from high school and are more likely to enroll in college courses than students who have not participated in dual enrollment programs. These students also achieve higher grade point averages and graduate at higher rates than non-dual enrollment students. Dual enrollment programs allow students to develop study skills and good habits that facilitate success at the college level of study. Dual enrollment participation creates academic momentum as students build a nest egg of success while still in high school, which serves as fuel to propel them to future success (Karp et al., 2012).

Tennessee encourages college readiness by preparing students for post-secondary education through dual enrollment opportunities (Karp et al., 2012). These opportunities provide students with a better understanding of collegiate expectations. Another positive impact as a result of dual enrollment is that students are more likely to graduate from high school. This experience encourages college success. Dual enrollment students have higher grade point averages than their counterparts who do not participate in dual enrollment. Dual enrollment students are more likely to continue their education, as well as make better grades than their counterparts (Karp et al., 2012).

The Connecticut Technical High School system is the only system in the nation that is funded and operated by the state (New England Association of Schools and Colleges, 2016). Other states such as Florida, Texas, Georgia, North Carolina, and Kentucky each place emphasis on technical education by funding dual enrollment opportunities (Karp et al., 2012). The courses offered in these states have consisted of a wide range of course offerings that include career and

technical education courses of study. These states have found the need to limit broad course choices in an effort to focus a clear path towards the completion of a credential (Karp et al., 2012).

States have various policies and regulations regarding students who take dual enrollment (Education Commission of the States, 2019). In Tennessee and Alabama dual enrollment opportunities are available to students in the 11th and 12th grades, where as in Georgia dual enrollment is available to students in grades 9-12. Many states have dual enrollment policies that are unique to that state. For example, in Minnesota postsecondary institutions must give enrollment priority to postsecondary students. However, after students have been enrolled in a postsecondary course through the postsecondary institution, the student then may not be displaced by another student. California has two dual enrollment programs. The original program allows high school students to attend postsecondary institutions part-time while still enrolled in high school. The second program consists of a College and Career Access Pathways partnership between the postsecondary institution and the school district to offer opportunities to students who may not be college bound or who are underrepresented in higher education. Through this second program districts may receive and allowance or apportionment for student attendance (Education Commission of the States, 2019).

Several states have exhibited many similarities to Tennessee regarding their dual enrolment programs. However, differences also existed in each of these states pertaining to the requirements for student to be eligible to enroll in these programs (Karp et al., 2012). In Florida students must have a 3.0 grade point average and pass the state's college readiness test (PERT) in order to be eligible to enroll in college-credit dual enrollment course. Florida requires that high school students must have a least a 2.0 grade point average in order to enroll in career

certificate areas of study. In Texas students demonstrate dual enrollment course readiness on one of their state's approved exams such as the COMPASS, ACCUPLACER, or THEA. Georgia's dual enrollment setup is much like Tennessee in that has both separate technical and community colleges available for dual enrollment opportunities. In Georgia students must have a 3.5 grade point average to enroll in college level general education courses and a 3.0 grade point average in order to enroll in technical education courses. North Carolina requires that students have a 3.0 grade point average in order to take academic coursework and pass a college readiness assessment or placement test. The test requirement can be waived if the student has a 3.5 grade point average. North Carolina student pursuing dual enrollment coursework in technical education are required to have a 2.0 grade point average or higher. Kentucky leaves eligibility requirements up to individual colleges. These standards often consist of passing a placement test (Karp et al. 2012).

The dual enrollment opportunities that exist prepare students for future careers in the workforce (Eyster et al., 2013). Technical programs are in demand by employers who seek to hire employees with the skill sets needed. Billions of dollars have been spent by the federal government as an investment in workforce development through programs such as the American Recovery and Reinvestment Act of 2009 (Eyster et al., 2013). Workforce development programs are focused on training employees and potential future employees to better prepare them for the needs of employers. These programs focus on quick return of unemployed workers to the workforce, as well as prepare youth for future employment through programs such as the Summer Youth Employment Program. Dual enrollment programs provide students with a head start towards receiving the training and knowledge that employers seek in employees. Dual enrollment facilitates a path for completing post-secondary training programs sooner after

graduating high school so that the workforce needs can be met faster than traditional means of college completion used in the past. Future shortages are anticipated for skilled workers in industries such as health care and advanced manufacturing (Eyster et al., 2013).

Due to economic downturn, students have been presented with fewer opportunities for training and education (Eyster et al. 2013). Dual enrollment allows high school students the opportunity to take advantage of the training that exists at the post-secondary level while still in high school. The credit received remains on the student's post-secondary transcript and serves as a motivator to continue post-secondary pursuits after high school, because these students are at an advantage of having post-secondary credits that non-dual enrollment students do not have (Eyster et al., 2013).

Hoops (2010) provides the most recent data in regards to the Tennessee Colleges of Applied Technology institutions. In Tennessee, the approach to providing technical education at the post-secondary level in an effort to jumpstart the future careers of high school student has continued to be successfully implemented by the Tennessee Colleges of Applied Technology (Hoops, 2010). The Tennessee Colleges of Applied Technology, formerly known as the Tennessee Technology Centers, are Tennessee's premier providers of Workforce Development (Smith, 2014). The opportunities at the TCATs provide a broad range of one to two year technical/occupational programs (Hoops, 2010). These programs have high completion and placement rates which result in placing students within relatively high wage employment. Integrated Postsecondary Education Data System (IPEDS) data shows that over the five-year period of 2004 through 2009 all twenty-seven TCATs averaged above 70% completion rates among all of the programs. No other state system came close in comparison with these results, which have continued. The TCAT system continues to prove itself to be a working model of

student success that is effective in training and preparing students for the workforce. High school juniors and seniors are eligible to enroll at a TCAT making it possible to get a jump start on their postsecondary education before graduating high school. The hours completed as dual enrollment reduces the hours to be completed as a post-secondary student. The TCAT system as a whole has continued to boast similar completion rates since the time of this study by Hoops (Hoops, 2010). According to the Council on Occupational Education website, the statewide completion rate for TCATs during the 2015-2016 academic year was 83%. (Council On Occupation Education, 2018).

Hoops (2010) provides a study that focuses specifically on the Tennessee College of Applied Technology system. The credits earned as a dual enrollment student are documented on the student's transcript and are applied towards the completion of the student's diploma at the secondary level. These students are then able to continue on a full -time basis beyond high school and take advantage of technical/occupational programs at the post-secondary level.

Dual enrollment programs have been implemented by the TCATs to provide opportunities to high school students throughout the state of Tennessee. The TCATs help businesses and industries by developing a well-trained and skilled workforce (Smith, 2014). The TCATs are accredited by the Council on Occupational Education (COE), which requires each TCAT program to maintain a 60 percent Completion Rate, 70 % Placement Rate, and a 70 % Licensure Exam Pass Rate to ensure that the needs of the workforce are being met. The TCATs provide dual enrollment opportunities that results in a strong pipeline between secondary and post-secondary students (Smith, 2014).

Statement of the Problem

Dual enrollment opportunities provide the vital first steps to the process of establishing workforce development efforts within the state of Tennessee. The TCAT system invests much time, effort, and resources into the recruitment of high school dual enrollment students, yet minimal data exists showing if there is a significant impact of the dual enrollment experience on the likelihood of completion of a certificate or diploma. The Tennessee Board of Regents (TBR) has not collected or analyzed data on information that showed the relationship between dual enrollment and the completion of a certificate or diploma. The purpose of this quantitative study using archival data is to determine if there is a relationship between attending a Tennessee College of Applied Technology as a high school dual enrollment student and completing a certificate or diploma and to explore if higher levels of engagement result in higher levels of completion of a certificate or diploma.

Research Questions

The following questions are to be answered regarding the relationship between dual enrollment and completion of a certificate or diploma:

Research Question 1: Is there a significate difference in the number of hours logged by dual enrollment students between those who received a credential (certificate or diploma) and those who did not receive a credential?

Research Question 2: Is there a significant difference in the proportion of TCAT students that earn a credential (certificate or diploma) among the three levels of engagement (no engagement, low to moderate engagement, or high engagement)?

Research Question 3: Is there a significant difference in the proportion of TCAT students who earn a credential (certificate or diploma) between dual enrollment participants and those who do not participant in dual enrollment?

Research Questions 4: Is there a significant difference in the proportion of TCAT students who earn a certificate between dual enrollment participants and those who do not participant in dual enrollment?

Research Question 5: Is there a significant difference in the proportion of TCAT students who earn a diploma between dual enrollment participants and those who do not participant in dual enrollment?

Significance of the Study

This study assessed data from TBR's SIMS database of former dual enrollment students at the Tennessee Colleges of Applied Technology to determine to what extent, if any, a relationship exists between dual enrollment status and completion of a certificate or diploma. If a relationship exists between dual enrollment and overall completion, the TCAT system as a whole could benefit from placing greater emphasis on the recruitment of dual enrollment students. The TCAT system is required to report completion rates of each program annually. A strong relationship between dual enrollment and completion could result in an increase in the recruitment efforts of dual enrollment students as a means of increasing the completion rates of the institution. An increase in recruitment could lead to an increase in enrollment of dual enrollment students. The known impact of dual enrollment towards completion of a certificate or diploma could also serve as a motivational factor for parents and secondary administrators to encourage high school students to engage in dual enrollment programs.

The findings of this study also provide information for future research of dual enrollment completion rates among students who attend a Tennessee College of Applied Technology. If hours completed by dual enrollment students do have a significant impact upon completion rates then future efforts to recruit and retain dual enrollment students could see a dramatic increase. The increase in effort toward recruitment and retention of dual enrollment students could cause a rise in dual enrollment numbers in the future as a result of the findings of this study.

Definitions of Terms

The most common terms associated with dual enrollment status have been identified and defined in order to provide clarity and avoid any confusion due to unfamiliar terms that may be discussed.

1. Certificate

   At many institutions, 'certificate' is the preferred term for an award given out to non-degree-seeking students who have completed a postsecondary education program. Depending on the academic institution, the aforementioned description of a diploma could also apply to a certificate. Certificate programs could also involve taking a series of courses within a diploma program. Additionally, certificates are available at the post-baccalaureate level (“What is the Difference”, n.d.).

2. Completion Rate

   The ratio of unduplicated counts of students reaching completion divided by the total number of students in a particular tracking cohort. (Marlow M., Tincher-Ladner L., King S., & Boggs G., 2016)

3. Diploma

At the postsecondary level, diploma programs are usually short-term and less comprehensive than associate's degree programs. Community colleges offer diploma programs as educational opportunities for students who aren't pursuing full-time degrees. Diploma programs usually consist of several courses in a specific subject area or skill and can lead you toward entry-level employment in a professional field ("What is the Difference", n.d.).

4. Dual Enrollment

   Dual enrollment programs are collaborative efforts between high schools and colleges consisting of a situation where high school students are able to take college courses while still in high school. Such arrangements provide students with challenging curriculum and allow the student to earn college credit prior to graduating high school. (Karp & Hughes, 2008)

Limitations and Delimitations

This study is delimited to a sample of students who attended a Tennessee College of Applied Technology during the 2015-2016 academic year. The time period chosen allows for the possibility of completing as a full-time student beyond high school. These students may enroll as dual enrollment students again the following year before returning as a full-time student to complete a program longer than one year in length. These students will enroll in one of the 89 programs offered among the 27 TCATs.

The 27 TCATs are located at Athens, Chattanooga, Covington, Crossville, Crump, Dickson, Elizabethton, Harriman, Hartsville, Hohenwald, Jacksboro, Jackson, Knoxville, Livingston, McKenzie, McMinnville, Memphis, Morristown, Murfreesboro, Nashville, Oneida,

Paris, Pulaski, Ripley, Shelbyville, and Whiteville. This study included the selection of all 89 programs offered at a TCAT (Appendix A – TCAT Programs) during a four-year period of time among the TCAT system. This study targets a group of dual enrollment students from the previous 2015-2016 academic year, which consists of spring, fall, and summer trimesters. The delimitations of this study include limiting it to Juniors and Seniors who were enrolled in one of TCAT programs during a one-year period of time that includes the 2015-2016 academic year.

The limitations of this study involve not including all dual enrollment students as well as all post-secondary programs across the state of Tennessee. Other limitations of this study include not including data for technical programs outside of the TCATs. Therefore, it does not represent the relationship between dual enrollment and completion in other programs throughout other colleges in Tennessee or colleges in states other than Tennessee. This data is limited to a sample and while other studies may result in similar findings, future studies may note some variances among the findings.

Overview of the Study

The contents of this study will consist of five chapters. Chapter 1 includes an introduction, statement of the problem, research questions, definitions of terms, and limitations and delimitations. Chapter 2 consists of a literature review of recent high school dual enrollment articles related to this study. The literature review consists of a brief history of dual enrollment along with background of the TCAT system and a review of its effectiveness. The literature will discuss the purpose of technical education. The literature review will also list and describe the programs selected for this study. Chapter 3 provides the research methodology used in the study and outlines the population selected, design, data collection, methodology, and data analysis.

Chapter 4 consists of the findings of this study and chapter 5 provides conclusions and recommendations for future research.

Chapter 2. Review of Literature

This literature review addresses the details of dual enrollment programs. The specific details of program design will be reviewed, as well as the arrangements of how these programs are established. Additionally, the topic of workforce training needs that are provided by dual enrollment programs is also a consideration that will be addressed. Other considerations such as program benefits which include student engagement, cost savings, increased academic performance are of relevance when reviewing the impact of dual enrollment. These benefits will be addressed along with other positive impacts that result from dual enrollment. One major benefit to consider includes the economic impact on the community and this topic will certainly be mentioned. The benefits gained by the student are also important to understand. The role of dual enrollment in providing realistic expectations for future post-secondary studies is reviewed. The student engagement provided by dual enrollment decreases the drop out rate and provides a sense of the fact that college can be an achievable goal in the minds of secondary students. The topic of longevity for dual enrollment programs is also discussed along with other considerations that are of relevance. Each of these topics are discussed in an effort to better understand the concept of dual enrollment.

Program Design

Some may be under the impression that dual enrollment is a new program, but dual enrollment programs began to emerge in the early 1970s, with a significant increase being evident during the 1980s, after the release of a report by the U. S. Department of Education's National Commission on Education called A Nation at Risk, which provoked many states to improve the academic scholarship of its high school students. (Lewis, 2009 p. 23).

Approximately two million students around the nation are participating annually in dual enrollment which is offered in 71% of America's public high schools (Lewis, 2009). Dual enrollment programs now exist in all 50 states. Different states have different policies regarding dual enrollment. Although state policies differ most have similar student requirements and funding details. Most of the other details are determined by the educational supervisors from the partnering high schools and colleges. Two different types of dual enrollment programs exist. In comprehensive programs the majority of the student's tuition and fees are covered. In limited programs the tuition and fees are paid for by the students and the students have more eligibility restrictions upon entering the dual enrollment program. There are several factors that a state must take into consideration when establishing a dual enrollment program. Policies are put into place to guide the high school and the higher education institution actions during the dual enrollment process. To define dual enrollment programs, several decisions have to be made and policies have to be put into place (Lewis, 2009).

Each state has dual enrollment programs that vary regarding specifics, but the programs established ultimately serve the purpose of allowing students to earn post-secondary credit while still in high school. Washington state created a dual enrollment program in 1990 called *Running Start* to allow juniors and seniors to simultaneously earn both high school and college credit (Johnson & Brophy, 2006). This program initially enrolled 3,350 students and continued to grow at a rate of nearly 5 percent over the next several years. This program resulted in a lower cost of college. It reduced the tax burden on taxpayers from the inception of the program through the time of this study. During this timeframe, parents and students have saved $23.1 million in tuition and taxpayers have saved $36.4 million through simultaneous enrollments. This was accomplished by providing credit of concurrent coursework, which eliminated the cost for

duplicate credits. The two main incentives of this program are savings of the overall costs of post-secondary education and it has shortened the time required to complete a degree as a result of eliminating duplicate coursework. Additionally, 80% of students in the Running Start program intended to transfer to a four-year institution to continue their educational pursuits (Johnson & Brophy, 2006).

From a nationwide perspective, state policies have proven to be instrumental in providing high quality dual enrollment programs to expand (College In High School Alliance, 2017). Providing incentives and establishing priorities for furthering dual enrollment opportunities has proven to be a successful approach. Policies that require high school credit to be awarded toward graduation has also contributed to the growth of dual enrollment programs. The alignment of secondary programs with postsecondary programs that train the technical skills to meet the needs of the regional labor market demands is crucial. The establishment of partnerships has also proven to pave the way in increasing the college going rate (College In High School Alliance, 2017).

A study of a high school in Texas recommended the massive expansion of college opportunities to be offered within the high school (Villareal, 2017). These college courses resulted in an increase of both the high school graduation rate as well as college enrollment while shortening the time to college graduation. Villareal found that when a group of high school students each took at least one dual enrollment course, the cohort as a whole increased its four-year graduation rate by 4.4%. The same cohort experienced an 11.6% increase in enrollment at a university the following year (Villareal, 2017).

The implementation method used to establish dual enrollment programs can be critical to the long term of those programs (Cassidy et al., n.d.). One strategy is to combine high school

students with college students on college campuses. In many instances when the student is allowed to come on campus and enroll in classes with the regular students the professor does not know the student is a dual enrolled student. This allows the student to get the most of the college experience (Cassidy et al., n.d.).

In some instances, the distance between the high school and the college prevents the students from participating in on-campus college courses (Cassidy et al., n.d.). In cases such as this, the college may provide a professor to teach the class within the high school or online. Another option for teaching the dual enrollment course could be to employ a high school instructor who is qualified to teach the college course. Some college professors question whether college courses taught by high school teachers adequately prepare the student for college class work. They fear the class work will be taught more to high school standards and less demanding than those taught by college professors. Often support is provided to the high school teacher through the college and they may be provided with a professor as a mentor during the dual enrollment class. The high school teacher may also be provided with needed materials and syllabi to correspond with the same college credit class taught on campus (Cassidy et al., n.d.).

To start a successful dual enrollment program, proper articulation agreements must be in place along with the appropriate funding for tuition, textbooks and transportation. (Cassidy et al., n.d.). The college credits are only as good as the articulation agreement. If a student obtains a college credit that does not transfer to the college they attend after high school, then the course credit is futile. Most articulation agreements include a common list of general education courses that are transferable between all public and even some private two-year and four-year higher education institutions (Cassidy et al., n.d.).

Individual states have different policies to fund dual enrollment programs (Cassidy et al., n.d.). Dual enrollment tuition may be paid for by the state or by the student. In some instances, the college may waive tuition to obtain the students attendance after high school, receive good publicity, or improve the students need for remedial courses upon entering college.

> Nationally six states pay tuition for dual enrollees. Fifteen states require districts to pay tuition on behalf of dual enrollees, or the state or colleges waive tuition for dual enrollees. In 22 states, students are required to pay tuition, and a few sates make to provision for tuition, leaving it to local institutions to determine whether to pass this cost on to students. At least two states, Georgia and Tennessee have extended their college scholarship programs (funded through the state lottery proceeds) to Dual Enrollment students who meet academic eligibility criteria. (Cassidy et al., n.d.) (p. 13)

Often the States that offer the best dual enrollment funding system have strict regulations on the types of dual enrollment courses that may be available. When state-funding is not involved in dual enrollment this allows dual enrollment rules and agreements to be determined on a local level (Cassidy et al., n.d.).

Textbooks are not typically covered in the dual enrollment financing (Cassidy et al., n.d.). Students may be required to cover the costs of their own text books. In some instances, the district or the college may have to pay for a portion of the text books. In three states students are provided with grant funding to cover the cost of text books. When textbooks costs are not covered this could significantly decrease the participation in the dual enrollment programs especially where lower income students are involved. Some schools have alternative cost saving ideas such as asking the professor to use the same text book for multiple semesters so the books can be passed down to students or keeping the text books in the school's library for different

students to use. Students may also buy used books online or from former students (Cassidy et al., n.d.).

Most states do not cover transportation costs between the high school and the college (Cassidy et al., n.d.). Some states students can apply for reimbursement for travel or grants may be given for transportation. In many instances when the distance between high schools and colleges are significant, dual enrollment courses are offered at the high school or online. This arrangement may eliminate all transportation costs (Cassidy et al., n.d.).

States have various policies and regulations regarding students who take dual enrollment (Porter, 2003). In Alaska, students in grades 9-12 may take up to three college credits per semester and they will receive half credit for high school and three college hours. In Illinois, only instructors employed by the college may teach dual enrollment classes. Kansas allows qualified high school teachers to teach classes within the high school as adjunct teachers. Kentucky students must score above average on a test specified for dual enrollment and students must also have a GPA of 3.2 or higher. To participate in dual enrollment in Mississippi a student must score a 21 or higher on the ACT, have a 3.0 GPA and the counselor or principal must recommend the student. The regulations regarding dual enrollment in Tennessee vary around the state. Currently, to be eligible to receive Dual Enrollment Grant funding in the state of Tennessee beyond the first trimester students must achieve a cumulative college grade point average of 2.75 for all post-secondary courses attempted while participating in the Dual Enrollment Grant program (Tennessee Higher Education Commission & Student Assistance Corporation, 2019). Dual enrollment classes are offered either on the college campus or at the high school by a qualified high school adjunct instructor. Tennessee colleges require students to maintain a 3.0 or higher grade point average in order to remain eligible for dual enrollment grant funding. Many

technical colleges in Tennessee offer dual enrollment in business and technical areas. Qualifications are less demanding allowing more students to participate. Students work toward a certificate program rather than a degree program. Technical colleges focus on obtaining a certificate or diploma rather than a degree (Porter, 2003).

Benefits of Dual Enrollment

Dual enrollment programs such as the ones available at the TCATs have helped pave the way for the development of future opportunities. Karp and Hughes (2008) found that exposure to post-secondary education as a dual enrollment student provides the student with a transition to post-secondary education. Dual enrollment exposure was identified as a means of successfully bridging the gap in the transition from high school to post-secondary education. In the past, the transition from high school to college had often been an unsuccessful one for many students in the past (Bailey et al., 2002). Opponents of dual enrollment have concerns about the quality of the programs. There are concerns regarding whether or not rigor is compromised in an effort to meet the enrollment and retention needs of the post-secondary institution. It is also a concern that some of these programs are not offered on a college campus, rather these programs are sometimes arranged in a high school environment. The change from a traditional college campus setting is upsetting to some who are opponents to dual enrollment (Bailey et al., 2002).

Many high school students who are already prepared for college level work still benefit from dual enrollment courses. Bailey and Karp (2003) found that high-achieving students may become disengaged in high school academics when they have completed all mandatory high school courses (Baily & Karp, 2003). Zinth and Barnett (2018) found that even middle-achieving high school students not only succeed in dual enrollment programs, but these students reap

substantial benefits from participating in these programs. If motivated these same middle-achieving students can improve performance and continue on to college. Dual enrollment courses provide post-secondary opportunities for moderate and even lower performing students (Baily & Karp 2003). Dual enrollment courses may prove to be even more beneficial to these students than to their traditional college bound peers. Offering dual enrollment courses to moderate and lower performing students, helps them to realize how important their high school academic achievements will prepare them for a successful college experience. Dual enrollment can expose students to college that may not otherwise be on track to a postsecondary education due to financial reasons or lack of parental involvement. It can allow students to see that college is in reach for all of today's young people. Dual enrollment can prepare a student gradually for the challenging course work of college. Students may realize early on the skills they will need to become a successful college student. If a student realizes they are not fully prepared for the college experience this may allow them the time needed to prepare themselves before entering college on a full-time basis. The relationship between the college and the high school is very important to a successful dual enrollment program. Dual enrollment can benefit the student by allowing them to get a head start on their college education free of charge and shorten the time it takes them to graduate from a postsecondary institution. Dual enrollment can benefit the high school by helping the student understand that they need to work harder to achieve academic success. Dual enrollment can benefit the college by getting students in their door to continue their education and serve as a marketing tool for the institution (Bailey & Karp, 2003).

Hoffman (2005) provided additional insights to the positive impacts determined by Bailey and Karp. Students often obtain college credits in dual enrollment programs free of tuition charges (Hoffman, 2005). In most states colleges and high schools have come together to make

postsecondary education courses available. Dual enrolment may help the students experience the college lifestyle while still being able to live at home with a supportive family structure. This may allow the students to become comfortable with the college environment without feeling overwhelmed as they are still in their comfortable surroundings. Students can gain college confidence in high school by obtaining college grades and support from college professors. Participation in dual enrollment differs greatly from state to state. Some states may require the student to maintain a particular GPA or obtain particular scores on SAT, ACT or other high school exams. In some state the student's ability to participate may be based on a teacher's recommendation. Other states do not set the bar as high for students who desire to participate in dual enrollment. This allows students to take pre-college courses and prepare for their postsecondary education while still in high school. Other states may leave the dual enrollment standards up to the high schools (Hoffman, 2005).

Dual enrollment arrangements have been used between high schools and colleges for many decades (Johnson & Brophy, 2006). Most states now have access to dual enrollment programs. Dual enrollment courses have proven especially beneficial in rural communities by allowing students to attend college courses in a cost efficient manner. Most dual enrollment courses are provided free of charge to the student. This allows the students to get a free head start on their postsecondary education. "Even with low or reduced cost programs like dual enrollment, those students from families at the highest income levels are still most likely to participate in them." (Johnson & Brophy, 2006 p. 26)

In addition to providing a head start, dual enrollment has also proven to be beneficial to high school seniors who have completed most of their required courses (Johnson & Brophy, 2006). These students often spend their senior year taking easy classes, skipping school and

focusing on things other than their education. Dual enrollment programs can help students extend and magnify their academics. These programs enhance the high school curriculum to allow students the opportunity to get a better understanding of college and help them better prepare for their postsecondary education (Johnson & Brophy, 2006).

Zinth (2014) built upon the work of the research by Johnson and Brophy (2006) by taking a closer look at the impact of dual enrollment. Dual enrollment programs have continued to gain significant support, but the full impact of dual enrollment is not completely known. Dual enrollment programs are collaborative efforts between high schools and colleges where high school students are able to take college courses while still in high school. Such arrangements provide students with challenging curriculum and allow the student to earn college credit prior to graduating high school. These programs provide high school students with first-hand exposure to the requirements of college level coursework (Karp & Hughes, 2008).

Karp and Hughes (2008) found that dual enrollment was proven to be beneficial to Career and Technical Education students because it allows them to participate in post-secondary courses during high school. This helps prepare them for future technical training or a career. These students are able to obtain technical and academic skills while exposing them to the college experience and helping them to understand the benefits of a post-secondary education (Karp & Hughes, 2008).

Karp and Hughes (2008) compared students who were similar in age, education, backgrounds, etc., but differed in the fact that some participated in dual enrollment classes and others did not. They found that students who participated in dual enrollment programs had more positive outcomes than their classmates who did not. The students who participated in dual enrollment were more likely to attend college after high school graduation. They were also more

likely to enroll in college full time. These students also obtained higher grades and completed college at a higher rate than those who didn't participate in dual enrollment courses (Karp & Hughes. 2008).

Swanson (2008) also identified positive impacts regarding the enrollment of dual enrollment students beyond high school at post-secondary institutions. Dual enrollment can have a great impact on a high school student's enrollment in college after graduation and the time it takes them to obtain a degree (Swanson, 2008). Dual enrollment may shorten the time it takes a student to complete a college degree and reduce the overall cost of a post-secondary education. "Dual enrollment participating students who entered college within seven months of high school graduation improved their likelihood of receiving a bachelor's degree from between 16% and 20% as compared with non-participants" (Swanson 2008 p. 4). Dual enrollment classes may help students gain momentum toward a degree and increase the probability of completion (Swanson, 2008)

Dual enrollment can be beneficial to high school students by preparing mentally, physically, socially, and financially for their postsecondary education (Cassidy et al., n.d.). Students who participate in dual enrollment find that they are capable of participating in and completing a college class. Students may be more comfortable in a college dual enrollment situation with their peers in familiar surroundings. This allows the student to pursue college with confidence (Cassidy et al., n.d.).

The success of dual enrollment programs mainly depends on the relationship between the high school/college and the mutual understanding of student needs and goals (Cassidy et al., n.d.). Other important features of a successful dual enrollment program are flexibility of the educational institutions involved and the involvement of an effective and active high

school/college liaison. College and high schools need to work out a legally binding contract for dual enrollment purposes. This contract covers the responsibilities and goals of the dual enrollment program. Most contracts also include: a financial agreement, specifics of when/how/where a course will be offered, who will teach the courses and exactly what stipulations the students will have to meet be allowed to participate in the dual enrollment program (Cassidy et al., n.d.).

There are many factors to consider when conducting a cost benefit analysis of dual enrollment such as the benefits to the students, underserved populations, high schools, colleges, employers, and the public as a whole (Barnett, 2010). These benefits have intangible costs that cannot capture a snapshot of the full impact to society. The impact on students results in benefits such as rigorous curriculum, a broader range of courses, and accelerating the progression towards the completion of a degree. Dual enrollment benefits students in underserved populations that often have limited means to resources and options. These underserved populations benefit from dual enrollment opportunities through an increase of aspirations, which serves as a driving force to aid low performing students in achieving high academic standards. High schools benefit through the expansion of curriculum and increased access to college resources and facilities. Enhanced alignment results as high school curricula come into alignment with college admission requirements and expectations. Colleges benefit by receiving students that are better prepared. This reduces the need for remedial courses. Colleges also benefit through the expansion of recruitment opportunities through dual enrollment programs. Employers and the public benefit because the student's degree completion time is shortened. This gets students to work sooner and reduces the ongoing need for public funds to provide education. The public also benefits by having increased post-secondary options. This results in

an increase in the number of students who enter college and obtain a degree. These graduates are more likely to contribute to the overall good of society by paying taxes and voting. These same graduates are also less likely to require costly public resources such as welfare and incarceration (Barnett, 2010).

Barnet (2010) found various other benefits associated with dual enrollment programs. In comparison to their peers, it was found that dual enrollment students are 12% more likely to enter college within seven months after graduation. While there are costs associated with the numerous benefits of dual enrollment, but it is hard to place a true cost on the benefits. These costs must be considered from the perspectives of each player involved. The key players involved consists of state and local governments, schools and school districts, colleges, and students and their families. These perspectives have a significant impact on the policies that determine program costs and more importantly how the programs are financed (Barnett, 2010).

Economic Impact

In today's global economy, an education that goes beyond high school is the surest path to the middle class (Villarreal, 2018). Lewis (2009) found that dual enrollment provides high school students with opportunity to begin obtaining post-secondary education while still in high school (Lewis, 2009). There are many positive impacts that result from dual enrollment. These positive impacts affect not only the student, but also the high school, the postsecondary institution, and the state itself. When a student obtains a degree from a postsecondary institution it increases the possibility for economic development in the state, which leads to a higher income per person. This in turn leads to a higher tax base for the state, which benefits the state as a whole (Lewis, 2009).

Student Impact

Studies pertaining to the completion of a certificate or diploma have been researched regarding the impact dual enrollment has on completion (Jaschik, 2019). A study of students at the University of Texas found that students enter the university with some dual enrollment credit are more likely to graduate than those that enter without previous dual enrollment credit. The same students who enter the university with some previous dual enrollment credit also had higher grade point averages (Jaschik, 2019). A previous study was conducted that concentrated on Tennessee students who participated in dual enrollment during high school and attended a Tennessee Board of Regents university after graduation (Porter, 2003). During this study students and data were analyzed to see the relationship, if any, between the amount of the student's dual enrollment college credit hours and the student's likelihood to continue and complete college beyond graduation. The data for Porter's study (12,834 records) were obtained from the Student Information System from five Tennessee Board of Regents Universities. The researcher found that students who participated in dual/joint-enrollment programs had more academic success and a higher retention and graduation rate than those students who did not participate in such programs. The study also revealed that dual credit hours had a significant influence on time to completing a degree (Porter, 2003).

Due to the number of students graduating from high school unprepared for college and no real job skills to join the work force dual enrollment programs rose from approximately 204,790 participating students in 1996 to 560,000 in 2002, which resulted in policies and arrangements for dual enrollment programs in all high schools (Porter, 2003). Promoters of dual enrollment claim students who participate in the program increase their chances of graduating from a post-secondary institution and they do so in shorter time at less cost than their peers who did not

participate. When high school students participate in dual enrollment they may find the transition from high school to college easier. Dual enrollment students may be more confident when applying to college. They will know more about what to expect and can prepare adequately with confidence. The benefits of dual enrollment can be never-ending but there are also concerns regarding young high school students taking classes in a college atmosphere. There could be articulation concerns between the high school and the college. The maturity level of high school students may be questioned regarding particular college material. Some dual enrollment college classes are taught at the high school resulting in no real college classroom experience (Porter, 2003).

Students who participate in dual enrollment may perform better in high school due to involvement and interest in college courses (Porter, 2003). High school seniors may become bored with regular high school courses or they have taken all "needed" courses and are forced to take classes they don't need to fill their day. This may result in students becoming bored, not attending school, or having too much free time to get into trouble. By giving students college courses you are challenging the students, gaining the students interest and helping the student feel productive toward their future. Dual enrollment students may feel that their time is no longer being wasted, but instead being put to good use. The report of the National Commission on High School Seniors (2001) addressed the topic of what graduates make of their high school experience by quoting a graduate as saying, "By the senior year, I was done with math. I was done with history. I was done with all the other classes. I was just taking of bunch of other classes that I didn't need. I'd rather be going to work and doing something else than this" (Porter, 2003 p. 22).

There is a great need for high school students to obtain postsecondary skills in order to obtain a job, support their families and help strengthen work force in their community (Porter, 2003). Secondary and postsecondary institutions should band together to create a seamless transition to higher education for students after high school graduation. Many states are starting a K-16 collaboration effort between secondary and postsecondary schools. These schools are starting with kindergarten classes to ensure a seamless curriculum and transition through a four-year college or occupational/technical program bases on the path the student chooses upon entering high school. Tennessee is one of the states where high school course requirements are in line with college admission requirements. High schools and colleges have combined efforts to help benefit the students and make the transition easier. They are working together to train teachers, both secondary and postsecondary, to help prepare students for college classes in high school and after graduation. High School to College transition workshops are being utilized for teachers and students. As a joint effort some secondary/postsecondary institutions share books, classrooms, equipment and facilities to help ensure the students are receiving the guidance needed for success after high school (Porter, 2003).

Porter (2003) highlights another issue raised by critics regarding dual enrollment is the locations available for dual enrollment classes. Classes being held in the high school can be interrupted by extracurricular high school activities, announcements, discipline issues, ringing bells etc. The quality of the classes may be lacking due to high school teachers becoming college professors with no real experience teaching colleges courses on a college campus. These teachers may only have high school teaching experience resulting in the student not truly getting college course work causing the student to be less prepared when they enter college courses on the college campus. Classes being help on the college campus can purpose other problems such as

lack of supervision, transportation, and liability issues for the secondary and postsecondary institution regarding under age students (Porter, 2003).

Porter (2003) also noted concerns by educators and parents regarding dual enrollment. As with any change to the normal way a process is carried out people will have different thoughts and perceptions regarding the new way. Many do not like change and don't want to stray from the traditional education route. This may cause educators to hold back on embracing the dual enrollment education movement. Some have sincere and valid concerns regarding dual enrollment such as: students being academically and developmentally prepared for college level classes while they are still attending high school. The immaturity of high school students may decrease their ability to fully understand and absorb college level material. Dual enrollment programs should not just be a continuation of high school classes; they should be more difficult and held to a much higher academic standard. Also, some parents fear being separated from friends and high school activates could cause a negative impact on the student's future (Porter, 2003).

It is of great importance that states adopt a dual enrollment policy (Lewis, 2009). Dual enrollment policies give the state a head start on educating their youth. Dual enrollment courses offered in high school may influence the student to enroll in college after graduating high school. Lewis noted that "students who participated in at least one dual enrollment course attended colleges and universities at a much greater rate than counterparts who did not (63.9% vs. 55.4% overall)" (Lewis, 2009 p.4). The exposure to post-secondary courses during high school resulted in an increased likelihood that these students would later attend a college or university. Most information represents dual enrollment in a positive light but there are some concerns such as a student's maturity level, reliability and ability to perform in rigors college courses. Also, the high

school and the post-secondary institutions will most likely have different academic calendars for the school year. In most studies, the positive overcomes the negative in regard to dual enrollment. Students participating in a dual enrollment class learn early on how to study and participate in college style classes. These students also learn the ins and outs of college life. They become familiar with the college process and the layout of the campus. This can help the student become a successful college student after high school graduation (Lewis, 2009).

Location of dual enrollment courses may directly impact the student and their perception of college (Lewis, 2009). Dual enrollment courses may be taught in the high school by a full-time college instructor or by a high school teacher who also qualifies as an adjunct instructor. Dual enrollment classes may be taken online through the postsecondary institution at the high school or the student may attend dual enrollment classes at the college campus. The high schools distance from the college may prevent students from attending courses on the college campus. This could give rural students a disadvantage in on campus preparedness. The classroom environment in a college class room may differ from that of a high school classroom. Students who took college classes on the college campus seemed to be more prepared, more serious about their classes and more independent. Students who obtain college credits via online at the high school may miss some important aspects of the college environment to help them be prepared for on campus college living (Lewis, 2009).

Realistic Expectations

Barnett et al. (2018) found that participation in dual enrollment led to positive results. An increasing amount of research shows a positive correlation between dual enrollment and the subsequent postsecondary student success. Lewis (2009) also found that dual enrollment

programs lead to positive outcomes. After high school graduation, many students often find themselves unprepared for college. Students often do not realize the disconnect that exists between their high school standards and the standards for attending college. A student's college readiness cannot always be determined by their GPA, ACT, or SAT scores. Students do not understand that just because you get admitted into college doesn't mean they will not have to take college remedial courses. Nearly half of these college hopefuls initially find themselves in remedial work. This increases both time spent in college by the student as well as money spent by the student for degree completion. Due to this issue many states are looking for a smoother transitional period between high school and postsecondary education institutions. Therefore, colleges and high schools must communicate early on to help ensure a student's college readiness. Dual enrollment could help fill the some of the gap between high school and colleges (Lewis, 2009).

Strong academic students make up the majority of all dual enrollment participants (Lewis, 2009). More recently a growing number of lower level academic students are participating in dual enrollment courses. Student's often feel more challenged and motivated in college courses and tend to perform at higher academic levels. Some students who were failing high school courses earned As and Bs in their college dual enrollment courses. A student in Vermont spent her class time day dreaming and ignoring her high school teachers. This student enrolled in a college English class where she earned an A even though she was required to participate in weekly reading assignments and write 18 papers. Dual enrollment opportunities through a vocational/technical training institution exists where a student can earn certifications while participating in dual enrollment. Students who are in danger of dropping out or who have fallen behind often benefit from such programs (Lewis, 2009).

Although such benefits of dual enrollment were noted by Lewis (2009), the initial shock of transitioning from high school to college may be too much for a graduating high school senior (Bailey et al., 2002). Students may feel overwhelmed by how to apply for college or how to pay for it. They may be discouraged and believe that they are academically unprepared. Remedial courses may also serve as a deterrent to college enrollment. When they initially start college, they may find they have trouble being way from familiar surroundings, balancing school demands, holding a job and participating in extracurricular activities. In the beginning, students may find it difficult to adjust to the whole college experience. Students may find things that came easy to them in high school become more difficult for them in college. Students may become confused regarding their life plans. This has caused educational institutions to re-think the transition between high school and college. State policy makers have found that they must raise the academic standards, require more rigorous course work and increase the quality of high school curriculum in order to help bridge the gap between high school and college. Communication between the secondary and postsecondary institutions could be very beneficial to help students understand what they need to know and what they need to do in order to be successful during the high school to college transition. When students feel a strong relationship between the secondary and postsecondary institutions they may become more comfortable with transitioning to the college setting. One of the best ways to accomplish such a relationship is through dual enrollment programs (Bailey et al., 2002).

Student Engagement

Dual enrollment opportunities engage high school students by offering career option experiences (Ashford & Dembicki, 2018). These experiences allow the student to earn college

credit through a less expensive option to attending a university. Dual enrollment was once mostly geared to high achieving academic students. The rise in career and technical education students has encouraged technical institutes to make dual enrollment available or their students (Karp et al., 2008). There is little research on the effects that dual enrollment may have on these students. Dual enrollment is thought to lead to many positive outcomes for students. Dual enrollment can help students become comfortable with the college life style and reduce the cost of college by allowing students to obtain college credits while still in high school. Dual enrollment offers a new type of benefits for lower performing students. These benefits include decreasing students drop outs, decreasing the need for remedial classes, and increasing the students desire to attend a post-secondary institution. When a lower achieving student participates in a dual enrollment program what once seemed impossible may begin to seem completely within reach. In the past not as much preparation has gone into dual enrollment programs for career and technical education students due to the nature of the career the students might select. Typical college classes would not benefit the students going to a technical school. Recently these programs have expanded and curriculum has been updated to enable high school students and help them get an early start on a post-secondary education. This may allow the student to attend a technical college part time during high school. The student may be able to obtain a certificate before graduation, which prepares them for immediate workplace success. Dual enrollment also allows these students to participate in the technical program without having to invest in expensive equipment. Some states are currently seeking ways to make dual enrollment available to more students. The findings showed positive short term and long term goals for dual enrollment students. Dual enrollment contributed to student success. These students earned their high school diploma. Students who participated in dual enrollment

programs were significantly more likely to enroll and college and persist to a second semester. On average students who participated in dual enrollment courses had significantly higher postsecondary GPA's one year after graduation and three years after graduation than their non-participating peers.

The outcome for students of low to mid achieving students and low income students also proved positive. By exposing these students to the postsecondary atmosphere early on they are more likely to realize that college is an achievable goal. These students were also more likely to attend college and have higher GPA's than similar non-participating dual enrollment students. This article shows that dual enrollment can positively influence students from all economic and educational backgrounds and those with social advantages/disadvantages. The findings in this study indicate those who benefit the most from dual enrollment are the students who are often overlooked or left out from the typical college preparations (Karp et al., 2008).

Students are being introduced to new ways to help encourage them to graduate high school and attend college (Cassidy et al., n.d.). One of these new ways is exposing them to dual enrollment opportunities. With dual enrollment students can obtain college credits with their peers while still in high school. This can give them a more comfortable head start to college, prepare them for the change from high school course work to college course work, give them the confidence needed to apply to college and show them that it is possible for them to complete college courses. Dual enrollment not only allows higher performing students to obtain college academic credit, but it also allows career and technical education students to get a head start on training in technical fields. In the beginning dual enrollment was for academically advanced students but it is now being implemented for students who would not traditionally be potential college students. Often these students are first-generation college-goers that require more support

to succeed. These students may be unprepared for the expectations of college courses. Lower academically performing students may encounter issues such as: college professors do not seek struggling students to offer extra help, college life style may be overwhelming with no prior exposure, and college courses offer fewer opportunities for students to improve their grades. Some high schools are offering counseling classes and advisors/mentors to help the dual enrollment students thrive in their college class. This student's advisor and college professor may work together to help the student achieve the skills necessary to succeed in college.

Although there are several other accelerated learning opportunities such as Advanced Placement and International Baccalaureate, dual enrollment is often the chosen advanced learning strategy for most schools because it allows college opportunities for a great diversity of students. The implementation of dual enrollment may be challenging for several reasons. There must be a partnership formed between the high school and the college. High school guidance counselors and college professors must form a successful working relationship. Funding is essential and must be obtained. Also, access to college classes must be arranged for students. In this article dual enrollment is being divided up into three different categories: singleton, comprehensive and enhanced comprehensive. Singleton dual enrollment is student driven and typically takes place when the student has completed most of their high school required classes and is interested in obtaining college credits while in high school. Comprehensive and enhanced comprehensive style dual enrollment introduces students to an increased vigorous college experience. For example, early college high schools blend high school and college in a rigorous yet supportive program, enabling students to earn up to 60 college credits or an associate's degree by the time they graduate from high school (Cassidy et al., n.d.).

The majority of high School students are not adequately prepared for college (Cassidy et al., n.d.). In 2008 more than two-thirds of all high school graduates enrolled in postsecondary institutions the following fall. Approximately 60 percent of the students who enrolled at 2-year institution and 30 percent of the students who enrolled at a 4-year institution were required to take remediation courses. About half of all students entering a 4-year institution graduate within 6 years. These statistics point to the need for more preparation in order for these students to be able to graduate in a timely manner. College instructors estimate that 42 percent of students entering post-secondary institutions are not properly prepared. Eighty two percent of college students said they would have worked harder in high school if the academic expectations of the high school required them to do so. Given these percentages, there should be more high school/post-secondary opportunities such as dual enrollment (Cassidy et al., n.d.).

While colleges have continued to provide new dual enrollment opportunities, some colleges have been hesitant to participate in dual enrollment programs (Cassidy et al., n.d.). This can be because their professors do not want to teach high school students. College professors may feel high school students are not mature enough to handle rigorous college class work. The professor may feel they may need to lessen the intensity of the college course to fit the needs of the high school students. Some professors feel the behavior of the high school student may interrupt the learning environment for the entire class. Yet, after a college professor teaches a dual enrollment class for the first time the profession often admits to being impressed by the abilities of the high school students. A college professor's interest in teaching dual enrollment may be increased by giving the professor adequate time to prepare for the course and allowing the professor an opportunity to help plan the program (Cassidy et al., n.d.).

Dual enrollment courses are taken not just by students who are academically successful, but also to students of average to low academic abilities (Catron, 2001). These students may desire to acquire further education beyond high school, but would be unlikely to seek a 4 year college degree. Dual enrollment allows these students to get a head start on their college degree or for some earn technical certificates that would allow them to enter the workforce. Most parents, students and teachers agree that benefits of dual enrollment far outweigh the negatives. Dual enrollment is found to be especially beneficial in rural area schools where options lacking due to a lack of resources. A variety of advanced courses is often not available to only a small group of highly successful academic students. Colleges already have these advanced courses in place, so it only made sense for colleges to offer these classes to high school students who may qualify. Another benefit of dual enrollment is the articulation between secondary and postsecondary schools. Some students who take honors classes in high school may be repeating almost the same exact class in college. Dual enrollment may decrease the unnecessary duplication of courses between high school and college. Dual enrollment can be financially beneficial to the parents, it can help the student ease into the college transition while obtaining college courses while still in high school, and colleges can benefit from dual enrollment by using it as recruitment tool (Catron, 2001).

It is of great importance that dual enrollment programs remain flexible (Catron, 2001). Different types of classes should be offered at both technical occupation and academic institutions. Students should be able to obtain different types of certificates or degrees bases on their needs and wants. Different courses may require different eligibility requirements such as age, prerequisite skills, recommendation from teachers, entrance exams, and admission requirements set forth by the college (Catron, 2001).

Other Considerations

Student attendance must also be considered when implementing a dual enrollment program (Cassidy et al., n.d.). Attendance issues may arise when a student enrolls in a college course. State policies indicate how colleges and high school receive state Average Daily Attendance (ADA) and Full Time Equivalency (FTE) funding for dual enrollment. In some instances, both the high school and the college may receive ADA and FTE funds. In other cases, only the college will receive full funding for the student's time in dual enrollment or the high school and the college will split the funding. Some schools choose to offer dual enrollment classes after the regular school day. This will allow the school to get full ADA and the college to receive FTE. This could however decrease participation in dual enrollment due to students not having transportation or their involvement in other after school activities (Cassidy et al., n.d.).

Heath (2008) studied 275 dual enrollment college entry students and compared them to a group of 258 traditional college entry students (Heath, 2008). Overall, it was found that the dual enrolled students had higher GPAs, higher completion rates, and the dual enrolled students obtained a degree in a shorter time period. Social experiences of the dual enrolled students were thoroughly examined to adequately obtain how a student may thrive socially while participating in dual enrollment. Students who participated in the dual enrollment program were overall more satisfied with their college transition. While participating in dual enrollment classes they formed relationships with other students, professors and office administration while still remaining familiar surroundings this made the transition to college full time easier for the students (Heath, 2008).

Dual enrollment can be a strategy to promote post-secondary attainment (Zinth & Barnett, 2018). However, dual enrollment eligibility requirements often limit access to students

who are academically advanced or considered the most likely to attend college after graduation. Alternate eligibility requirements can provide access to dual enrollment coursework options that did not previously exist. Broadening access to students who are undecided regarding college attendance after high school is one way to expand dual enrollment programs. Providing pre-collegiate experiences to high school students is another approach to consider in an effort promote dual enrollment (Zinth & Barnett, 2018).

Dual enrollment is mostly discussed in a positive light but there are always concerns behind every good idea (Heath, 2008). Students may miss the typical high school experience as a result of trying to obtain an excessive amount of college credits. When a student feels over whelmed from taking too many dual enrollment college courses it could possibly have a negative effect on how the student perceives college. The students age and maturity level is also a considering factor when dual enrollment is being discussed. Dual enrolled students stated college classes require more time studying and preparing than typical high school classes. Some high school teachers feel that dual enrollment takes the high achieving academic students away from regular high school courses. Some college professors feel as if the curriculum will be "watered down" to fit the needs of younger less mature high school students. Parents may also become concerned their child will be separated from friends or miss out on the normal high school lifestyle. Dual enrollment has proven itself again and again. The majority of dual enrollment programs prove the good far outweighs the bad. As dual enrollment becomes more accepted and understood more funding will become available, so we can further the outreach of dual enrollment programs. Dual enrollment programs will gain more support as more people see the positive impact dual enrollment has on students, parents, teachers, high schools and colleges (Heath, 2008).

Obstacles do exist in establishing access to dual enrollment programs for many students (Kilgore & Taylor, 2016). The three biggest obstacles identified by Kilgore and Taylor (2016) were lack of credentialed instructors, the costs associated with dual enrollment programs, and access to post-secondary institutions. Kilgore and Taylor noted that these concerns are being addressed. For example, loan forgiveness programs and professional development funds are being implemented to increase the number of credentialed instructors. Online resources are being used to increase dual enrollment access and options, as well as decreased the costs. (Kilgore & Taylor, 2016)

Dual enrollment allows high school teachers and students to interact with college staff and professors (Hughes, 2010). Dual enrolled students may enter a college class on a college campus as just another college student. The college professor teaching the course may not even realize the student is a dual enrolled high school student. According to Hughes, it is not always beneficial to the student for the professor to be unaware that the student is a dual enrolled student. In most circumstances it would be beneficial for the college professor to know which students were dual enrolled. If one or more of the high school dual enrolled students shows poor performance then the high school can be contacted and extra support may be offered. In order to keep students interested in college, they do not need to fail their first college course. Some high schools put together a college style orientation packet to help high school students blend in with their older more mature college class mates. Some states have dual enrollment classes set up to include only high school students, so they are not incorporated with older college students. These type dual enrollment classes may be taught at the college or at the high school and may be taught by a qualified college teacher either from the college or the high school as a college adjunct.

Hughes (2010) noted that dual enrollment courses being taught on the high school campus raise concerns of students not getting the full college effect. Some college professors feel that when a dual enrollment course is being taught by a high school adjunct teacher the students may not get the authentic college version of the course. According to Hughes, those who still find themselves doubtful of the importance of dual enrollment should take a harder look at the benefits. Hughes stated that "dual enrollment was positively related to students' likelihood of earning a high school diploma, to college enrollment, to persistence in college, and to higher postsecondary grade-point averages." (p. 13) Overall, dual enrollment has a positive impact on a student's preparation for college after high school graduation (Hughes, 2010).

In spite of dual enrollment's positive impacts, some students still find themselves unprepared (Kotamraju, 2005). Due to the unpreparedness of high school graduates, policies have been implemented and actions have been taken to help high school graduating students. "Perkins III is a federal program focusing on career and technical education (CTE) delivered within the secondary and post-secondary education system." (Kotamraju, 2005 p. 2). The objective of the Perkins III grant is to improve the student's academic ability, improve the relationship between the secondary and post-secondary institutions, encourage students to select careers that are in demand and have competitive wages. Program articulation agreements need to be arranged between secondary and post-secondary education institutions before a dual enrollment program is put in place (Kotamraju, 2005). Through policy implementations, access to dual enrollment opportunities can be provided to students (Ddamulira, 2017). Policies at the state level can have a significant impact on providing access to dual enrollment opportunities. For example, Minnesota has subsidized dual enrollment, which has resulted in little to no cost to students. Policy makers at the federal level also play a significant role in implementing policies

to provide dual enrollment opportunities. For example, at the federal level policies can be implemented to provide access to PELL Grant funds for dual enrollment funding to low income students. Implementation of policies can assist in ensuring that students are prepared to access dual enrollment opportunities (Ddamulira, 2017).

Dual enrollment programs differ from state to state regarding policies, structures, and options (Kotamraju, 2005). One of the main issues is the "credit transfer issue". If the college credits the student earns in high school will not transfer to the college then the credits are meaningless. Credit transfers and articulation agreements differ from state to state and may even vary from program to program. Concurrent enrollment is one of the popular forms of dual enrollment especially among students and secondary administrators. Concurrent enrollment is where the high school student participates in college courses within the high school. This allows students to remain in the school, take classes with their regular classmates and participate in typical high school activities. High school administrators may feel concurrent enrollment is beneficial because it allows some of their highest academic students to remain at the high school. Concurrent enrollment may also benefit the school or the student financially. There would be no travel expenses or on-campus college fees (Kotamraju, 2005).

In addition to cost factor considerations, it is also important to understand that a student's environment also plays a role in influencing the student towards enrolling in postsecondary education as a dual enrollment student (U.S. Department of Education, 2019). The education level of the parent has an impact on the child in pursuing post-secondary education. Students whose parents earned a bachelor's degree or higher took dual enrollment courses at a rate of 42% compared to a participation rate of 26% for students whose parents highest level of education was lower than a high school diploma.

Speroni (2011) researched on the demographics of students who participate in dual enrollment programs. Roughly one third of high school graduates do not enroll in postsecondary institutions. One third of those who are required to enroll in remedial education to prepare for college level work. Dual enrollment helps ease this gap between high school and college. Supporters of dual enrollment believe high school students that participate in college classes are more likely enroll in college after high school graduation and they are more likely to be prepared for the college life style. Critics of dual enrollment feel that high school students may be too immature to handle the vigorous demand of college and they may become discouraged at an early age. Dual enrollment has many positive results: students may obtain college readiness while still being in familiar surroundings, students get a head start on college credits resulting in earlier college graduation, and students may benefit from the reduces cost of college. The financial benefits of dual enrollment may just be the deciding factor for students wanting to go to college (Speroni, 2011).

Dual enrollment programs are voluntary and consist of mostly white, female, Native-English speaking students from wealthy families (Speroni, 2011). These students are more prepared academically and financially than non-dual enrollment participating students. Critics may argue that the college enrollment based on dual enrolled students may not be as relevant as once thought because these numbers consist of students who would be more likely to enroll and succeed in college without dual enrollment (Speroni, 2011).

Some believe the dual enrollment credits offered should be less rigorous college courses allowing students to ease into the higher demand of college classes (Speroni, 2011). If a high school student takes a less difficult course it can result in the student making a good grade, feel accomplished, and more confident they can succeed in college. Others believe only offering the

less demanding college courses is giving the student a false sense of what college ultimately requires and dual enrollment students should be given the option to take more demanding courses. For example, Speroni (2011) noted that, “algebra is a gatekeeper course, and having it completed at the onset of college seems to have helped students make progress toward a degree.” (p. 47). College Algebra is a rigorous college course and perhaps students who conquer this class in high school feel they are more prepared for college and may be more likely to enroll and continue toward a college degree. It may be more comfortable for a student to take a more academically challenging college course in high school because of the availability of support from teachers and a less vigorous work load. High school students could also feel more confident in their ability to complete college when they have completed a more difficult college course during high school, which encourages students to continue postsecondary pursuits beyond high school (Speroni, 2011).

Chapter 3. Research Method

The purpose of this quantitative study using comparative data was to compare the completion of a certificate or diploma for dual enrollment students based on levels of engagement to students who received no previous dual enrollment credits prior to full enrollment at a TCAT. This chapter includes a description of the study methodology, rationale, selection of the population, description of the data collection, and the hypotheses.

Statement of the Problem

Dual enrollment opportunities provide the vital first steps to the process of establishing workforce development efforts within the state of Tennessee. The TCAT system invests much time, effort, and resources into the recruitment of high school dual enrollment students, yet minimal data exists showing if there is a significant impact of the dual enrollment experience on the likelihood of completion of a certificate or diploma. The Tennessee Board of Regents (TBR) has not collected or analyzed data on information that showed the relationship between dual enrollment and the completion of a certificate or diploma. The purpose of this study was to determine if there is a relationship between attending a Tennessee College of Applied Technology as a high school dual enrollment student and completing a certificate or diploma and to explore if higher levels of engagement result in higher levels of completion of a certificate or diploma.

Research Questions

The following research questions and null hypotheses were chosen regarding the relationship between dual enrollment and completion of a certificate or diploma to provide

direction for the study:

Research Question 1: Is there a significate difference in the number of hours logged by dual enrollment students between those who received a credential (certificate or diploma) and those who did not receive a credential?

Ho1: There is not a significant difference in the number of hours logged by dual enrollment students between those who received a credential (certificate or diploma) and those who did not receive a credential.

Research Question 2: Is there a significant difference in the proportion of TCAT students that earn a credential (certificate or diploma) among the three levels of engagement (no engagement, low to moderate engagement, or high engagement)?

Ho2: There is not a significant difference in the proportion of TCAT students that earn a credential (certificate or diploma) among the three levels of engagement (no engagement, low to moderate engagement, or high engagement).

Research Question 3: Is there a significant difference in the proportion of TCAT students who earn a credential (certificate or diploma) between dual enrollment participants and those who do not participant in dual enrollment?

Ho3: There is not a significant difference in the proportion of TCAT students who earn a credential (certificate or diploma) between dual enrollment participants and those who do not participant in dual enrollment.

Research Questions 4: Is there a significant difference in the proportion of TCAT students who earn a certificate between dual enrollment participants and those who do not participant in dual enrollment?

Ho4: There is not a significant difference in the proportion of TCAT students who earn a certificate between dual enrollment participants and those who do not participant in dual enrollment.

Research Question 5: Is there a significant difference in the proportion of TCAT students who earn a diploma between dual enrollment participants and those who do not participant in dual enrollment?

Ho5: There is not a significant difference in the proportion of TCAT students who earn a diploma between dual enrollment participants and those who do not participant in dual enrollment.

Methodology

The focus of this study was on whether or not dual enrollment students have an advantage towards completion and placement. The differences in completion and placement rates were examined among students in the largest programs among the TCAT system. A nonexperimental quantitative research methodology was chosen for this study in order to quantify the extent of the impact of dual enrollment as it pertains to overall completion of a certificate or diploma. Permission was obtained from Dissertation Committee Chair Dr. Hal Knight who provided a letter requesting the data needed. The data were then retrieved from TBR's existing database. This previously recorded existing documentation was used to compare the differences between non-dual enrollment students and students who attended a TCAT as a dual enrollment student prior to enrolling as a full-time student after high school. The quantitative data selected aided in quantifying the relationship between dual enrollment and completion if it exists. The data obtained was confidential information and were handled

accordingly to preserve the confidentiality of all students involved in this study. This approach was used because quantitative information is in existence that can be obtained to better understand the relevance of dual enrollment in the completion process. This approach used the existing data to compare the impact of dual enrollment as it relates to placement rates of students in their field of study. The greatest weakness of this methodology lies in the sample chosen for this study. The sample chosen included all TCAT programs, but did not include post-secondary technical programs in the state of Tennessee outside the TCAT system. The sample also excluded technical programs outside the state of Tennessee. It is possible that a different sample or even a larger sample could produce less than perfectly consistent results. However, the sample chosen was a strong representation of the programs available for dual enrollment in the TCAT system. The sample chosen provided findings regarding the correlation that dual enrollment has towards the completion of a certificate or diploma. A comparative design was used to analyze the data obtained from the TBR for this study.

Design

This research focused on the possible impact of dual enrollment on the likelihood of completing a certificate or diploma. A data-driven quantitative method approach was chosen for this study to determine if a relationship exists between dual enrollment and completion of a certificate or diploma. The students were divided into three groups for this study. Group one consisted of students who received no dual enrollment credit prior to enrollment as a full-time student. This group was identified as ‘no’ engagement. Group two consisted of students who completed less than 150 hours of training while attending as a dual enrollment student. This group was identified as ‘low to moderate’ engagement. Group three consisted of students who

completed 150 hours or more of training while attending as a dual enrollment student. This group was identified as 'high' engagement. Each group was identified as being one of the three somewhat evenly distributed groups that had identifiable breaks between them in terms of hours completed by dual enrollment students. These groupings were selected and compared to each other, as well as to non-dual enrollment students to see if a notable impact exist.

Population

The population for this study consisted of students who had previously attended one of the programs offered at a TCAT during the 2015-2016 academic year. The programs included in this study are listed in Appendix A – TCAT Programs. This study targeted a group of dual enrollment students from the previous 2015-2016 academic year that consists of spring, fall, and summer trimesters. A group of non-dual enrollment students with similar hours in the same respective programs was chosen for comparison purposes. The population was separated into groups based on the number of hours completed as a dual enrollment student as previously noted. The students in the population were enrolled in a program at one the 27 TCATS across the state of Tennessee. These programs include all programs and consist of dual enrollment students and non-dual enrolled students. All students, both dual enrollment and non-dual enrolled in these programs at all of the 27 TCATs were used in the population of this study.

Data Collection

The programs chosen for this study consisted of all programs that enrolled students across the TCAT system. Both dual enrollment and non-dual enrollment students enrolled in a technical training program were chosen. Data were requested from the Office of Colleges of Applied Technology at the Tennessee Board of Regents that includes the placement and

completion rates of the students chosen for this study. This data also included the total number of hours completed while enrolled as dual enrollment students. Data were obtained from the TBR's Student Information System (SIS) that is used to store data for all students enrolled at a TBR institution. The data were received and maintained on a personal computer so that it could be further evaluated using the Statistical Package for Social Sciences (SPSS) software program.

The completion information of certificates and diplomas were collected for students who attended during the 2015-2016 academic year in order to allowed time for possible completion of a diploma. The chosen period of time allows students who previously attended as dual enrollment students to have had an opportunity to complete their program of study as a full-time student after graduating high school. Data were collected for all students enrolled in a training program during the 2012-2013 year.

This data is inclusive of both students with former dual enrollment credit hours as well as non-dual enrolled students. These students were divided into three different groups. Group 1 (no previous dual enrollment credit hours) consisted of students who had not previously attended as a dual enrollment student. Group 2 (less than 150 hours) consisted of dual enrollment students who were considered low to moderate engagement, Group 3 (greater than 150 hours) consisted of dual enrollment students who were highly engaged.

The data provided information from the previous year on certificates and diplomas earned. The data will also provide information on the number of hours completed as a dual enrollment student in order to identify any relationship that exists between and the number of hours completed as a dual enrollment student and the certificates and diplomas earned.

Chapter 4. Findings

The purpose of this study was to compare the success factors (Earning a certificate or diploma) of dual enrollment students comparted to students who did not participate in a dual enrollment program prior to enrollment at a Tennessee College of Applied Technology. The researcher operationalized student success through evaluating the completion of a certificate based on the level of dual enrollment engagement. These factors were investigated to determine if the performance of dual enrollment students was significantly different from students who enrolled with no previous dual enrollment credit. This researcher used a nonexperimental research design using quantitative methodology along with a comparative and correlational design. The researcher used data extracted from SIMS. The target population consisted of dual enrollment and full-time students enrolled at a Tennessee College of Applied Technology. The trimesters reviewed are Fall 2015, Spring 2016, Summer 2016, Fall 2016, Spring 2017, Summer 2017, Fall 2017, Spring 2018, and Summer 2018. The population consisted of 28,940 students. There were 6,126 dual enrollment students in comparison to 22,120 non-dual enrolled students. Each of these students were pursuing certificate or diploma at one of the Tennessee Colleges of Applied Technology. Five research questions guided this study and five null hypotheses were tested.

Data Analysis

An independent samples t test was used to determine if there was a significant difference in the number of hours logged by dual enrollment students among those who received the credential of a certificate or diploma and those who did not receive a certificate or diploma. A two-way contingency table analysis was used to determine if there was a difference in the

completion rates of TCAT students in the system's largest programs who have no, low to moderate, or high engagement in dual enrollment prior to full admission at TCAT. A two-way contingency table analysis was used to determine if there is a difference in the completion rates of dual enrollment students and those who do not participate in dual enrollment prior to full admission at a TCAT. A one sample chi square analysis was used to determine if there is a difference in the proportion of TCAT students who earn a certificate among dual enrollment participants and those who do not participate in dual enrollment. A one sample chi square analysis was used to determine if there is a difference in the proportion of TCAT students who earn a diploma among dual enrollment participants and those who do not participate in dual enrollment. IBM-SPSS was used to analyze the data.

Research Question 1

Research Question 1: Is there a significate difference in the number of hours logged by dual enrollment students between those who received a credential (certificate or diploma) and those who did not receive a credential?

Ho1: There is not a significant difference in the number of hours logged by dual enrollment students between those who received a credential (certificate or diploma) and those who did not receive a credential.

An independent-samples t test was conducted to evaluate whether the mean number of hours logged in dual enrollment was significantly different between students who persisted to a credential (certificate or diploma) and those who did not persist to a credential. The number of hours in dual enrollment was the test variable and the grouping variable was whether students received a credential (yes or no). The test was significant, $t(1970) = -10.54$, $p < .001$. Therefore,

Ho:1 was rejected. Students in the credential group logged more than double the hours (*M* = 470.27, *SD* = 651.13) than students that did not persist to a credential (*M* = 212.67), *SD* = 178.07). The 95% confidence interval for the difference in means was -305.53 to -209.68. The η^2 index was .17, which indicated a large effect size.

Research Question 2

Research Question 2: Is there a significant difference in the proportion of TCAT students that earn a credential (certificate or diploma) among the three levels of engagement (no engagement, low to moderate engagement, or high engagement)?

Ho2: There is not a significant difference in the proportion of TCAT students that earn a credential (certificate or diploma) among the three levels of engagement (no engagement, low to moderate engagement, or high engagement).

A two-way contingency table analysis using crosstabs was conducted to evaluate whether the proportion of TCAT students earning a credential was significantly different among the three engagement level groups. The two variables were credential (yes or no) and level of engagement (no, low to moderate, or high). Earning a credential and level of engagement were found to be significantly related, Pearson $\chi^2(2, N = 28017) = 110.42$, $p < .001$, Cramer's V = .07. Therefore, the null hypothesis was rejected. The proportions of TCAT students earning a certificate or diploma in the three level of engagement groups were 66.5, 48.1, and 70.0, respectively.

Follow-up pairwise comparisons were conducted to evaluate the differences among these proportions. Table 1 shows the results of these analyses. The Holm's sequential Bonferroni method was used to control for Type I error at the .05 level across the three comparisons. All three comparisons (no engagement to low/moderate engagement, no engagement to high

engagement, and low/moderate engagement to high engagement) were found to be significantly different with the high engagement group displaying the highest proportion of students earning a credential.

Table 1

Comparison of Engagement Levels Using Holm's Sequential Bonferroni Method

Engagement Comparison	Pearson chi-square	*p* values (Alpha)	Cramer's V
No	101.63	<.001 (.017)	.06
Low to Moderate to High	91.59	<.001 (.025)	.22
High	6.63	.010 (.050)	.02

Research Question 3

Research Question 3: Is there a significant difference in the proportion of TCAT students who earn a credential (certificate or diploma) between dual enrollment participants and those who do not participant in dual enrollment?

Ho3: There is not a significant difference in the proportion of TCAT students who earn a credential (certificate or diploma) between dual enrollment participants and those who do not participant in dual enrollment.

A two-way contingency table analysis using crosstabs was conducted to evaluate whether the proportion of TCAT students earning a credential was significantly different between dual enrollment participants and those who do not participate in dual enrollment. The two variables were credential (yes or no) and dual enrollment participation (yes or no). Earning a credential and level of engagement were found to be significantly related, Pearson $\chi^2(2, N = 18562) = 1.56$,

p <.001, Cramer's V = .01. Therefore, the null hypothesis was rejected. The proportions of TCAT students earning a certificate or diploma in these two groups of students were 66.5 and 62.4 respectively.

Follow-up pairwise comparisons were conducted to evaluate the differences among these two groups of students. Table 2 shows the results of these analyses. The Holm's sequential Bonferroni method was used to control for Type I error at the .05 level across the two comparisons. Both comparisons (dual enrollment participants and those who do not participant in dual enrollment) were found to be significantly different with the dual enrollment participants group displaying the highest proportion of students earning a credential.

Table 2

Comparison of Dual Enrollment Versus Non-Dual Enrollment Engagement Using Holm's Sequential Bonferroni Method

Engagement Comparison	Pearson chi-square	*p* values (Alpha)	Cramer's V
No	1.56	<.001 (.017)	.01
Some	1.56	<.001 (.025)	.01

Research Question 4

Research Questions 4: Is there a significant difference in the proportion of TCAT students who earn a certificate between dual enrollment participants and those who do not participant in dual enrollment?

Ho4: There is not a significant difference in the proportion of TCAT students who earn a certificate between dual enrollment participants and those who do not participant in dual enrollment.

A one-sample chi-square test was conducted to assess whether TCAT students that participated in dual enrollment while in high school were more likely to earn a certificate than TCAT students that did not participate in dual enrollment. The results of the test were statistically significant, $\chi^2(2, N = 4806) = 3552.52$, $p < .001$. The proportion of students that earned a certificate ($p = .93$) but were not engaged in dual enrollment was significantly larger than the proportion of students ($p = .07$) that were engaged in dual enrollment while in high school.

Research Question 5

Research Question 5: Is there a significant difference in the proportion of TCAT students who earn a diploma between dual enrollment participants and those who do not participant in dual enrollment?

Ho5: There is not a significant difference in the proportion of TCAT students who earn a diploma between dual enrollment participants and those who do not participant in dual enrollment.

A one-sample chi-square test was conducted to assess whether TCAT students that participated in dual enrollment while in high school were more likely to earn a diploma than TCAT students that did not participate in dual enrollment. The results of the test were statistically significant, $\chi^2(2, N = 13756) = 10415.88$, $p < .001$. The proportion of students that earned a diploma ($p = .94$) but were not engaged in dual enrollment was significantly larger than the proportion of students ($p = .07$) that were engaged in dual enrollment while in high school.

Chapter 5. Summary, Conclusions, and Recommendations

The purpose of this comparative quantitative study was to compare the success factors of the dual enrollment student population to the non-dual enrollment student population at the Tennessee Colleges of Applied Technology. The researcher compared engagement levels of dual enrollment to measure the impact on the attainment of a certificate or diploma. Engagement levels based on hours logged as a dual enrollment student were compared among those who received a credential versus those who were nonrecipients of credentials, as well as versus nondual enrollment students. The study compared credentials earned based on the participation of dual enrollment and nondual enrollment students. The study also compared differences among those who participated in dual enrollment and those who did not that earned a certificate and diploma.

The present study involved the population of students at a Tennessee College of Applied Technology. Each of these colleges is under the governance of the Tennessee Board of Regents. This single governing board creates consistency in the certificates and diplomas offered at the 27 colleges. Each of the students in the present study was pursuing a certificate or diploma at one of the TCATs.

Overall there were 28,017 students in the population. Among this population there were 1,972 dual enrollment students and 26,045 nondual enrolled students. The time period selected for study consisted of students enrolled in the 2012-13 academic year through the 2015-16 academic year. This study involved analyzing the data among the dual enrollment and nondual enrollment populations that successfully earned a credential based on the attainment of a certificate or diploma. An independent-samples t test was conducted for Research Questions 1

and 2. Two-way contingency table analyses were conducted for Research Questions 3 and 4. A one-sample chi -square tests was conducted for Research Question 5.

Summary of the Findings

After evaluating the 5 research questions, the findings were that dual enrollment status does result in significantly increase the likelihood of obtaining a certificate or diploma. It was also found that high engagement of dual enrollment does have a significantly greater impact on the attainment of a certificate or diploma than does low to moderate engagement.

The evaluation of the data for Research Question 1 regarding the difference in hours logged by dual enrollment who received a credential was the focus of Research Question 1. It was determined that there was a significant difference between those who received a credential and those who did not receive a credential. The students receiving a credential logged more than twice the hours than the students who did not obtain a credential.

The evaluation of the proportion of TCAT students that earn a credential among the three levels of engagement (no engagement, low to moderate engagement, or high engagement) was the focus of Research Question 2. The attainment of a certificate or diploma and the level of engagement were found to be significantly related. The high engagement group displayed the highest proportion of credentials earned by students.

Research Question 3 focused on the proportion of TCAT students that earn a credential between dual enrollment participants and those who do not participate in dual enrollment. The dual enrollment group displayed the highest proportion of students who earned a credential.

The proportion of TCAT students who earned a certificate between dual enrollment and nondual enrollment students was the focus of Research Question 4. The proportion of students

who earned a certificate and were not engaged in dual enrollment were significantly larger than the proportion of students who were engaged in dual enrollment. Therefore, the student who were engaged as dual enrollment students were significantly more likely to earn a certificate than their nondual enrolled counterparts.

The proportion of TCAT students who earned a diploma between dual enrolled and nondual enrolled students was the focus of Research Question 5. The proportion of student that earned a diploma and were not engaged in dual enrollment was significantly larger than the proportion of students who were dual enrolled. It was found that student who were engaged as dual enrollment students were significantly more likely to earn a diploma than nondual enrollment students.

Conclusions

The analysis of Research Question 1 indicated a significant difference between the number of hours logged by dual enrollment students who received a credential and those who did not receive a credential, $t(1970) = -10.54$. The students who earned a credential logged more than twice the hours of the students who did not earn a credential. Karp et al. (2012) found that dual enrollment participation creates academic momentum as students build a nest egg of success. The hours completed serves as a motivator for the student to complete the credential because the student has invested their time and effort. Some of the overall effort required has been accomplished and the portion ahead of the student to be completed is smaller than it was prior to enrolling as a dual enrollment student. The concept of hours nested by dual enrollment students serves as a strong motivator to complete a credential.

The analysis of Research Question 2 indicated that there was a significant difference among the three levels of engagement for the students who earned a credential. A significant relationship was found to exist between earning a credential and the level of engagement by dual enrollment students. The Holm's sequential Bonferoni method found that there was significant difference among the comparison of all three groups. The high engagement group resulted in the highest proportion of students who earned a credential. Catron (2001) found that dual enrollment programs allow students to earn the technical certificates needed to enter the workforce. Students who participate in high levels of engagement as dual enrollment students earn certificates and diplomas quicker than their low engaged dual enrollment and non-dual enrolled counterparts.

The analysis of Research Question 3 indicated that the proportion of TCAT students who earn a credential is significantly different between dual enrollment students and those who do not participate in dual enrollment. The Holm's sequential Bonferoni method found that there was a significant difference between dual enrollment student and those who do not participate in dual enrollment. Dual enrollment students displayed the highest proportion of students earning a credential. Heath (2008) found that dual enrollment students have higher completion rates than non-dual enrolled students. The analysis shows that TCAT students who participate in dual enrollment programs earn credentials at a higher rate than non-dual enrollment students.

The analysis of Research Question 4 indicated that the proportion of students who earned a certificate but were not engaged in dual enrollment was significantly larger than the proportion of students that were engaged in dual enrollment. Jaschik (2019) found that students with some dual enrollment credit were more likely to graduate than those that entered the institution without previous dual enrollment credit. TCAT students who were not engaged in dual enrollment earned a certificate at a higher proportion than dual enrollment students. This is attributed to the fact that

many of the students who attend as a dual enrollment student do not seek a certificate. Many of these students attend for a single block of hours during high school and do not return. Therefore, in comparison to their non-dual enrollment counterparts who attend full time and are vested to complete the entire program, the proportion students who were not engaged in dual enrollment earn certificates at a significantly larger rate than dual enrollment students.

The analysis of Research Question 5 indicated that the proportion of students who earned a diploma but were not engaged in dual enrollment was significantly larger than the proportion of students that were engaged in dual enrollment. Zinth (2014) found that career and technical education students are more likely to earn a high school diploma. While dual enrollment participation at a TCAT increases the interest by the high school student and facilitates the completion of a high school diploma, this study found that the proportion of students who were not engaged in dual enrollment earned a diploma at a higher rate than dual enrollment students. This is attributed to the fact that many of the students who attend as a dual enrollment student do not seek a diploma. Many of these students attend for a single block of hours during high school and do not return. Therefore, in comparison to their non-dual enrollment counterparts who attend full time and are vested to complete the entire program, the proportion students who were not engaged in dual enrollment earn diplomas at a significantly larger rate than dual enrollment students.

The results of the study demonstrated an increased likelihood of the attainment of a certificate or diploma as the result of dual enrollment engagement. The study found that the attainment of a certificate or diploma at a TCAT by dual enrollment participants is significantly different than that of nondual enrollment students. However, this is one study based on the TCAT System. If the study was expanded to include other technical training programs in other

states a different conclusion could be the result. It does appear from this research that dual enrollment participation leads to greater completion rates in attaining certificates and diplomas.

The timeframe chosen could also have an impact on the findings. This study focused on a four-year period of time in order to have a broad sample. The intention of this broader selection was to ensure that a more consistent finding would be the result rather than selecting a single trimester in which isolated variances may have occurred. The time frame chosen allowed for a two-year period beyond the chosen timeframe in order to allow for the completion of credentials by student who were enrolled as dual enrollment students during the period of time being evaluated. While the findings were that dual enrollment does result in greater rates of attainment of credentials, the study does not take into account the students who will return beyond the two-year period of time following the period of time chosen for this study. In the years following the study students who were previously dual enrolled may return to complete a credential. As this occurs the attainment rate of dual enrollment students who ultimately obtain a certificate or diploma will be further increased. All programs were chosen for this study. This too was to provide a broad sample in an effort to obtain a consistent finding.

There are some judgements that can be made from the data available. Completion data can be observed for each program to determine which programs have greater dual enrollment participation, as well as which programs benefit the most from dual enrollment participation in regards to the attainment of a credential. The main takeaway is that for all areas evaluated during this study it was consistently found that as a result of dual enrollment, certificates and diplomas were obtained at a higher rate than that of students who did not participate.

Other factors may also have an impact on dual enrollment success, such as attendance, financial resources, and a strong support network. While these factors were not considered in this

study, these factors may be of consideration in future studies. Factors such as these may be difficult to assess, however it may be found that factors such as these have a significant influence on completion. For example, dual enrollment students with consistently poor attendance may perform at lower rates than do their counterparts who have good attendance records. A closer look at why students with poor attendance records miss school frequently could be taken into consideration. It may be found that financial hardships create a situation where they need to work part time jobs while going to school or that a health issue by a family member is having a negative impact on the dual enrollment student's attendance.

Financial aid is also a major factor to consider when evaluating the completion of a certificate or diploma, as this factor impacts both dual enrollment and nondual enrollment students. While the dual enrollment grant provides funding to dual enrollment students, funding is also needed beyond high school by these students in order to complete a credential. Previously dual enrollment students and nondual enrollment students alike are then both eligible for Wilder-Naifeh Technical Skills Grants, PELL Grants, and other forms of financial aid that exists. These forms of funding can often prove to be vital to the success of the student's ability to obtain a credential. For example, a small amount of financial aid funding needed to purchase a book can sometimes be a major barrier for a student that is attempting to complete a credential. The same lack of a small amount of funding can also be a barrier for the student struggling to overcome the costs associated with transportation.

This researcher did have the ability to accurately identify the population that was to be used for this study. The information used was obtained from the TBR Office. The certificates and diplomas obtained by dual enrollment and non-dual enrollment students was also available.

Recommendations for Practice

Dual Enrollment Reporting

The completion status of non-dual enrolment students is reported by the TCATs in the form of completion, placement, and licensure data. However, this information is not reported for dual enrollment students. Dual enrollment students sometimes change training objectives or simply take a dual enrollment course at a TCAT for enrichment purposes. These students may take a dual enrollment course at a TCAT due to an interest in the subject matter while at the same time intending to attend a college to pursue a four-year degree rather than a seek to obtain a diploma from a technical program after graduating high school. There are many reasons why students do not complete a program, but the students who do complete a certificate or diploma as a dual enrollment student, the completion of such certificates and diplomas should be documented to show the achievements obtained by dual enrollment students. This data, along with the number of hours completed should be reported.

Dual Enrollment Data

Dual Enrollment data is needed to provide information such as hours completed and completions of a certificate or diploma. Access to this type of information would allow students to view the dual enrollment completion rates prior to enrolling at the institution of their choice. This data would also be beneficial to administrators and vested stakeholders in the community when considerations are being given to the implementation of a new dual enrollment program. This data would also be of use to future research in assessing the impact of dual enrollment.

Recommendations for Further Research

The following recommendations are being presented as a direct result of this research:

1. Further research on the technical credential attainment of dual enrollment students is needed outside the Tennessee Colleges of Applied Technology.
2. Research focused on broader dual enrollment populations may provide further insight to the full impact of dual enrollment.
3. Ongoing research that allows for the considerations of the latest trends such as the current trend to transition to virtual online platforms will need to be assessed in order to provide relevant information based on current trends.

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APPENDIX: TCAT Programs

The 89 programs offered at the TCATs include: Assistant Animal Laboratory Technology, Aesthetics Technology, Advanced Manufacturing Education, Advanced Manufacturing Production Technology, Advanced Manufacturing Technology, Administrative Office Technology - Medical Coding, Administrative Office Technology, Automotive Technology, Avionics Maintenance Technology, Aviation Maintenance Technology, Building Construction Technology, Barbering, Barbering Instructor Training, Computer Aided Design Technology, Computer Electronics, Computer Information Systems, Computer Information Technology, CNC Machining Technology, Nursing Aide, Computer Operating Systems and Network Technology, Cosmetology Instructor Training, CNC Operator-Programmer, Cosmetology, Collision Repair Technology, Central Sterile Processing, Culinary Arts, Digital Graphic Design, Digital Graphic Design Technology, Dental Laboratory Technology, Dietary Manager, Diesel Powered Equipment Technology, Dental Assisting, Electrician Apprenticeship Training, Early Childhood Education, Electro-Mechanical Technology, Electronics Technology, Emergency Medical Technology, Electrical & Plumbing Construction Technology, Electronic Systems, Heating, Ventilation, Air Conditioning and Refrigeration, Hybrid Electrical Vehicle, Health Information Management Technology, Health Science Education, Heating, Ventilation, Air Conditioning and Refrigeration, Industrial Electrical Maintenance-Mechatronics, Injection Molding/Robotics, Industrial Maintenance Automation, Industrial Maintenance Technology, Industrial Maintenance and Electrical Systems, Industrial Maintenance, Industrial Maintenance Integrated Automation, Industrial Maintenance/Mechatronics, Industrial Maintenance Repair, Industrial Maintenance, Industrial Maintenance, Industrial Electricity, Information Technology and Infrastructure Management, Information Technology, Manicuring, Major Appliance Repair Technology,

Motorcycle and ATV Repair, Medical Assisting, Mechatronics, Mechanical Maintenance Electrical and Instrumentation, Medical Office Assistant, Medical Office Information Technology, Tool and Die Machining, Manufacturing Technology, Machine Tool Technology, Millwright Skills, Outdoor Power Equipment, Patient Care Technology/Medical Assisting, Pipefitting and Plumbing Technology, Phlebotomy Technology, Pharmacy Technology, Power Line Construction and Maintenance, Pipefitting and Plumbing Technology, Power Sports Technology, Practical Nursing, Residential Building Maintenance, Retail, Hospitality & Tourism Technology, Residential/Commercial/Industrial Electricity, Residential Wiring and Plumbing, Surgical Technology, Telecommunications Technology, Truck Driving and Welding Technology.

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