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EFFICACY OF DUAL ENROLLMENT IN RURAL SOUTHWEST VIRGINIA

by

Karen Glass Carter
B.S., August 1988, Radford University
M.S., January 1999, Bowie State University

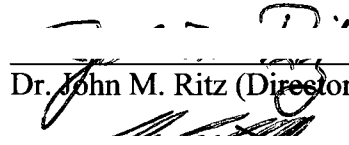
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Approved by:



Dr. John M. Ritz (Director)



Edward Raspiller (Member)



Dr. Philip A. Reed (Member)

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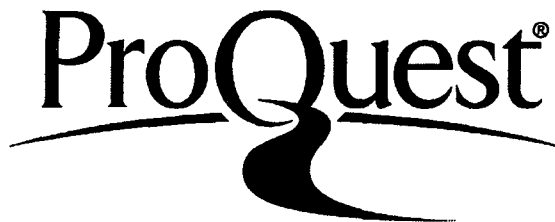
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Abstract

EFFICACY OF DUAL ENROLLMENT IN RURAL SOUTHWEST VIRGINIA

Karen G. Carter
Old Dominion University, 2009
Director: Dr. John M. Ritz

The intent of this dissertation was to determine if enrollment into a career and technical education dual enrollment program encouraged students to continue their education into postsecondary education and if workplace readiness skills were increased. This study completed a factorial analysis of student demographic and factorial data as associated with the enrollment of career and technical education dual enrollment in rural, southwest Virginia. Specifically, the study explored secondary students ($N = 221$) currently enrolled during the academic school year 2008-2009 within a Virginia approved career and technical education dual enrollment course. These students attended one of four career and technical centers contained within the service area of a Virginia community college. Student surveys were used to determine opinions regarding career and technical education dual enrollment factors concerning enrollment motivation, social and financial concerns, and workplace readiness skill development.

The study found the demographic description of a career and technical education student in rural, southwest Virginia to be almost evenly divided between male and female (there was a frequency difference of three), in the senior year with an average grade point average of 3.0-3.49, not receiving free or reduced lunch nor being a first-generation college student. Findings also revealed students felt they were treated as adults during their enrollment in demanding, high achieving courses with content pertaining to real-life goals. Analysis revealed four components labeled as (a) college/career awareness, (b) affordable challenging courses, (c) guidance assistance, and (d) student motivation that

positively supported career and technical education dual enrollment programs were effective at increasing student participation to the postsecondary level.

Finally, student awareness of Virginia's 13 Workplace Readiness Skills was found to be accomplished through the enrollment into career and technical education dual enrollment courses. Students' responses supported the issuance that all 13 Workplace Readiness Skills were recognized and developed during course enrollment. Each of the skills returned as factors leading to the establishment of three components labeled as (a) workplace skill development, (b) skill/education need, and (c) desire to attend college, which supported increased student awareness of workplace readiness skills as well as the need for continued education or training beyond high school necessary to be successful and productive in today's workforce.

This dissertation is dedicated to my wonderful husband, Charlie, daughter, Devon, and son, Cody without whom none of my achievements or successes would have been possible.

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This doctoral degree accomplishment would not have been possible without the encouragement and support from several key people. First, and foremost my husband, Charlie, who was my steadfast sounding board and confidence builder. He never complained about the numerous late nights of attending class, studying, or writing. He has always provided selfless support and encouragement throughout all my educational endeavors. His love and understanding have been unquantifiable. To him I will always love and be thankful for as well as his continuous reminders of how truly blessed we really are.

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Next, I would like to thank my mom and dad who have always supported me in all my pursuits, trials, successes, and tribulations. From the early years of high school in shuttling me across the state and country on FBLA trips to handling U.S. Navy transfers, my parents have been the homeport of support and assurance. I would like to thank them for their mentoring example and love. Without their sacrifices, I would not have been provided the experiences and opportunities that have so enriched my life today.

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way” has been a constant source of empowerment. Were it not for the emails and calls with words of motivation to apply, this process would never have begun. Thank you both for being steadfast supporters, readers, cheerleaders, and always ready with a hardy Glass hug. This process could not have been completed without you.

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Karen Glass Carter

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CHAPTER I

INTRODUCTION

Dual enrollment is a mechanism providing secondary students the opportunity to take postsecondary courses while remaining enrolled in high school (Andrews, 2004; Kleiner & Lewis, 2005; Marshall & Andrews, 2002). According to the National Center for Education Statistics, 1.2 million (8%) high school students participated in dual-credit enrollment in the 12-month 2002-03 school year (Kleiner & Lewis, 2005) and 71% of public high schools in the United States offered dual credit career and technical education courses (Waits, Setzer, & Lewis 2005). Additionally, two 2005 reports from the U.S. Department of Education showed 71% of U.S. high schools and 51% of U.S. postsecondary institutions had dual enrollment programs during this same time frame (Karp, Calcagno, Hughes, Jeong, & Bailey, 2007). An increasing amount of data describing the factors and characteristics as well as the academic and financial benefits (Andrews, 2004; Bailey, Hughes, & Karp, 2002; Catron, 2001; Chapman, 2001; Karp, Bailey, Hughes, & Fermin, 2005; Marshall & Andrews, 2002; Smith, 2007) has been accumulated. Participation in dual enrollment programs is growing as well as the popularity of such programs (Boswell, 2001; Catron, 2000; Chapman, 2001; Girardi & Stein, 2001).

All fifty states, along with their respective education departments, have noted the curriculum inclusion of a dual enrollment program (Bailey, Hughes, & Karp, 2002). These, however, vary in course content, course location, type of instructor, method of earning college credit, support services, and characteristics of participating students (Golann & Hughes, 2008). Research by the National Center for Education Statistics

(NCES) (2005) reported of the postsecondary institutions with dual enrollment programs, 80% offered courses on the college campus, 55% percent offered courses on the high school campus, and 12% offered courses at some other location. Additionally, for those courses offered on the high school campus, 26% reported were taught by college instructors only, 32% by high school instructors only, and 42% by both college and high school instructors (NCES, 2005).

The availability of dual enrollment programs within the high schools is an educational and workplace skill building opportunity many rural students would not otherwise be afforded. Unlike students in urban settings, who are often within walking distance, the geographical boundaries of the rural student sometimes entail a one-hour, one-way trip to a postsecondary institution. Additionally, dual enrollment programs enable secondary and career and technical education centers to collaborate with area community and technical colleges offering students workplace training opportunities without the investment in costly equipment—equipment already available at community and technical colleges (Karp & Hughes, 2008).

Dual enrollment builds upon the promise and shortcomings of previous career and technical education reform efforts, particularly Tech Prep. The promise here was to provide for a seamless transition from secondary to post-secondary education without curriculum duplication. The major shortcoming was students often did not benefit from this “credit-in-escrow” or “articulated course-work” model that required matriculation to the partnering college before awarding credit or advanced standing (Karp & Hughes, 2008). However, dual enrollment’s policy tool possesses the capability to improve

postsecondary preparation and workplace readiness (Krueger, 2006) by awarding credit automatically to a college transcript once the students successfully complete a course.

This multiple pathway approach integrates rigorous academics with demanding career and technical education, comprehensive student support services, and relevant work-based learning opportunities, providing all high school students the opportunity of preparedness for both college and career (Golann & Hughes, 2008). In today's global economy where knowledge is truly the power source, education is pushing for higher skill attainment at an earlier age and in entry-level positions (Daggett, 2008).

Accentuating this point was an estimate provided by the U.S. Bureau of Labor Statistics (2006) that a majority of the fastest growing and highest paying occupations between now and 2016 would require some form of postsecondary education.

Research also indicated the benefits of dual enrollment go beyond that of the student to reach parents, high schools, and postsecondary institutions as well (Andrews, 2000; Boswell, 2001; Bailey, Hughes, & Karp, 2002; Girardi & Stein, 2001). The ultimate goals and benefits of dual enrollment are to engage, recruit, and retain high school students in college programs for the benefit of the student and community (Duffy, 2002). Students gain from a more comprehensive curriculum, one not often provided in the rural setting due to a lack of highly qualified teachers in advanced study areas such as mathematics, languages, or technology. These benefits inspire and engage students thereby creating a high school environment boosting student performance, as well as graduation and college transfer rates (Chapman, 2001). Students find themselves being better prepared for the rigors and challenges of college-level course work. Finally, early admission into college also has the added benefit of pleasing parents, by providing a

college education with a lower price tag (Andrews, 2004; Bailey, Hughes, & Karp, 2002; Boswell, 2001). While there is a large amount of research regarding dual enrollment policy development (Hoffman, 2005; Golann & Hughes, 2008), as well as the benefits for states, parents, and students (Boswell, 2001; Karp, Bailey, Hughes, & Fermin, 2004), very little research has been conducted to determine the level of efficacy these programs encourage career and technical education students in rural settings to continue into postsecondary education as well as increase workplace skill readiness.

Problem Statement

The problem of this study was to determine the efficacy of dual enrollment as a credit-based transition program mechanism in helping rural, southwest Virginia career and technical students participate in postsecondary education as well as increase knowledge of workplace skill readiness.

Research Questions

The research questions addressed in this study were as follows:

- RQ1:** What are the demographics and characteristics of dual enrollment students within the four-county service area of rural southwest Virginia?
- RQ2:** Does participation in the dual enrollment program encourage student participation into the postsecondary level of education?
- RQ3:** Does participation in a dual enrollment program provide development of workplace skill readiness?

Background and Significance

This quantitative research design was exploratory factor analysis utilizing principal component analysis with Varimax rotation. This statistical analysis identified

factors or components in order to determine the efficacy of rural southwest Virginia dual enrollment programs as a mechanism for increased participation into college and workplace readiness skill development. Specifically, the study explored career and technical education dual enrollment students attending a career and technical center within the servicing area of its community college situated in rural, southwest Virginia.

The community college's service area included a range of four counties and one incorporated township generally characterized as low-socioeconomic and first-generational college students. Minority students comprised a very small percentage, less than 2%, of the total student population. However, the ethnicity distribution of the student population was representative of the general population within the college's service region.

The college's dual enrollment program served eleven high schools and four career and technical education centers. The total number of dual enrolled students for the 2008-09 school year was 939, which comprised 21% of the community college's total annual enrollment (MECC, 2009). Of those, 221 were designated as career and technical education students, dual enrolled at one of the four career and technical centers. This study focused upon these students.

The purpose of this research was to determine if participating in a secondary dual enrollment program provided a mechanism through which rural, southwest Virginia career and technical students were encouraged to participate in postsecondary education as well as increase their workplace readiness skill level. Three research goals have determined: (a) students' perceptions of high school dual enrollment programs as reflected in their academic, financial, and career experiences; (b) if after enrollment into a

dual enrollment program, students were encouraged to continue their education to the postsecondary level; and (c) if dual enrollment affects the workplace readiness level of students.

Research has provided positive evidence of dual enrollment's impact upon students as they transitioned into 2- and 4-year postsecondary programs leading to greater financial opportunities as well as broader career pathways (Andrews, 2004; Kleiner & Lewis, 2005; Marshall & Andrews, 2002; Robertson, Chapman, & Gasken, 2001). This complementary program provided a continuum of education and training to the standard high school education curriculum as well as workplace skills (Smith, 2007). Additionally, dual enrollment partnerships offered postsecondary enrollment options to high school students that (a) eased transition to college, (b) reduced college costs by accelerating time to degree completion, and (c) provided a highly trained workplace competitive on a global scale (Boswell, 2001).

Presently, only forty states have enacted dual enrollment programs entitled Postsecondary Options (PSO) or dual enrollment legislation stating any student is eligible to enroll in college courses held either on the college campus or within the high school (McCarthy, 1999; Karp, Bailey, Hughes, & Fermin, 2004). Virginia's dual enrollment program has been no exception. Its appearance within the Commonwealth began in 1988 with the approval of the Virginia Plan for Dual Enrollment (Virginia Community College System (VCCS), 2009a) wherein eligible high school students enrolled in college level courses providing both high school and college credit. The 1988 Virginia Plan (Appendix A) documents the impetus for Virginia's dual enrollment program allowing the public schools and community colleges to cooperatively outline curriculum details avoiding

unnecessary duplication of curriculum. With its approval, a door opened to the “average” student desiring education beyond high school but was unlikely to pursue a bachelor’s degree without incorporating career and technical courses into the approved course listings (Chapman, 2001).

VCCS’s Chancellor Glenn DeBois listed Virginia’s dual enrollment program as one of his top five goals for Virginia’s strategic five-year plan (VCCS, 2009a) in an effort to improve higher education accessibility especially to those residing in rural areas. Assisting in the efforts to attain this goal was the newly modified 2008 Virginia Plan for Dual Enrollment (Appendix B) which provided for the program’s continuity into the next century through alignment with Virginia’s fall 2009 definition of a Tech Prep student, effective July 1, 2009 (VCCS, 2009b). This adoption will provide coded data for a new statewide tracking system allowing for advanced collection, reporting, and analysis of secondary and postsecondary program outcomes. These outcomes were an established requirement by the Carl D. Perkins Career and Technical Education Improvement Act of 2006 (Perkins IV) (PL 109-270) requiring each state and local program to report on separate core performance indicators for secondary and postsecondary students in order to track student progress on sixty industry recognized certifications.

Dual enrollment has historically targeted high-achieving, gifted high school students; however, educators and legislators increasingly see it today as a mechanism to assist a wider range of students transition from high school to college (Golann & Hughes, 2008; Rogers & Kimpston, 1992). Because dual enrollment programs increase the intensity and rigor of the high school curriculum by introducing college-level work, there is concern regarding the assumption low-achieving students are, by definition,

unprepared for college level work. However, as noted by Jordan, Cavalluzzo, and Corallo (2006) a wide diversity of students with varying levels of achievement and motivation may benefit from the dual enrollment experience. Programs offered through a variety of approaches and strategies often enhance the student's motivation, self-esteem, academic success, and ultimately their life choices.

Georgia's P-16 1995 initiative emphasized this point, when the percentage of high school students taking a rigorous core curriculum rose from 76% to 91% and postsecondary remediation levels fell by nearly 40% by linking K-12 to postsecondary education (Portch, 2002). Andrews (2004) as well found 70% of public high schools offered courses for dual credit; 92% of schools offering courses for dual credit offered such classes with an academic focus; and 51% reported offering dual credit courses with a career and technical education focus during the 2002-03 school year. Additionally, those schools offering dual credit courses on a postsecondary campus, 82% reported these courses enrolled both high school and postsecondary students. Of schools offering career and technical dual enrollment courses on a postsecondary campus, 78% reported these courses contained both high school and postsecondary students. As a result, dual enrollment programs may simultaneously meet students' needs for academic rigor and promote greater coordination between the secondary and postsecondary education sectors (Karp et al., 2004).

The Education Commission of the States (2000) and the Bridge Project at Stanford University (Venezia, Kirst, & Antonio, 2001) have also advocated dual enrollment programs as a viable strategy for improving the quality of the high school experience and bridging the transition from high school to college. Moreover, a

significant multimillion-dollar contribution by the Bill and Melinda Gates Foundation to establish “early college” programs is partly responsible for the growth of interest in designing and implementing effective interventions and strategies to aid in this effort. As of spring 2005, the Gates Foundation alone has spent more than \$95 million to create a network of early college high schools in more than 25 states (Jordan et al., 2006).

The U.S. Department of Education reported in, *Principal Indicators of Student Academic Histories in Postsecondary Education 1972-2000* (2004), college credits earned prior to high school graduation reduced the average time-to-degree and increased the likelihood of graduation for students who participate in these programs. Adelman (2006) found one out of four students who earned a graduate degree accumulated nine or more credits by examination or dual-enrollment, 10 times the proportion of students who earned no degree. Research in Minnesota suggested the number of students taking advanced placement tests rose by 988% between 1986 and 2004, due in part to the state’s dual enrollment program “College in the Schools”, when participation rose from approximately 1,200 in 1991-92 to 14,000 plus in 2004-05 (Nathan, Accomando, & Fitzpatrick, 2005). Virginia had 28,731 high school students in dual enrollment programs in 2007 (VCCS, 2009) as compared to 6,700 in 1997 (Andrews, 2001), a 379% increase in the number of students during the last ten years. The VCCS target for 2009-2010 is 45,000, almost doubling this number.

By locating dual enrollment programs on a community college campus, a broad spectrum of unique benefits provides students with role models and activities promoting the “power of the site” (Greenberg, 1989, p. 26) further establishing clear ties to careers and higher education. Attributes found in the effective educational setting included strong

leadership, collegial relationships, a sense of community, clear goals, high expectations, and a school environment conducive to learning (Jordan et al., 2006). Additionally, Mortensen (1999) reported more than a quarter of students who entered 4-year colleges and almost half who entered 2-year colleges never returned for their second year. Bailey et al. (2003) suggested programs such as dual enrollment may help to reduce these numbers. College-based dual enrollment mechanisms may help to shrink instances of school failure, particularly for low- and moderate-performing students, by bringing them into college classes in the context of small programs providing positive support (Jordan et al., 2006).

Students who struggle academically or who are at risk of dropping out of high school may also realize significant benefits. Providing pathways for students to move seamlessly between secondary and postsecondary systems, dual enrollment promotes greater support for students' college aspirations and greater collaboration between high schools and colleges (Bailey & Karp, 2003; Clark, 2001). However, the No Child Left Behind Act 2001 (PL 107-110) has placed stringent requirements upon states to increase the emphasis on academic standards. By doing so, it has led to a de-emphasis of secondary career and technical education courses. These courses often lab-intensive, required regular updates to hardware and materials (e.g., automotive technology), and as a result were often phased out due to the high overhead costs (Rahn, 2002).

Reauthorization of Perkins IV (PL 109-270) provided an avenue for the integration of core academics and authentic learning environments through the establishment of the States' Career Clusters (<http://www.careerclusters.org/>). The mission being that these sixteen career clusters were to bridge the dividing gap between

academics and vocational education in existence since the passage of the Smith-Hughes Act of 1917, thus making the community college's traditional role as a provider of career and technical education an ideal partnership. The benefits of these partnerships are of particular value, including those concerning workforce development, as career and technical education administrators must now reevaluate their curriculums in light of current economic factors straining the country while at the same time fulfill workforce needs of a global economy.

Virginia has become a leading force in the nation through its innovative integration of workplace readiness skills across its entire career and technical education curriculum. Incorporating study findings from the University of Virginia's, *Virginia's Changing Workplace: Employers Speak* (Martin, Carrier, & Hill, 1997) provided the primary data to accomplish this inclusion. This study interviewed over 500 employers from across the state with their responses analyzed in order to gather job-entry workforce skill requirements. Findings provided Virginia's Department of Career and Technical Education the foundational data to develop, implement, and evaluate 13 basic entry-level skills, deemed necessary for successful entry into the workforce.

Community colleges as well were evolving in their response and adaption to the economy, higher education, workforce development, and the broader educational community (Brint & Karabel, 1989). With these adaptations, considerable interest in designing collaborative mechanisms for colleges and high schools appeared, with dual enrollment having emerged as the promising form of collaboration fostering transitions from high school to college (Bailey, Hughes, & Karp, 2003). Although dual enrollment programs vary from school to school or even state to state, common characteristics of

allowing high school students to accumulate college credit, improved student readiness, broaden aspirations, and increased self-confidence to seek and succeed in postsecondary education are dominant (Jordan et al., 2006).

Several models of dual enrollment programs currently operate in the United States, ranging from college-based programs taught in integrated classrooms to high school-based programs. Due to the low number of available national and state information sources on dual enrollment of high school students at postsecondary institutions in existence (Karp, Bailey, Hughes, & Fermin, 2004), the *Dual Enrollment Programs and Courses for High School Students* (2004) survey, undertaken by the National Center for Education Statistics (NECS), Institute of Education Science, and requested by the Office of Career and Technical and Adult Education, was designed to provide policymakers, researchers, educators, and administrators with baseline information on the prevalence and characteristics of dual enrollment programs (Kleiner & Green, 2003). However, to date, no unified set of policies or procedures exist that effectively assess an individual state's dual enrollment program even though all fifty states have enacted policies supporting the development of such programs.

Further research is needed to analyze the effectiveness of these models providing guidance to policymakers and educators attempting to assess the merits of differentiating models and in finding the right fit for their local needs. Nevertheless, while the emergence of these programs has undisputed positive benefits both financially and academically, the effectiveness has been largely ignored. This gap in the literature is especially prevalent when addressing the rural high school dual enrollment student. This study will assist in providing research to help fill this gap.

Limitations

The following were the limitations for this study:

- Virginia's dual enrollment guidelines delineate entrance or eligibility requirements. These included funding, limits on course taking, age restrictions, and placement test scores.
- High school students, who were enrolled in college courses unauthorized for dual credit, were treated as regular college students and were not considered to be participants in a dual enrollment program for this study.
- The study took place within the service area of one rural, southwest Virginia community college which served students from four counties and one incorporated township.
- Participants were limited to those students currently enrolled in grades 9-12 for the school year 2008-09.
- The study reviewed only those career and technical education courses currently approved under the 2008-09 Virginia Dual Enrollment Memorandum of Agreement and 2008 Virginia Dual Enrollment Plan.
- The study population ethnicity consisted of less than 2% minorities.

Assumptions

For this study, the following assumptions were held to be constant:

- Credit for courses was earned simultaneously at both the high school and college level and was reflected upon a college official transcript.

- Courses were taught on the college campus or service area career and technical center.
- The community college was a commuter college with a yearly enrollment of 3,500 – 4,000 students.
- Virginia’s dual enrollment program was not widely known or understood by parents and students of the service area.
- Career and technical education dual enrollment program opportunities varied depending upon each center’s instructional credentials alignment with the Southern Association of Colleges and Schools (SACS) qualification mandate for each program area.

Procedures

The subjects for this study were identified as 9th-12th graders currently enrolled in a career and technical education dual enrollment program within the service area of the rural southwest Virginia community college designated by the Virginia Community College System (VCCS). The 42-question original survey, administered during May-June 2009, included opened- and closed-questions provided Likert scale and Boolean data, which allowed participants’ opinion of the dual enrollment program to be analyzed. Permissions were obtained from the service area’s individual school system’s superintendents. Randomization of a sample population was achieved by surveying only those students present during the pre-scheduled dates. The data were compiled and a quantitative research design with exploratory factor analysis utilizing principal component analysis with Varimax rotation was employed to determine answers to the research questions presented during this study.

Definitions of Terms

The following terms are defined in order to give the reader a better understanding of the content discussed within this study:

- *2 + 2 program* – a program where students took career and technical courses while still in high school and completed the course work after continuing to a community college in order to gain certifications and/or an associate degree at the community college.
- *Concurrent enrollment* – the term often used in place of dual enrollment. The National Alliance of Concurrent Enrollment Partnerships (<http://www.nacep.org/>) narrowly defines concurrent enrollment as high school students taking college courses taught at their high school by qualified high school teachers.
- *Dual enrollment* – known as “dual credit,” “concurrent enrollment,” or “joint enrollment,” and refers to the participation in college-level courses and the earning of college credits by students while still enrolled in high school (Kleiner, Lewis, & Greene, 2005).
- *Dual enrollment courses* – courses where students receive both high school and college credit for a college-level class successfully completed. Courses were offered to fulfill general education requirements for associate degrees and all baccalaureate degree-granting institutions. Other courses are offered in the areas of career and technical education programs.
- *Dual enrollment program* – an organized program with special guidelines permitting high school students as specified under Virginia’s Memorandum of Understanding to take college-level courses.

- *Regular dual enrollment course* – dual enrollment courses traditionally taught within the arts and sciences division of a community college not having a career and technical designation, e.g., mathematics, science, foreign language, or English.
- *Tech Prep* – term used most often to identify courses taken through community or technical schools to shorten the completion timeframe of certificates and/or applied degrees in these colleges. Funding and detail information located within the Carl Perkins Act of 2006 (PL 109-270).
- *Tech Prep Student* – one who is currently or was previously enrolled in at least one career and technical education dual enrollment course, while a postsecondary Tech Prep student will have successfully completed at least one career and technical education dual enrollment course while in high school, effective July 1, 2009 (VCCS, 2009b).
- *Virginia's Memorandum of Understanding* – statement of agreement between Virginia's secondary school systems and Virginia's Community Colleges defining dual enrollment eligibility requirements (VCCS, 2009a).
- *Workplace Readiness Credential* – a baseline of hard and soft skills transferable from one position to another across industries considered valuable for any skilled or professional occupation at any level of education (Rey-Alicea & Scott, 2007 and ACT, 2006).

Summary and Overview

Chapter I discussed how dual enrollment has become one of the fastest growing credit-based programs in the United States. Dual enrollment courses provide high school

students the flexibility in course selection, financial savings, and an opportunity to build workplace readiness skills. Underachieving high school students were discussed where research found they performed better at the higher educational level when offered rigorous and engaging courses. As a result, student awareness of dual enrollment programs was shown to increase as their knowledge of the relationship that exists between these courses and their future success in the workforce increased (Lords, 2000).

Chapter II's Literature Review provides evidence to support the significance of dual enrollment programs. This study served to fill the gaps in the literature depicting the effectiveness of such programs. Chapter III, Methods and Procedures, includes the necessary information detailing this study's population and instrumentation used. Chapter IV, Findings, provides the tabulated results of the data obtained. Concluding with Chapter V, Summary, Conclusions, and Recommendations, the researcher will answer the study's research questions and make recommendations for future studies.

CHAPTER II

LITERATURE REVIEW

This review of the literature began with a historical progression of dual enrollment's development throughout the United States as a whole, and then led into Virginia's progressive development and contingency for the 21st century. As dual enrollment has developed into a mechanism creating a smoother and more successful transition from high school to college, advocates believe students in these programs are more likely to remain engaged in and challenged by rigorous courses thus eliminating the fragmentation that currently exists between the secondary and postsecondary systems of education (Karp & Bailey, 2003). Venezia, Kirst, and Antonia (2003) provided evidence supporting high school exit requirements are not aligned with college entry requirements, which result in ill-prepared students. Advantages and disadvantages of dual enrollment are reviewed as each have developed along with concerns and issues in regards to funding, course rigor and relevancy, and student issues being addressed by the implementation of dual enrollment as a mechanism for promoting college participation. Finally, with the number of dual enrollment programs on the increase, these programs have also gained recognition as additional scholarly preparation in workplace readiness skills. Virginia's 13 workplace readiness skills are outlined along with the Commonwealth's inclusion of these within its career and technical education curricula.

Historical Progression

Dual enrollment programs, often considered as a 21st century concept or enrollment strategy, actually have roots dating back to the 19th century. Johns Hopkins University is evidentiary of its presence in 1876 with its Three-Year Collegiate Program

(Greenberg, 1988). Margaret Fincher-Ford (1997) described dual enrollment programs in the 1880's when the Massachusetts Teachers' Association passed two resolutions leading to partnerships between high schools and postsecondary institutions. One resolution called the relationship evil, while the other noted more cooperation between the two educational levels would be a positive goal (Fincher-Ford, 1997).

Notations of dual enrollment programs were also found within the University of Chicago's 1892 restructuring process (Stoel, 1988), as well as Harvard University when then President Charles Eliot chaired a committee recommending high school courses be geared toward preparing students for college (Wallace, 2006). This represented the first national attempt to standardize high school curriculum and coordinate secondary and postsecondary education (Fincher-Ford, 1997), thus setting the stage for community college expansion and articulation agreement development between secondary and postsecondary schools (Brint & Karabel, 1989; Cohen & Brawer, 1994). This dual enrollment philosophy continued until 1959 when the College Board granted students the option of earning college credits through Advanced Placement examinations (Boswell, 2000) and in 1964 when Simon's Rock Early College admitted students into college during their senior year (Stoel, 1988).

In 1972, the creation of two unique partnerships, utilizing the basic concepts of dual enrollment as well as its philosophy of providing higher-level education along with developing career pathways and job readiness, was developed. The first partnership, known as the Syracuse University Project Advance, linked Syracuse University (SU) with secondary schools in New York, New Jersey, Maine, Michigan, and Massachusetts. Through this partnership, high schools offered qualified seniors the opportunity to enroll

in SU courses for credit. Currently, approximately 8,000 students from 170 high schools annually enroll in SU courses (SUPA, 2009). This program was recognized as one of the best known and longest running concurrent enrollment programs in the country (Andrews, 2001).

As a second partnership, the City-As-School High School still leads the nation with its external or experiential learning model for high school students. Founded by the City of New York as an independent alternative high school in 1972, the school's primary objective was to offer students from Manhattan, Brooklyn, and the Bronx a multitude of learning experiences encompassing the depth and breadth of New York City's businesses or resources (City-As-School, 2009). These programs have made their mark on the foundations of education by making it possible for weak or under-prepared students to transition from high school to college (Stoel, 1988). Already educational leaders from secondary and postsecondary schools were beginning to see the necessity and benefit of and for building partnerships allowing students to transition not only to the postsecondary level but to the workforce as well.

Greenberg (1991) remarked how the publication of *A Nation at Risk* "heightened the public perception of a crisis in our schools" (p. 25) and prompted development of programs such as dual enrollment. Dual enrollment's conception highlighted national concerns over the role high schools played in preparing students for a competitive global economy (Bailey, Huges, & Karp, 2002). Reeling from the remarks noted within the report, both secondary and postsecondary schools began to organize, develop, and implement tougher graduation standards for high school students. One such collaboration was College Now, which opened in fall of 1984 with students from several Brooklyn,

New York, public high schools enrolling in Kingsborough Community College (Greenberg, 1988). Similarly, Minnesota's Postsecondary Enrollment Options Program (PSEOP) began in 1985 with the intent of providing rigorous academic opportunities and expanding course options for high school students (<http://www.mntransfer.org/>) with other states following suit.

Virginia's Progression

Virginia, as well, has been proactive in its educational collaboration efforts. Catron (1998) described the 1980's as a time when Virginia's public schools and colleges collaborated to create integrated programs. These included academic as well as career and technical areas providing students the opportunity to develop workforce skills and have the option of continuing their education at the community college upon high school graduation, otherwise known as 2 + 2 or Tech Prep programs. Students completed two years of a vocational degree while in high school and the subsequent two years of the degree at a community college with little or no curriculum overlap. Working cooperatively and focusing upon the rationale that there was a need for such programs, provided the "average" student an avenue to pursue a bachelor degree, an avenue previously not considered.

The Commonwealth, known as a dual enrollment forerunner (Boswell, 2001; Catron, 1989; Catron, 2001), in 1988 designed the Virginia Plan for Dual Enrollment and provided the impetus for Virginia's dual enrollment program. Virginia's Plan outlined such areas as (a) course offerings, (b) student eligibility, (c) credit awarded, (d) faculty selection, (e) assessment, (f) state funding, and (g) tuition and fees (Catron, 2001). The 1988 Plan (Appendix A) was deliberately vague in terms of tuition, fees, and admission

requirements, thus allowing the state's 23 individual community colleges, particularly in the rural areas, to negotiate their own agreements with the public school districts.

Donald Finley, 1988 Secretary of Education in Virginia, contended dual enrollment programs would benefit rural areas (Catron, 2001). This was due in part to the fact that in many rural areas, per capita income was generally low, and undoubtedly, financial agreements that allowed students to participate in dual enrollment courses at no direct cost have increased its popularity. In addition, researchers speculated community colleges, considered a first choice of higher education in more rural areas whether because of the geographical location or because the number of dual enrollment courses taught in the high school, attracted larger numbers of students to dual enrollment programs (Catron, 2001).

Virginia modified the 1988 plan on January 27, 2005, when the Secretary of Education, the Virginia Superintendent of Education, and the Chancellor of Virginia's Virginia Community College System (VCCS) renewed and expanded the original document. This document was again modified in June 2008 through the collaborative efforts Dr. Tomas Morris, Secretary of Education, Dr. Billy K. Cannaday, Superintendent of Public Instruction, and Dr. Glenn Dubois, Chancellor, VCCS. Where the 1988 plan placed strict enrollment and course limitations, the modified 2008 plan (see Appendix B) outlined such areas as student enrollment criteria, course eligibility, faculty selection, and assessment requirements to be established and administered by the community colleges servicing the geographical area.

An additional disadvantage corrected by the 2008 Plan was students did not benefit universally from its "credit-in-escrow" or "articulated course-work" model

requiring matriculation to the partnering college before awarding credit or advanced standing especially for career and technical courses (Karp & Hughes, 2008). The sixteen career cluster concentrations that provide dual enrollment options beginning as early as the ninth grade, replaced these outdated articulation agreements during the fall 2009. Secondary Tech Prep programs now have the charge to reduce the number of high school graduates who place into developmental courses at the community college (VCCS, 2009). Additionally, the 2006 Perkins IV Act increased the awareness of this need by mandating career pathways integration into all career and technical programs. These pathways afforded students an actual college transcript where credits automatically posted once students successfully completed an approved dual enrollment course. Students no longer endure the wait period previously mandated by the community colleges on all articulated high school courses, which held the posting of the grade until the successful completion of a student's first college term. With this update, dual enrollment programs provided increased mobility as students entered the postsecondary arena. Further, this transition required the development and maintenance of an individualized student worksheet that integrated regular education courses with career and technical courses. This was to develop a program of study from the middle school to the completion of a bachelor's degree, thus establishing awareness, need, and understanding of lifelong career choices and opportunities.

Beginning July 10, 2009, Virginia adopted a statewide definition of the Tech Prep student. A secondary Tech Prep student was defined as one who currently or was previously enrolled in at least one career and technical education dual enrollment course. A postsecondary Tech Prep student was defined as an enrolled postsecondary student

having successfully completed at least one career and technical education dual enrollment course while in high school (VCCS, 2009). The VCCS and the Virginia Department of Education (VDOE), in conjunction with national subject experts on Tech Prep and Perkins legislation, developed this definition and marked the first time the Commonwealth of Virginia had a system for identifying and tracking Tech Prep students from high school into community college and/or the workplace. By doing so, a database was created allowing Virginia to gather, maintain, and report on national Tech Prep performance measures that would include coded dual enrollment data as required by Perkins IV.

State Policy Development

While all fifty states register some instance of dual enrollment within their educational curriculums, Karp, Bailey, Hughes, and Fermin (2005) stressed only 40 states currently had active dual enrollment programs. These programs were enacted by legislation entitled Postsecondary Options (PSO) or dual enrollment legislation (McCarthy, 1999) with the definition that students are eligible for admission in college courses held on the college campus or take place within the high school. A 2001 report by the Education Commission of the States (ECS) noted all but three states had some planned dual enrollment program, though the legislative requirements and institutional arrangements promoting the programs varied widely (ECS, 2001). The ECS's report continued by classifying state programs for dual enrollment in terms of the articulation agreements, funding arrangements, and course criteria. Comprehensive programs must meet two or more of the following criteria: (a) students pay little or no tuition, (b) earn both high school and college credit, and/or (c) have few restrictions. In states with limited

programs, students may pay part or all tuition costs, books, have enrollment restrictions, or encounter courses with rigorous criteria.

Minnesota was credited as the first state to develop dual enrollment policy, Postsecondary Enrollment Options Program, through its Postsecondary Enrollment Options Act (Minnesota Statute §124D.09). Several states followed Minnesota's lead: Missouri's §167.223, 1990; North Carolina's Huskins Bill, G.S. 115D-20(4); Washington state's Running Start Program; and Florida's Accelerated Mechanism Program (Florida Statute §1007.271). Because of diversity in nomenclature, dual enrollment programs are not uniform or ubiquitous across the fifty states. However, as dual enrollment students continue to earn credit from one college and seek transfer to another, the necessity of all states having established state-approved policies is obviously paramount. States currently struggling with this development process will need to heed the advice of Girardi and Stein (2001) to be attentive while creating policies regarding tuition or admissions. The concern being either of which can widen or close the experience gap for high school students in the transition to college, which may build barriers for students, particularly for low-income students (ECS, 2005).

Virginia's Policies

Virginia received legal authorization (Virginia Code § 23-9.2:3.02) in 1988 with the passage of the Virginia Plan for Dual Enrollment (VCCS, 2009). This plan was one of the first in the nation to outline such factors as student eligibility, credit awarding, faculty selection, assessment, tuition and fees, and state funding appropriations. Within Virginia Code §22.1-253.13:1 (JustiaLaw, 2009) local school divisions are mandated to develop:

...a plan to notify students and their parents of the availability of dual enrollment and advanced placement classes, the International Baccalaureate Program, and Academic Year Governor's School Programs, the qualifications for enrolling in such classes and programs, and the availability of financial assistance to low-income and needy students to take the advanced placement and International Baccalaureate examinations (paragraph 4).

It is interesting to note while funding provisions are made for Advanced Placement (AP) and International Baccalaureate (IB) courses, none specifically mentions how to fund dual enrollment, only that it be available.

State funding remains one of the most scrutinized components of Virginia's Plan due to the state-approved credit funding for both public schools (in terms of average daily membership credits) and community colleges (in terms of full-time equivalent student credits) which might be considered "double-dipping" since both institutions benefit financially (Catron, 2001; Boswell, 2001). Twenty-seven states allow both the K-12 school district and the community college to count dual enrollment students toward both full-time equivalent (FTE) and average daily attendance (ADA) (Boswell, 2001). However, this strategy of dual funding is unpopular with some, particularly legislators and taxpayers, who dislike the double dipping concept of having two systems for one service (Bailey, Hughes, & Karp 2002; Clark, 2001; ESC, 2001; McCarthy, 1999).

Proponents of dual enrollment contend the purpose of the program is to provide student access to expanded course offerings. It was not to provide a financial benefit to the institutions. While this strategy of funding both systems may provide an incentive for

both school districts and community colleges to participate with dual enrollment courses, the bleak fiscal environment hitting states across the nation has drawn increased attention to the inefficient use of funding for dual enrollment courses (Hunt, 2007). According to Bailey et al. (2002), as dual enrollment courses increase in popularity among students and parents, the question on how to fund dual enrollment courses equitably while making the most efficient use of public monies will become an even more debated topic.

Virginia currently battles this very issue as the 2008 dual enrollment plan states “schools and colleges are encouraged to provide high school students the opportunity for dual enrollment at no tuition cost to them or their families. In addition, neither the public school nor the community college shall be penalized in their respective state appropriations for developing and implementing the dual enrollment agreement” (VCCS, 2008, p. 3). Moreover, Virginia legislation directly addresses dual enrollment in secondary schools through the Regulations Establishing Standards for Accrediting Public Schools in Virginia (8 VAC 20-131; §54.1-2105), which states:

Beginning in the middle school years, students shall be counseled on opportunities for beginning postsecondary education and opportunities for obtaining industry certifications, occupational competency credentials, or professional licenses in a career and technical education field prior to high school graduation. Such opportunities shall include access to at least three Advanced Placement courses or three college-level courses for degree credit pursuant to 8 VAC 20-131-100. Students taking advantage of such opportunities shall not be denied participation in school activities for which they are otherwise eligible. Wherever possible, students shall be

encouraged and afforded opportunities to take college courses simultaneously for high school graduation and college degree credit (dual enrollment)... (p. 28).

National Goals and Objectives

At the National Governor's Conference held on February 27, 2005, a national conversation regarding the preparation of American high school students for postsecondary education arose. This discussion included results formulated through studies by the Western Interstate Commission for Higher Education, the Education Commission of the States, and Achieve, Inc., where state governments and their polices investigated connections established throughout the educational system (P-16) had been surveyed (Swanson, 2008). The overwhelming finding was the need for data tracking systems to follow students throughout their education careers, which would expose key issues leading to success or failure of postsecondary education attainment. Later in 2005, the National Center for Education Statistics published a report of high school students participating in dual enrollment classes and the prevalence of postsecondary institutional involvement in providing dual enrollment programs (Kleiner & Lewis, 2005; Waits, Setzer & Lewis, 2005). McCormick and Carroll (1997), authors of the report, found community college students who complete an associate degree before transferring have a much high rate of bachelor's degree attainment than those who do not.

Venezia, Kirst, and Antonia (2003) investigated a genuine need to guide students across the academic divide separating high school and college experiences in the Stanford Bridge Project. This research found high school assessments often stress different knowledge and skills than college entrance and placement requirements. Similarly, the

coursework between high school and college is not connected; students graduate from high school under one set of standards and, three months later, are required to meet a completely new set of standards at the postsecondary level. A recommendation resulting from this study was to expand successful dual or concurrent enrollment programs between high schools and colleges to include all students, not just traditionally “college-bound” students.

The Education Commission of the States considered dual enrollment as one component of a seamless K-16 system, and recommended, “State policymakers should consider funding the dual or concurrent enrollment of upper division high school students in community college courses and provide incentives to students to accelerate their education progress” (Boswell, 2000, p. 8). This recommendation hastened dual enrollment’s continuous growth as a nationwide method of providing high school students the opportunity to enroll into postsecondary courses at public and private two- and four-year institutions (Andrews, 2004; Kleiner & Lewis, 2005; Marshall & Andrews, 2002) and provided complementary curriculum content rather than supplemental (Robertson, Chapman, & Gaskin, 2001). Both of these points, school districts found especially prudent, as so many are critically currently reviewing curricula as possible areas for cost reduction in light of the current economic state. School districts are finding they were often better-situated to expand courses and/or career clusters with dual enrollment options that hold little or no costs while building partnerships with area postsecondary institutions.

Today’s educators and policymakers see dual enrollment as a strategy to facilitate a broader range of students transitioning from high school to college by providing

linkages and avenues to career pathways (Marshall & Andrews, 2002). Students who struggle academically or who are at risk of dropping out may also realize significant benefits from dual enrollment (Golann & Hughes, 2008). There were 540,382 public school students who dropped out of grades 9–12 during the 2004–05 school year within the 50 states (NCES, 2007). Dual enrollment efforts to improve relationships between students and high school, as well as community colleges, are being realized through the establishment of goals such as: (a) providing a wide variety of college-level courses for students; (b) providing student development-oriented, first-year experience courses to high school students; (c) enhancing the performing and visual arts curricula in high schools; (d) enhancing science and language offerings in high schools; (e) exposing as many students as possible to a college-level experience; (f) providing a college-level experience for the most academically talented students; (g) allowing students to “get a jump” on their college education; (h) providing a seamless transition from high school to college; and (i) encouraging students who do not aspire to attend college to explore the possibility of continuing their education (Chapman, 2001). Lords (2000) found dual enrollment was just the right thing to retain the love of learning and as DeLuca (1977) noted it provided engagement during the senior year in high school.

State legislators see dual enrollment as an excellent model of accelerated placement where the program creates a cache of high school students completing upwards of thirty credits or more of college, resulting as an indicator of student persistence to college preparedness (Robertson, Chapman, & Gaskin, 2001). The effect for students, who might not otherwise have seriously considered attending college, will

develop an awareness of increased academic preparedness as well as increased self-confidence, resulting in higher probability of degree attainment or workforce success.

Program Advantages

Dual enrollment programs have quickly expanded to be the largest movements in education since the start of the 21st century (Achieve, 2007; Clark, 2001; Marshall & Andrews, 2002) providing a wide range of benefits to students, parents, and secondary, as well as postsecondary institutions (Andrews, 2000; Boswell, 2000; Chapman, 2001; Karp & Hughes, 2008). In addition to accenting students' regular high school education, dual enrollment provides meaningful benefits including financial, expanded study, additional credits, and the opportunity to begin career exploration at an early age (Chapman, 2001; Duffy, 2002; Hale, 2001).

The National Alliance of Concurrent Enrollment Partnerships (NACEP) (<http://www.nacep.org/>) was organized in 1999 as a response to the dramatic increase in dual enrollment programs developing throughout the country. NACEP's primary mission was to foster and support rigorous dual enrollment. NACEP had 352 members (146 institutional and 206 individual) from 29 states, served as a national accrediting body, and supported all members by providing standards of excellence, research, communication, and advocacy for dual enrollment (NACEP, 2009). By doing so, the NACEP has assisted institutions with the development of dual enrollment mechanisms that have shaped positive outcomes as seen through: (a) increased academic rigor, (b) assisted low-achieving students met high academic standards, (c) provided academic opportunities and electives in cash-strapped, small, rural schools, (d) increased student aspirations, and finally (e) reduced college costs (Karp & Hughes, 2008).

Peng (2003) compared dually enrolled and non-dually enrolled students in the first two years of public four-year universities and found students who participated in dual enrollment had higher GPAs and retention rates at the university level than non-participants. DiPuma's (2002) study focused upon students who might not otherwise be college-bound but had an opportunity to successfully complete college classes and found students performed similarly to regularly enrolled students though slightly better than first time college students. Windham and Perkins (2001) found dual enrollment students successfully completed college-level courses subsequent to their dual enrollment experiences by 77%. Finally, Vander Ark (2003), Executive Director of the Bill and Melinda Gates Foundation, believed high school should be transitional rather than terminal, thus it had the obligation to prepare all students for college.

Secondly, analysts agreed the separation between K-12 and postsecondary systems was a fundamental cause of problems associated with education continuation and program completion (Venezia, Kirst, & Antonia, 2003). Students who graduated from high school in good standing often found themselves in a remedial class upon college entrance. Many disengaged students remained uninformed about the future importance of academic learning in high school and the impact their decisions had on future life opportunities (Bailey & Karp, 2003). Educators as well as state and federal policy makers regarded dual enrollment programs, as avenues to facilitate college access and workforce success for average students (Karp & Hughes, 2008).

A National Center for Education Statistics report titled, *Dual Credit and Exam-based Courses in U.S. Public High School: 2002-03* (Waits, Setzer, & Lewis, 2005), provided baseline information regarding the prevalence and characteristics of

acceleration mechanisms including those of dual enrollment. The study found 70% of all public high schools offered courses for dual credit with approximately 1.2 million enrollments in dual credit courses. Additionally, 92% of schools offering courses for dual credit offered such classes with an academic focus, and 51% reported offering dual credit courses with a career and technical/vocational focus. The U.S. Department of Education report *Principal Indicators of Student Academic Histories in Postsecondary Education 1972 – 2000* (2004) found college credit earned prior to high school graduation in dual enrollment programs reduced the average time-to-degree. Time-to-degree for average students with no acceleration credits earned was 4.65 years, compared to 4.25 years for students who earned nine or more acceleration credits.

As a companion, the National Center for Education Statistics reported, *Dual Enrollment of High School Students at Postsecondary Institutions: 2002-03* (2005), national estimates especially for dual enrollment using data collected through the Postsecondary Education Quick Information System (PEQIS) (Kleiner & Lewis, 2005) were analyzed. This study found during the 2002-03 academic year 98% of public 2-year institutions had high school students taking courses for college credit. Furthermore, approximately 680,000 of the students who took courses through dual enrollment programs with the postsecondary institutions, the institutions were unable to deny access to students for the sole reason students were still enrolled in high school (U.S. Department of Education, 2004).

Through the establishment of these partnerships, community colleges found development of dual enrollment programs had quickly become a viable recruitment tool (Clark, 2001; Hoffman & Vargar, 2005; Krueger, 2006). By providing secondary

students early access to institutions, students are not only encouraged to take educational opportunities more seriously, but it is also hoped the experience would generate interest in continuing with a postsecondary institution (Brown, 1993; Collins, 1980; Greenberg, 1989). The effectiveness of these collaborations could be seen by the sparked student interest in building career pathway curriculums which eliminated or reduced course redundancy, helped students progress faster, and developed higher interests regarding staying in school which for the community colleges result in higher rates of degree attainment (Andrews, 2000; Howell, 2001; Clark, 2001). The *National Commission on the High School Senior Year* (2001) noted:

A more demanding secondary school curriculum will enable students to enter the workforce immediately, if they choose to, confident that they have the skills and knowledge needed on the job and, increasingly, in their employer's classrooms. They also will be better equipped to attend college later or enroll in specialized training as their careers develop. It perhaps needs also to be added that as more students receive the preparation they need to continue education right out of high school, the more likely they are to enroll immediately in college or other postsecondary courses (p. 22).

Finally, secondary schools realized many of the same benefits as their postsecondary partners. Far too often, high school students fulfill graduation requirements by the end of their junior year, resulting in many seniors biding their time with enrollment into non-essential electives rather than rigorous courses (Duffy, 2002). Low to moderate achievers in secondary schools were also found to be successful in

college courses, especially with the help of institutions providing support structures encouraging student success (Greenberg, 1988). Cunningham and Wagonlander (2002) found secondary schools consistently showed positive outcomes of dual enrollment including improved school attendance, GPAs, and graduation rates with more graduates continuing to postsecondary as well as increased job placement rates.

Program Disadvantages

This review has found the lack of a nationwide or even statewide standard operating policy as one of dual enrollment's most glaring disadvantages. There are significant gaps in the literature supporting the development of a national policy on dual enrollment programs as well as few studies providing evidence of such. This lack of developed policy only leads to irregular program development and maintenance. While the Commonwealth of Virginia has been progressive in creating the 1988 and 2008 State Plans, disparity in how Virginia's Community Colleges administer the programs remains. These organizational differences represent unequal opportunities for potential students (Wallace, 2006).

While 18 states mandated high schools must inform students and parents of dual enrollment options, such as who may take college courses, eligibility and tuition requirements, funding streams, and program features, these programs varied widely from state to state (ECS, 2005). No state, to date, comprehensively addressed all aspects of dual enrollment. With the amount of speed with which dual enrollment has grown in the past 10 years, coupled with the fact many states have yet to enact strict policies dictating development, administration, and operation of dual enrollment programs, these same policymakers will need to carefully consider areas such as P-16 collaboration, funding,

equity, standards, and public relations (Krueger, 2006). States continue to act in isolation and many without the aid of program specifics leading to program disparity and missed opportunities to enhance students' life-long learning capabilities.

Next, secondary officials are often cited as seeing the increase in dual enrollment participants as a "brain drain" on their school systems (Clewley, 1996; Greenberg, 1989). Officials see a vacuum effect as the number of students in dual enrollment increases and the number normally enrolling in other advanced courses decreases. However Cox and Daniel (1983) found that by allowing secondary students to enroll in courses offered by the higher education institution, the secondary schools were under less pressure to improve their own curricular offerings.

Waits, Setzer, and Lewis (2005) showed the distribution of dual credit and dual enrollment courses uneven at the secondary level, with dual enrollment courses more available to students attending medium to large high schools (500 or more enrollees) than small high schools and to students enrolled in towns or suburban areas rather than urban or rural locations. Further, students attending high school with the highest minority enrollment were less likely to have access to dual credit courses than students attending less diverse schools. These results suggested students' opportunities to participate were unequally distributed, with students having different demographic, geographic, and economic characteristics being differentially involved (Karp et al., 2004).

Secondly, as mentioned earlier many states were concerned with the "double-dipping" impact on taxpayers (Boswell, 2001). Supporters contended the program reduced tuition costs for students and families as well as saved taxpayers money, especially with so many students having the opportunity to accumulate college credits

during the length of their high school days, which equated to one expense while the economic savings was often tremendous to the parents (Greenberg, 1988; Krueger, 2006). Non-supporters felt their tax dollars were paying two state entities for one student at the same time.

Azinger (2000) reported an additional issue of students not having the ability to differentiate between high school and collegiate cultures by pointing out high school administrators' concerns regarding their students' safety when students attend classes at the postsecondary school. Secondary administrators feared that high school students were not socially mature enough to handle taking classes on a college campus and their participation would cause students to miss out on their golden years (Andrews, 2000; Brint & Karabel, 1989).

Finally, the issue of rigor reduction for the dual enrollment classes has surfaced as a leading issue of program commencement for community colleges (Bailey, Alfonso, Calcagno, Jenkins, Kienzl, & Leinbach, 2004; Krueger, 2006). Postsecondary institutions who refused to accept dual enrollment courses had coined the phrase "gypsy courses" to describe these (Reisberg, 1998). However, this usually stemmed from the institution's lack of knowledge regarding high school dual enrollment. Teachers met and maintained the same credentials as their counterparts within the postsecondary institution as well as delivered and reached the same course objectives as if students were sitting on an actual college campus.

Workplace Readiness Skills

Current studies and research regarding dual enrollment have been on the rise as dual enrollment not only gains recognition as an accelerated mechanism reducing the cost

of a college education but also as a means of providing additional scholarly preparation in workplace readiness skills for secondary students (Adelman, 2006; Karp, et al., 2004; Windham & Perkins, 2001). Morrison (2008) described four perfect storms looming within the United States as: (a) workforce shortages; (b) educational attainment; (c) global competition; and (d) decreasing value of the U.S. economy. Pink (2006) formulated and supported a theory that our society's future economic success and way of life will depend upon "moving from an economy and society built on the logical, linear, computer-like capabilities of the Information Age to an economy and society built on the inventive, empathic, big-picture capabilities of what's rising in its place, the Conceptual Age" (pp. 1-2).

The Secondary and Technical Education Excellence Act of 2003 (U.S. DOE, 2003) has called for increased student preparation for college in that every high school student deserved to graduate possessing the core academic skills needed for postsecondary education and highly skilled employment. Dual enrollment programs fostered relationships between community colleges and secondary schools effectively reducing the need for postsecondary remediation. Additionally, with the reauthorization Perkins IV Act of 2006 (PL 109-270), all career and technical education centers were required to align programs with the sixteen career clusters documenting a planned approach to career attainment starting in the middle school. This alignment provided for the development of course rigor, relevancy, and relationships as well as assisted students with the development of marketable skills and served as a pipeline of skilled employees for the nation's workforce (Reese, 2008). Dual enrollment programs will be critical to this transformation success and students' successful transition to postsecondary

education, the workforce, or both. President Barrack Obama (2009) emphasized this point during his inaugural address to Congress, where he issued a challenge to all Americans:

...to commit to at least one year or more of higher education or career training. This can be community college or a four-year school; vocational training or an apprenticeship. But whatever the training may be, every American will need to get more than a high school diploma. And dropping out of high school is no longer an option (Recording 31:49).

The key to achieving success in a new economy will begin with how well businesses obtain, train, and retain knowledge workers. In the 2002 *Keeping Competitive* report, 73% of employers reported “very” or “somewhat” severe conditions when trying to hire qualified workers (U.S. Chamber of Commerce, 2002). The globalization of business and industry required workers to acquire core knowledge and skills that could be quickly applied, upgraded, and adapted to a wide and rapidly changing variety of work settings (ACTE, 2008). Here, educational innovation was particularly important for economies as they approached the frontiers of knowledge and dealt with the possibility of integrating and adapting exogenous technologies that have a tendency to disappear (Roma, 1990).

The U.S. Department of Labor (2006) predicted there would be roughly four million new job openings in health care, education, and computer sciences along with 90% of those requiring postsecondary education. However, it was estimated that between 2010 and 2020, the United States would lack the qualified talent to fill 12 to 24 million jobs (Gordon, 2009). These facts combined with 78 million baby boomers approaching

retirement announced a potential skills gap defined by the American Society for Training and Development (2006) as:

...a significant gap between an organization's skills needs and the current capabilities of its workforce. It is this point at which an organization can no longer grow and/or remain competitive in its industry because its employees do not support the organization's strategies and goals (p. 5).

Transitioning from a once powerful, industry-based economic system to that of a knowledge-based system has been and continues to be difficult at best. The current workforce found itself in a constant state of tumultuous change resulting from the barrage of cultural and economic forces with educational systems called upon to prepare today's students with the basic skills that would ensure success in not only today's global market but its future's as well. Unfortunately, an education system that lagged behind in workforce skill development reflected as a primary effect upon high unemployment rates, ineffective training investments, and an influence upon the local, state, and national economies. Krueger (2006) noted this as the driving force in the demand for well-educated, technically proficient workers.

Employers realized the need for standardization in workplace readiness skills. Technical as well as basic employability skills such as reading, writing, and basic communications top the list. Reactionary legislation including Goals 2000, Education America Act of 1994, School-to-Work Opportunities Act of 1994, Workforce Investment Act of 1998, No Child Left Behind Act of 2002, and Carl D. Perkins Career and Technical Education Act of 2006 have all focused on increasing and measuring skills needed in education, work, and life (ACTE, 2008). The Partnership for 21st Century

Skills created in 2002 comprised of leaders from education, business, and government sectors such as the Council of Chief State School Officers and the International Society for Technology in Education met to establish basic skills students would need in order to become productive learners, workers, and leaders for the next century. The concept of a “workforce readiness credential” emerged in an effort to validate work-ready skills. Rey-Alicea and Scott (2007), along with the ACT (2006), defined these skills as a baseline of hard and soft skills transferable from one position to another across industries considered valuable for any skilled or professional occupation at any level of education.

During a 3½ year study performed by the Weldon Cooper Center for Public Service at the University of Virginia, 564 business and industry employers were interviewed from across the Commonwealth of Virginia regarding skill needs for entry-level jobs requiring less than a four-year college degree (Martin, Carrier, & Hill, 1997). Findings from this study reflected national concerns of dissatisfaction with the low level or lack of entry-level workforce skills. Basic workforce hard skills such as reading, mathematics, writing, speaking, computer literacy, and critical thinking, once understood to be a part of any standard educational curriculum or training program, were weak or nonexistent. Additional expectations of work ethic, positive attitude, independent thinking, and self-presentation, also known as “soft skills”, traditionally inculcated in the home, were not among the study’s findings when reviewing the interview data. The study findings provided the foundational framework in 2007 for Virginia's Workplace Readiness Skills Curriculum. Thirteen workplace readiness skills were incorporated into each career and technical education state approved curriculum and currently described on Virginia’s Career and Technical Education’s Resource Center’s webpage (<http://www.>

cteresource.org/featured/wprs.html) as shown in Table 1. Governor Tim Kaine (Virginia) endorsed this initiative of understanding career and technical education as a critical and fundamental component of each student’s personal development towards total education and career success (Mackey, 2007). Because students often lack opportunities to gain these skills or create links to the workforce between theory and practice through regular academic courses, career and technical education’s unique relationship with employers

Table 1

Virginia’s 13 Workplace Readiness Skills Descriptions

Demonstrated Skill	Classification (Hard/Soft Skill)	Descriptive Characteristics
Reading	Hard skill	<ul style="list-style-type: none"> • Ability to interpret technical and general interest materials commonly used in a particular field of study. • Apply an understanding of the reading material to actual job operations.
Math	Hard skill	<ul style="list-style-type: none"> • Perform math operations using whole numbers, fractions, & percentages. • Use statistics (percentages, averages, medians, and standard deviations). • Monitor processes and quality of performance. • Use mathematical reasoning to solve word problems. • Use algebra-based formulas; and perform job-specific math operations.
Writing	Hard Skill	<ul style="list-style-type: none"> • Ability to compose and edit work-related documents of varying complexity to: <ul style="list-style-type: none"> ○ define the purpose ○ determine the audience ○ gather information ○ plan the format/layout ○ write a first draft • Edit and revise as necessary to ensure that the document is complete, clear, concise, correct, and considerate of the reader.
Speaking	Hard Skill	<ul style="list-style-type: none"> • Ability to express ideas clearly. • Ensure one understands the ideas expressed by others in both formal and informal contexts. • Give and take direction or instruction. • Give and respond to oral reports or presentations. • Participate in group or team discussions. • Engage in conversation with co-workers, supervisors, and clients; and conduct business in person and via electronic means.

(table continues)

Table 1 (continued)

Demonstrated Skill	Classification (Hard/Soft Skill)	Descriptive Characteristics
Reasoning, problem-solving, and decision-making	Hard skill	<ul style="list-style-type: none"> • Differentiate among types of problems (e.g., technical, human relations, ethical). • Utilize established methods of problem solving and decision making in both individual and group settings. • Apply previous learning to authentic situations. • Predict short- and long-term effects of proposed solutions or decisions. • Test solutions or decisions to determine effects or to identify related problems.
Understanding of the “big picture”	Hard skill	<ul style="list-style-type: none"> • Identify the company’s mission and the individual employee’s contribution to that mission. • Understand of the company functions within the broad world of business, industry, and service. • Explain the rationale behind organizational policies and procedures. • Explain the necessity and benefits/disadvantages of organizational change. • Explain basic economic concepts.
Strong work ethic	Soft skill	<ul style="list-style-type: none"> • Exhibit responsibility by coming to work as assigned, contributing work required to meet organizational goals, adhering to policies and procedures, managing time to accomplish assigned tasks and exhibiting flexibility. • Adaptability by working longer hours than normal to accomplish a goal, substituting for an absent coworker, taking a temporary assignment, accepting changes in the work environment as a challenge and an opportunity.
Positive attitude	Soft skill	<ul style="list-style-type: none"> • Develop an understanding of the importance of cooperating with coworkers and supervisors. • Ability to take direction willingly. • Exhibit eagerness to learn. • Act in a pleasant and polite manner with customers, coworkers, and supervisors.
Independence and initiative	Soft skill	<ul style="list-style-type: none"> • Ability to work without constant supervision. • Self-motivated. • Provide suggestions for improvement. • Exhibit interest in making the organization more effective and productive. • Maintain work standards in the midst of change.
Self-presentation	Soft skill	<ul style="list-style-type: none"> • Ability to identify ways in which the individual employee represents the organization. • Exhibit a neat appearance. • Utilize effective communication skills. • Exhibit elements of etiquette required in professional settings.

(table continues)

Table 1 (continued)

Demonstrated Skill	Classification (Hard/Soft Skill)	Descriptive Characteristics
Maintain satisfactory attendance	Soft skill	<ul style="list-style-type: none"> • Understand the importance of being on time for work and all appointments. • Limit tardiness, early departures, and absences to legitimate and essential occasions. • Explain the importance of satisfactory attendance to the overall operation of the business. • Negotiate anticipated absences according to company policy. • Notify the supervisor of unanticipated absences.
Team member to accomplish goals	Soft skill	<ul style="list-style-type: none"> • Awareness of attending team (group) meetings as: <ul style="list-style-type: none"> ○ focusing on the topic ○ purpose of the meeting ○ offering facts and ideas • Assisting others contribute facts and ideas by <ul style="list-style-type: none"> ○ passing on good ideas to others ○ looking for ways to help others ○ recognizing others for their contributions ○ communicating expectations ○ explaining the importance of teamwork to the overall operation of the business

have placed it in a prime position to promote the use and value of workplace readiness credentials within the business and industry community.

Career and technical education programs provide the relevancy necessary to engage students, as well as provide authentic learning situations leading to workforce readiness skill attainment. Hoffman (2005) estimated between 10% and 30% of juniors and seniors secure college credits by enrolling in dual enrollment courses. She also suggested that as many as half of dual credits are accumulated by students enrolled in career and technical education, pointing to the subject matter diversity encompassed under the dual credit umbrella. According to the United States Census Bureau, in 2006, 28% of adults had received a bachelor's degree (U.S. Census, 2006) leaving 72% to find other pathways to gain technical skills and additional education required by the current workforce. Nationally, for every 100 ninth-grade students, 68 graduated from high

school, 40 immediately entered college, 27 were enrolled in their sophomore year, and 18 graduated with either an associates or bachelor's degree (NCHEM, 2002).

Grant-funding options continue to develop, such as the American Competitiveness Grant (ACG) and the National Science and Mathematics Access to Retain Talent (National SMART Grant), to assist states with the development of programs by providing highly-qualified faculty to strengthen program enrollment and ultimately, the United States world education position. With nearly half of all United States juniors and seniors having participated in at least one form of credit-based transition program (Clark, 2001), dual enrollment programs are affecting change vital to remaining competitive in a global economy requiring innovation, creativity, and adaptation (Morrison, 2008). These grant features combined with the growth of state-mandated funds, have increased the number of dual enrollment programs emerging that encourage students to enroll in more challenging high school courses, increase access and success in college, and ultimately pursue high-demand career choices in the global economy (STEM, 2007).

Summary

Chapter II discussed the background and development of dual enrollment programs as a mechanism to increase the continuance of education into the postsecondary level by providing career pathway identification as well as rigor and relevancy to a secondary curriculum. Policy factors such as funding, faculty selection, tuition costs, and enrollment criteria were discussed. Advantages and disadvantages of dual enrollment program inclusion were outlined as well as a number of state legislations enacted to address each. While Virginia's dual enrollment plan was not the first to be developed, it

was found to be on the forefront as one to be emulated due to its solidarity with the state's 23 community colleges as well as its alignment with the state's career cluster models for career pathway development. As dual enrollment programs have gained momentum in providing for the continuance of education, the importance of a national unifying policy emerged. Finally, an outline of Virginia's 13 workplace readiness skills provided a rationalization of factors for constructing career and technical education curriculum alignment and building accessible bridges to life-long learning. Chapter III will provide a profile of the population of students used during this study and the procedures of gathering and treating research data.

CHAPTER III

METHODS AND PROCEDURES

This analysis was to determine the efficacy of the dual enrollment mechanism for career and technical students to increase college participation as well as the development of workplace readiness skills. Research data will measure students' opinion within four categories labeled student motivation, teacher choice, guidance counselor, and workplace skill development to ascertain the level of effectiveness each factor heightened students' awareness of college, post-high school collegiate opportunities, and increased workforce advantage. The formative process will include an analysis of the population, instrument design, method of data collection, statistical analysis, and summary.

Type of Research

This quantitative research design was exploratory factor analysis utilizing principal component analysis with Varimax rotation. Factor analysis is a statistical procedure used to uncover relationships among many variables. This allows numerous intercorrelated variables to be condensed into fewer dimensions, called factors. The researcher's *à priori* assumption was that any indicator may be associated with any factor. There is no prior theory and one uses factor loadings to intuit the factor structure of the data. Principal component analysis seeks a linear combination of variables such that the maximum variance is extracted from the variables. It then removes this variance and seeks a second linear combination which explains the maximum proportion of the remaining variance, and so on. Principal component analysis analyzes total (common and unique) variance and will attempt to exclude unique variance. Varimax rotation is an orthogonal rotation of the factor axes to maximize the variance of the squared loadings of

a factor (column) on all the variables (rows) in a factor matrix, which has the effect of differentiating the original variables by extracted factor. Each factor will tend to have either large or small loadings of any particular variable. A Varimax solution yields results, which make it as easy as possible to identify each variable with a single factor.

The context of this research was to determine: (a) the extent to which taking career and technical education dual enrollment classes is associated with continuing education into the postsecondary level and (b) the extent to which taking career and technical education dual enrollment classes is associated with a student's development of workplace readiness skills. The research identified factors, to be known as components within this research, in determining the efficacy of the dual enrollment programs within rural southwest Virginia as a mechanism for increasing the participation in college and workforce skill development.

Population

The population of this study consisted of 221 ($N=221$) currently enrolled (2008-09 school year) career and technical dual enrollment students within the service area of one rural, southwest Virginia community college. Researchers have given guidelines for the minimum sample size needed to conduct factor analysis. Some have suggested the ratio of sample size to number of variables as a criteria: the recommendations range from 2:1 through 20:1. Guadagnoli and Velicer (1988) have suggested a minimum sample size of 100 to 200 is adequate in factor analysis. Gorsuch (1983) recommended five subjects per item, with a minimum of 100 subjects, regardless of the number of items. Guilford (1954) argued that N should be at least 200.

Student participants were in the 9th through 12th grades currently enrolled in at least one career and technical dual enrollment course within one of four southwest Virginia career and technical education centers for the school year 2008-2009. Randomization of the sample was accomplished by setting appointment dates and times with each center wherein only those students present were surveyed. No mailings or follow-up appointments were conducted. Each participant met all eligibility requirements as outlined in the 2008 Virginia's Plan for Dual Enrollment (Appendix B).

Research Variables

The principle research variables for this study were derived through the examination of factors pertaining to participation in a career and technical dual enrollment program in one of four career and technical centers within rural southwest Virginia. Independent variables included background demographics (gender, grade, academic standing, economic status, first-generation college student, ethnicity, and career and technical education program area), student motivation, educational teacher, educational counselor, and workforce development skills. All variables were defined through the research goals and survey instrument (see Appendix C) and were treated as independent variables within the factor analysis (Field, 2005), thus allowing for the development of correlations important in the context of this study.

Dependent variables were college access and workplace skill readiness. When students successfully complete a career and technical education dual enrollment course, they were to receive both high school and college credit. High school credit was listed on the student's high school transcript as one Carnegie Unit, while college credit was reflected upon an official college transcript as earned credit. A goal of dual enrollment

was to increase the awareness of college access and promote student continuation into the postsecondary level. Additionally, an enriched curriculum established by the Virginia Department of Education to develop 13 basic workplace readiness skills was foundational for all career and technical education courses.

Instrument Design

Participants completed the survey (Appendix C) consisting of 30 primary questions further structured into 42 questions, which contained five labeled sections: (a) Section 1 - Demographic Background; (b) Section 2 - Student Motivation; (c) Section 3 - Education ~ Teacher; (d) Section 4 - Education ~ Counselor; and (e) Section 5 - Workplace Development. Section 1 identified student gender, grade level, current academic standing, if a first generation college student, ethnicity, income level, and the career and technical education program area. Section 2 included six questions involving the student's motivation to enroll in the dual enrollment program. Section 3 contained five questions inquiring about the student's dual enrollment perceptions as related to the teacher. Section 4 contained six questions related to guidance motivation as provided through counselors, teachers, parents, or friends. Section 5 asked six questions concerning workplace readiness skills with the first question expanded to include Virginia's 13 workplace readiness skills (VDOE, 2009).

Section 1 provided nominal style answers with Section 2 having six items coded as two nominal, two ordinal, and two dichotomous variables. Sections 3-5 utilized a five-point Likert scale of 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree. These questions were developed to address the study's research goals.

The instrument used was an original survey developed by the researcher. The survey was reviewed by an institutional researcher for clarity, bias, and readability then piloted for reliability and validity. A pilot study was utilized to collect vital comparison data regarding the main population providing fundamental information regarding questions, procedures, and magnitude of variation of response measures. Total participants for the pilot included 24 (n=24). Seven, having prior career and technical education dual enrollment experiences, were currently attending the service area community college continuing within an already established career pathway. The remaining seventeen were currently dual enrolled in a career and technical course at a service area high school but not attending any career and technical education center.

The pilot instrument (Appendix D) included six questions associated with the student's background demographics coded as nominal, and six questions associated with student motivation with one nominal, two ordinal, and two dichotomous variables. The remainder of the pilot survey questions were coded as scaled variables on a five point Likert scale (1= Strongly Disagree; 2= Disagree; 3 = Neutral; 4= Agree; 5 = Strongly Agree) and included five questions associated with the educational teacher, six questions associated with the educational counselor, and five questions associated with workplace development.

For the pilot study, the survey was grouped into three parts for analysis. Questions 1-6 returned data pertaining to the demographics and characteristics of the sample. Next, the factorability of the pilot survey questions was examined. The questions were divided into two main groupings for factor analysis. The first group contained those questions

within the educational teacher and counselor sections (Questions 7-23). The workplace development grouping contained the remainder of the Questions (24-28).

The modification of four questions was deemed necessary for clarification and understanding after pilot testing. Question 4 was revised to better define a first-generation student for clarity. The addition of an “other” option to Question 11 allowed students to enter possibilities the researcher may not have considered with regard to dual enrollment challenges. Question 25 within the workplace development section that listed Virginia’s 13 Workplace Readiness Skills was expanded. The pilot question had not identified or categorized the skills associated with workforce skill development. Rather it asked the question if “workforce skills had been increased”. This produced a wide range of interpretability and considerable questions by the pilot population. The addition of the 13 skills areas provided specific data regarding each skill development within the career and technical education dual enrollment course. Fourth, a question added under the demographics section asked which career and technical education area the student was currently enrolled provided delineation of career and technical education areas.

With the survey administered to high school students, the pilot information provided information regarding the bias, readability, clarity, and logistics associated with secondary students. This combined process provided for assessment, production mistakes, question and scale construction, readability, and understanding (Dillman, 2000). Expert feedback was acquired from one educational researcher and one educational psychology community college faculty knowledgeable in the field as well as instrument development (Dillman, 2000). Instrument modifications were made based on the data gathered from the pilot study. The final survey instrument (Appendix C)

containing 42 questions was then administered to the career and technical education dual enrollment students at four southwest Virginia career and technical centers.

Field Procedures

Collection of data commenced upon completion of the University's Human Subjects approval process. Four county school district superintendents were contacted by letter (Appendix E) to obtain permission to survey currently enrolled dual enrollment students at their respective career and technical centers. School systems required the date of surveying to commence after Virginia's Standards of Learning testing completed between the end of April to mid-May 2009. This resulted in a survey period between mid-May and mid-June 2009.

Having received the district superintendents' permission, respective career and technical education center's directors/principals were contacted requesting permission and assistance to administer the survey. Appointments with the individual principals/directors within each career centers and dual enrollment faculty provided opportunity for review and discussion of the survey, consent forms, protocol, and scheduling of survey administration.

Two time slots (20 minutes) were required for each center since each served multiple high schools where students were bused daily. Students must decide to attend either the morning session or afternoon depending upon course enrollment and/or availability. Surveying the students 20 minutes at the end of the morning class period and the beginning 20 minutes of the afternoon period had minimal class-time disruption. This time-period was normally reserved for club meetings, laboratory cleaning, etc., and provided ample time to orient the students and complete the survey.

The survey protocol (Appendix F), provided to each administrator and faculty member, was read aloud to each participant prior to beginning the survey. Coding each survey with a numbering system, which consisted of a combination of faculty member's initials and student number were utilized in order to compare with class rosters to ensure duplication did not occur. Students were instructed not to write any name or identifying marks upon the surveys. Sealable envelopes maintained confidentiality throughout the survey timeframe as well as at the completion of the survey.

Statistical Analyses

Principal component factor analysis is a reduction technique used to summarize an original set of variables into a minimum number of clusters and used to uncover the presence of latent attributes among a set of variables. This analytical approach was taken to resolve the contextual dimension the study posed wherein students rated the relative importance of questions concerning student motivation, teacher, guidance, and workforce development as part of educational and career planning. The extraction method was principal component analysis, and the rotation method employed Varimax with Kaiser Normalization to produce a better estimate of the true factors in addition to a simple structuring of factors (Fabriger, Wegener, MacCallum, & Strahan, 1999). Varimax rotation is an orthogonal technique that minimizes the number of variables loading on each factor.

A correlation screening reduced the information from many variables into a set of weighed linear combinations of variables. For initial screening, variables with correlations between absolute 0.5 and absolute 0.9 qualified. Qualifying variables were subjected to a principal component analysis to reduce the survey questions into factoring

components of efficacy regarding students' choosing to participate in a dual enrollment program. Principal component analysis was justified as being psychometrically sound, provided a unique mathematical solution, and a way to avoid some difficult features indicative to factor analysis (Coakes & Steed, 1997; Stevens, 2002; Tabachnick & Fidell, 2007). Drawing on guidelines set forth by Green and Salkind (2005) and Guadagnoli and Velicer (1988) factor loadings greater than .60 were set as the minimum criterion for acceptance with allowance for those loading at this mark. Allowing the development of correlations was important in this context, because enrollment status, credits, age, and income level were expected to be related to each other independent of the choice to take dual enrollment classes.

After reviewing factor analysis literature and employing SPSS as an analytical software tool, criteria in performance of the analysis included:

1. Communalities in Principal Component Analysis having a value of < 0.7 were considered suspect (Field, 2005; Stevens, 2002).

2. Kaiser-Myers-Olkin scale determines if two variables share a common factor with other variables. Interpreting correlations to indicate the unique variance they share have statistics < 0.5 were considered inadequate, 0.5 to 0.7 mediocre, 0.7 to 0.8 middling, 0.8 to 0.9 meritorious, and greater than 0.9 marvelous (Field, 2005; Meyers, Gamst, & Guarino, 2006).

3. Bartlett's Test of Sphericity calculates the determinate of the matrix of the sums of products and cross-products (S) from which the intercorrelation matrix is derived where results should be significant with values of $p < 0.05$ (Field, 2005; Tabachnick & Fidell, 2007).

4. Sample size consideration for factor analysis or principal component analyses were based on the research of Guadagnoli and Velicer (1988). Their findings suggest factors with four loadings of greater than 0.6 are valid regardless of sample size and three factor loadings greater than 0.8 are also valid (Stevens, 2002). General guidance suggest any factor loading over 0.6, when considering small n-size, were worthy of retention for re-examination with larger samples sizes.

5. Kaiser's criterion of factors with eigenvalues greater than 1.0 was used (Field, 2005; Meyers, Gamst, & Guarino, 2006; Stevens, 2002) with additional criterion of plotting eigenvalues with a scree test which retains all factors with eigenvalues in the sharp descent part of the plot before the eigenvalues begin to level off (Green & Salkind, 2005).

6. Internal consistency reliability was based upon Cronbach's α reliability within the component as reflective of the scale 0.32 = minimal; 0.45 = fair; 0.55 = good; 0.63 = very good; 0.7 great; and greater than 0.8 = excellent (Green & Salkind, 2005). It is also noted that in the case of smaller samples sizes and fewer variables, Cronbach's α is sensitive to numbers of variables. Smaller numbers of items usually result in smaller α 's.

Summary

This chapter described the research and characterized the research design as exploratory factor analysis utilizing principal component analysis with Varimax rotation on quantitative data received from surveys of career and technical dual enrollment students. Appropriate permissions were obtained, survey piloted and validated, and administered. The data were coded and analyzed using principal component analysis.

Criteria for use with the statistical processes were specified with reliability testing accomplished using Cronbach's α .

Chapter IV reports the findings of the study. The preliminary analyses to which the collected data were subjected will be reported as well as the results. Each of the three research questions will be examined and findings of the principal component Factor Analysis will be reported.

CHAPTER IV

FINDINGS

The goal of this study was to determine the efficacy of dual enrollment as a credit-based transition program mechanism for assisting career and technical students located in rural, southwest Virginia to increase postsecondary participation as well as workplace readiness skills. This research intended to reveal which specific variables drawn from student surveys, if any, contributed to factors leading to an increase in postsecondary participation as well as workforce skill development for career and technical students. Independent variables included background demographics (gender, grade, academic standing, economic status, first-generation college student, ethnicity, and career and technical education program area), student motivation, educational teacher, educational counselor, and workforce development. All variables could contribute to the constructs underlying a student's ability to continue education to the postsecondary level and provide success in the workforce. Data were collected and analyzed. This chapter presents the findings of that research.

Survey Response

Students enrolled during the school year 2008-09 within one of the four career and technical centers in a dual enrollment program were asked to participate in this study. An additional requirement was students needed to be currently dual enrolled within an approved career and technical education area course within the service area's community college. A total of 221 ($N = 221$) students met this eligibility criteria and answered a 42-question, pen and paper survey on pre-arranged dates. The return was 161 ($n=161$) surveys having a return rate of 73 percent.

Instrumentation and Data Coding

The protocol for this study addressed information relevant to the goals of the research questions. The following is an explanation of data emergence consideration as well as an explanation of data handling procedures.

For the instrument used, a frequency and descriptive analysis was completed on Section I (Questions 1 – 11). Next, two internal consistency estimates of reliability were computed. The first was for the college participation scale containing Sections 2-4 (Questions 12 – 24) and the second for workforce skill development scale containing Section 5 (Questions/variables 25 – 30). Question 14, Section 2, was reversed scaled during the coding to reflect consistency in direction of the positive dimension of interest. Using the same rule of thumb provided during the pilot study by Green and Salkind (2005) suggesting results of .55 or greater as acceptable, the college participation scale items had a resulting Cronbach's $\alpha = .66$ while the workforce skill development scale Cronbach's $\alpha = .90$.

Preliminary Analyses

SPSS analysis software was used for all data analysis. An examination of cases for missing data resulted in no missing data. A descriptive and frequency analysis completed through SPSS added verification of no missing data. Completed results, including response counts, were reviewed and calculated at the completion of each surveying period. The tables included in this discussion represent the distribution of frequency and percentages where the percentages were rounded to the nearest tenth of a percent.

Analysis completed through SPSS for frequencies and descriptions reported responses for Section I (Questions 1-7), as 93.8% Caucasian, female (50.9%), in her senior year (37.9%) with a 3.0 – 3.59 GPA (49.1%). An additional demographics finding was reflective of the general demographic statistics regarding the service area in that 49.7% (n=80) were first-generation college students. Interestingly, 50.3% (n=81) were not first-generation college students, the difference of only one student.

The four-county service area of southwest Virginia had a state-established average of \$25,000 per family of four to qualify for free or reduced lunch (VDOE, 2009). Survey Question 6 established the financial income level. While many students are not knowledgeable of their family's financial situation, each was fully aware if he/she was qualified for the free or reduced lunch program and resulted in 44.7% (n=72) qualifying for free or reduced lunch and 55.3% (n=89) not qualifying. Question 6 findings were opposite of the general demographics for the area. One caveat noted was that these findings were based on the students qualifying for Virginia free/reduced lunch while the service area's median income of \$24,862 was still considerably below that of the state's median income for 2008 set at \$62,926 (U.S. Census, 2009). Table 2 outlines the frequencies and percentages relative to Section 1.

Question 7, Section 1, contained data regarding the dual enrollment area each student was currently enrolled. This categorization identified areas of high or predominant program enrollments. Business education had the largest enrollment 40.4% (n=65), with health occupations 19.9% (n=32), and networking 19.3% (n=31) rounding out the top three. The low numbers in the other categories may reflect the lack of dual

Table 2

Section 1 Frequencies and Descriptions, Questions 1-6

Section I	Number	Percent of Total
(Q1) Gender		
Male	79	49.1
Female	82	50.9
(Q2) Grade Classification		
Freshman	9	5.6
Sophomore	35	21.7
Junior	56	34.8
Senior	61	37.9
(Q3) Academic Standing		
3.5 – 4.0	47	29.2
3.0 – 3.49	79	49.1
2.5 – 2.99	27	16.8
2.0 – 2.49	8	5.0
(Q4) First Generation		
Yes	80	49.7
No	81	50.3
(Q5) Ethnicity		
Caucasian (White)	151	93.8
Black	5	3.1
Hispanic	2	1.2
Mixed Racial	1	0.6
Other	2	1.2
(Q6) Free Lunch (Low Economic Level)		
Yes	72	44.7
No	89	55.3

enrollment program availability across the service area. As previously noted, secondary dual enrollment faculty must meet the same eligibility requirements as that of the community college faculty, which, generally requires at a minimum a master degree in the content area or master degree plus 18 hours graduate hours in the content area. Table

3 provides the detail data for career and technical education dual enrollment concentration areas surveyed during this study.

Table 3

Breakdown of Career and Technical Education Dual Enrollment Concentration Areas

CTE Dual Enrollment Area	Number	Percent of Total
Business Education	65	40.4
Health Occupations	32	19.9
Networking	31	19.3
Electricity	12	7.5
Industrial technology	7	4.3
Drafting (engineering, CAD)	7	4.3
Welding	3	1.9
Child Care	2	1.2
Agriculture	1	0.6
Manufacturing Technology	1	0.6
Total	161	100.0

Section 2 addressed student motivation for enrolling in a career and technical education dual enrollment course. Specifically, it asked how each student was notified about the dual enrollment program. Question 8 allowed students to choose multiple answers by selecting all the answers applicable. Table 4 illustrates the results, which revealed students noted the teacher provided dual enrollment information 42.9% of the time.

Question 9 asked the number of regular dual enrollment classes each were currently enrolled (these would be non-career and technical education courses). Findings were 93 (57.8%) enrolled in at least one regular dual enrollment course. However, 156

Table 4

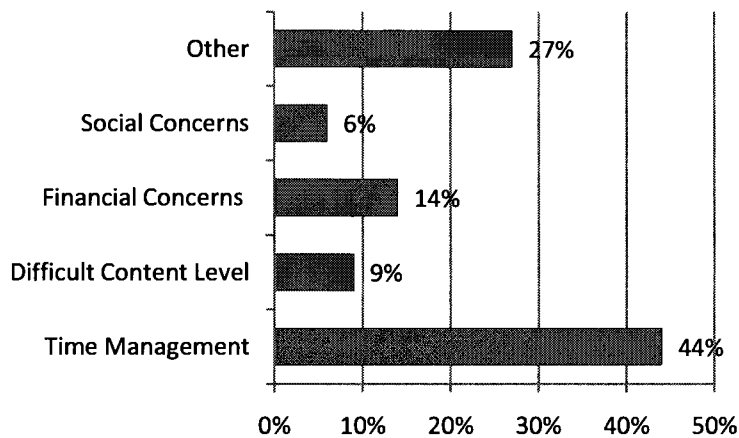
Source of Dual Enrollment Information

Source	Frequency	Percent
Teacher	69	42.9
Guidance Counselor	45	28.0
Combination of All	20	12.4
Friends	20	12.4
Brochure/Billboard	5	3.1
Parents	2	1.2
Total	161	100.0

(96.8%) responded to being enrolled in at least one career and technical education dual enrollment class asked by Question 10. Fourteen (8.7%) were enrolled in 3-4 regular dual enrollment courses compared to three (1.9%) who were in 3-4 career and technical education dual enrollment courses, and finally five (3.1%) were enrolled in 5 or more regular courses compared to two (1.2%) were enrolled in 5 or more career and technical dual enrollment courses.

Question 11 asked students to identify the area(s) each considered to be their greatest challenge while taking dual enrollment courses. Areas listed were time management, difficult content level, financial concerns, social concerns, and an “other” option allowed students to write in an area not considered by the researcher. Students’ responses to the other included teacher change, textbook and/or licensure costs, as well as no concerns. Figure 1 depicts time management as the greatest challenge with social concerns being the least concern while enrolled in career and technical education dual enrollment classes.

Figure 1. Student challenges in career and technical education dual enrollment.



The final two questions, Questions 12 and 13, in Section 2 inquired about students' view of teacher choice and the expected high level of performance, respectfully. Teacher choice affected the decision to enroll 42.9% of the time with 57.1% reflected as no affect. When asked if the level of assignments was difficult to manage, 87.6% responded no.

Survey Section 3 required students to respond based upon a five-point Likert Scale to gauge students' educational motivation regarding dual enrollment teachers. Questions 14 -18, asked students to consider their regular high school courses, if any, when answering. Then they were to compare these with their career and technical education dual enrollment courses to determine if they were pushed to perform at a higher level. Students strongly agreed by 13.7% and agreed by 47.8%, they were pushed to perform at a higher level more often in response to Question 14. Next, Question 15 found 57.2 % of the students agreed they felt it did not matter who they were within the career and technical education dual enrollment course with the remainder 42.8% stating neutral.

When asked in Question 16 if students felt they were treated as an adult in the career and technical education dual enrollment courses, 48.4% agreed while 25.5% strongly agreed for a combined affirmative response of 73.9%. Students agreed or strongly agreed their dual enrollment courses' content provided linkages to real-life goals 84.5% of the time in Question 17. Section 3, Question 18 found a combined 53.5% of the students agreed dual enrollment course's content was more challenging. Table 5 provides a complete summary of the questions and responses in Section 3.

Table 5

Complete Summary of Section 3 Survey Results

Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
(Q14) Higher level of performance	1.9%	8.1%	28.6%	47.8%	13.7%
(Q15) Does not matter who I am	0%	0%	42.9%	42.9%	14.3%
(Q16) Treated as an adult	1.9%	3.1%	21.1%	48.4%	25.5%
(Q17) Dual Enrollment content liked to real-life goals	1.9%	0.6%	13.0%	55.3%	29.2%
(Q18) Dual Enrollment content is more challenging	1.2%	9.3%	36.0%	34.2%	19.3%

Section 4 of the survey focused upon the students' view of the high school or career and technical education guidance counselor in terms of influence and dual enrollment information provided. Six questions (19 - 24) utilized the 5-point Likert Scale to rank the students' responses and completed Section 4. Question 19 asked if the guidance counselor provided dual enrollment program information along with its benefits to all students. Students responded 13.0 % strongly agreed while 50.9% agreed the

guidance counselor indeed provided them information. When asked in Question 20 if participating in the dual enrollment program increased the likelihood of continuing their education into college, 43.5% agreed and 38.5% strongly agreed. Next, students responded to Question 21 that their participation in dual enrollment had increased their awareness of college access opportunities with an 87.0% positive response. A positive result of 73.9% was found when students were asked if dual enrollment programs increased their awareness of career pathway opportunities in Question 22. Student responses to Question 23 found 40.4% agreed and 19.3% strongly agreed that participation in the career and technical education dual enrollment program would reduce the financial burden for going to college. Question 24 found students agreed for a combined 55.3% of having at least one meeting with their counselor regarding college or career plans. Table 6 provides a complete summary of the questions from Section 4.

Section 5 inquired if student's perception, awareness, and views of their participation in the dual enrollment program had increased their development of Virginia's 13 Workplace Readiness Skills as well as their awareness of college access programs (25 - 30). Question 25 asked students to independently consider each of Virginia's 13 skills identified by the Virginia Department of Education as outlined earlier and assess if these skills had been addressed within their career and technical education dual enrollment course. Students overwhelmingly responded in agreement that these skills were being incorporated within the career and technical education curriculums. Results ranged from 45.3% to 59.0% in agreement with those in strong agreement ranging from 13% - 33.5%. Table 7 provides a complete summary of the responses for Question 25 from Section 5.

Table 6

Complete Summary of Section 4 Survey Results.

Question	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
(Q19) Counselor provided dual enrollment program information along with its benefits to all students	3.7%	9.9%	22.4%	50.9%	13.0%
(Q20) Participating in the dual enrollment program has increased the likelihood that I will continue education into college	1.9%	0.0%	16.1%	43.5%	38.5%
(Q21) Participating in dual enrollment has made me more aware of the available programs providing access to college	0.6%	0.0%	12.4%	57.8%	29.2%
(Q22) Participating in dual enrollment has made me more aware of available career pathway options	0.6%	0.6%	14.9%	54.7%	29.2%
(Q23) Participating in the dual enrollment program there will be less of a financial burden of continuing my education into college	1.2%	4.3%	34.8%	40.4%	19.3%
(Q24) Students had at least one meeting with the guidance counselor to discuss college or career plans	7.5%	13.0%	24.2%	40.4%	14.9%

In determining students' perspective of their accessibility to postsecondary education as well as possible career pathway options, the remaining Section 5 data were gathered. Question 26 revealed 32.3% students strongly agreed, 50.9% agreed, 15.5% neutral, and 1.2% disagreed their participation in the career and technical education

Table 7

Percentage Categorization of Virginia's 13 Workplace Readiness Skills Responses

(Q 25) Skills Assessment to Demonstrate:	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Reading Skills	0.6	2.5	24.8	59.0	13.0
Math Skills	0.0	5.0	23.6	55.9	15.5
Writing Skills	0.0	2.5	24.8	58.4	14.3
Speaking & Listening Skills	0.6	1.9	21.7	54.0	21.7
Computer Literacy	0.0	1.9	24.8	45.3	28.0
Reasoning, problem-solving & decision-making skills	0.0	1.9	16.8	58.4	23.0
Understanding of the "Big Picture"	2.5	1.2	21.7	56.5	18.0
Work Ethic	1.2	1.9	14.3	49.1	33.5
Positive Attitude	1.9	0.0	15.5	49.1	33.5
Independence & Initiative	0.0	0.6	17.4	54.0	28.0
Self-Presentation Skills	0.6	0.6	18.0	57.1	23.6
Satisfactory Attendance	0.0	1.2	19.9	51.6	27.3
Team Member	0.0	0.6	21.1	49.7	28.6

dual enrollment program had increased their awareness of the need for education/training beyond high school in order to be competitive in the workforce. Continuing, when students were asked in Question 27 if having some college provided an advantage to workforce entry, the findings were 39.1% strongly agreed, 49.1% agreed, 9.9% were neutral, and less than 2% disagreed.

The final data gathered from Question 28 revealed if students planned to attend college after high school, where 67.1% strongly agreed, 22.4% agreed, 9.3% were neutral, and less than 2% disagreed. Question 29 asked students if their intentions were to attend college even without the influences of the career and technical education dual enrollment program; 47.2% strongly agreed, 32.3% agreed, 15.5% were neutral, 3.1% disagreed, and 1.9% strongly disagreed. Students responded to Question 30 if their awareness of career choices had been increased; it resulted in 42.2% strongly agreeing, 46.6% agreeing, 10.6% being neutral, and less than 1% disagreeing.

Research Question Findings

Segmentation of factors into three independent variable groupings allowed for the evaluation of each research question separately. Section I, demographics, consisted of Questions 1-11 and provided data to analyze results from the descriptive and frequencies of the sample population in order to answer RQ1. Section 2 consisted of Questions 12-24 and provided the data for the results of RQ2. Section 3 consisted of Questions 25-30, with Question 25 categorizing Virginia's 13 workplace readiness skills and provided the data for RQ3.

Research Question 1

“What are the demographics and characteristics of CTE dual enrollment students within the four-county service area of rural southwest Virginia?” SPSS's program for frequencies and descriptions analyzed the data from Sections 1 of the survey. Section 1 questions were segmented into groups to more effectively answer RQ1. Findings within this sample closely resembled the area's demographics as reported by the U.S. Census Bureau (2005). The proportions of race within the sample population corresponded to the

proportions within the service area's population with minorities representing less than a combination of 6.5% of those surveyed, while the service area consisted of less than a 2% combination of minorities for the total population. The percentages of females within the population mirrored those found for the service area as well. Findings within the sample population were such that 44.5% qualified for free or reduced lunch based on the State of Virginia Department of Education's Nutrition Guide (2009) that a family of four would need to earn less than \$25,000 annually, reflective of the median income level for the service area. The number of first generation college students had a difference of one student. A noteworthy description due to the service area reported dominance of being first generational. Table 8 provides a comparison and description of the demographics.

Table 8

Demographic Comparison for Service Area & Sample

Population	Total Population	Race	Gender	Median Income
Service Area	*90,468	*White – 98% *Black – 1.3% *Asian - < 1% *Other - < 1%	*Female – 51.1% *Male – 48.9 %	*\$24,812
Sample	161	White – 93.5% Black – 3.2% Asian – 0% Hispanic – 1.3% Mixed – 0.6% Other – 1.3%	Female – 50.9% Male – 49.1%	44.5 % qualified for free/reduced lunch = incomes < \$25,000 yearly income

**Source: 2005 U.S. Census Bureau*

The grade classification was found to have a majority of juniors (34.8%) and seniors (37.9%) which is reflective of the level of courses approved by the service area for the community college. However, results also showed a return of 9% freshman and 21.7% sophomore classifications. These findings revealed the service area to be

compliant with 2008 Virginia's Dual Enrollment Plan which provides that all high school students are eligible to participate in the dual enrollment arrangement between the public school and community college.

The research data provided results to determine motivational characteristics of dual enrollment students as well. Data reported that students acquired the majority of their dual enrollment information from their teachers (42.9%) of the time, while the guidance counselor provided only 28.0% of the information. This may provide an explanation to the rather large percentage (30%) of students who, while enrolled in at least one career and technical education dual enrollment course (92.5%), were not currently enrolled in any regular dual enrollment course within their respective high schools. The finding also revealed 57.1 % of the students said teacher choice did not affect their decision to enroll into the dual enrollment program. This may also be directly correlated to the fact students received a majority of the dual enrollment information from their teacher. Finally, time management (43.5%) was found to be the students' greatest dual enrollment challenge but interestingly enough 87.6% did not find the course's difficulty level more challenging.

Research Question 2

Does participation in the dual enrollment program encourage student participation into the postsecondary level of education? Initially, the factorability of thirteen components (Questions 12-24) were examined. Several well-recognized criteria for the factorability of a correlation were used. Nine of the thirteen components correlated at the minimum 0.6 with at least one other component, suggesting reasonable factorability. Second, the Kaiser-Meyer-Olkin measure of sampling adequacy was .69, within the

recommended value of 0.6 or higher, and Bartlett's Test of Sphericity was significant ($\chi^2(78) = 353.56, p < .01$). The diagonals of the anti-image correlation matrix were over 0.5, supporting the inclusion of each component in the factor analysis. Finally, the communalities returned values at or close to 0.6 (see Table 9) further confirming each item shared some common variance with other items. Given these overall indicators, factor analysis was conducted with all 13 components.

Principal component analysis was used due to the primary purpose of identifying factors to determine the efficacy of dual enrollment programs to increasing participation. The initial eigen values showed the first factor explained 24% of the variance, the secondary factor 11% of the variance, the third factor 10% of the variance, the fourth factor 9% of the variance, and the fifth factor 8% of the variance. The four-factor solution, which explained 54% of the variance, was preferred because of its previous theoretical support, the leveling off of eigen values on the scree plot after four factors, and the insufficient number of primary loadings and difficulty of interpreting the fifth factor. The Varimax with Kaiser Normalization rotation was used for the final solution.

A principal component factor analysis of 13 components, using Varimax with Kaiser Normalization was conducted, with four factors explaining 54% of the variance. Component 13, "The dual enrollment course difficulty level" did not have a primary loading of .5 or greater. All other components had primary loadings over 0.6 and three components had a cross loading above 0.3. Component 22 (Increased awareness of college access opportunities), Component 23 (Increased awareness of career pathway opportunities), and Component 24 (Less of a financial burden) with the first two having

strong primary loadings of 0.73 and 0.63 respectively, while the third had a primary loading of 0.33.

The four-factor solution was rotated by using a Varimax with Kaiser Normalization rotation to yield interpretable factors. After inspection of loaded components, the emerged factors were labeled as (a) college/career awareness, (b) affordable challenging courses, (c) guidance assistance, and (d) student motivation. Internal consistency for each of the scales was examined using Cronbach's alpha. The alpha for college/career awareness (6 components) was great at .72; affordable challenging courses (3 components) was good at .54; guidance assistance (3 components) was fair at .46; and finally student motivation (5 components) was fair at .43. No substantial increases in alpha for any of the scales could have been achieved by eliminating more items. Table 9 shows the factor loadings matrix for this final solution on all four factors.

Table 9

Factor Loadings and Communalities Based on a Principal Components Analysis with Varimax Rotations for 13 Components from the College Participation (n = 161).

Components	Factors				Communality
	College/ Career Awareness	Affordable Challenging Course	Guidance Assistance	Student Motivation	
Teacher choice.	-.10	-.25	.04	.56	.39
Higher level of performance.	.27	.51	-.13	.01	.35
It does not matter who I am.	.15	.18	-.11	.65	.48
Treated like an adult.	.62	.06	.10	-.28	.47
Dual enrollment course content linked to real-life goals.	.65	.10	-.09	-.19	.48

(table continues)

Table 9 (continued)

Components	College/ Career Awareness	Affordable Challenging Course	Guidance Assistance	Student Motivation	Communality
Dual enrollment courses content more challenging.	.22	.74	.13	.02	.61
Counselor provided dual enrollment information.	.06	-.02	.77	.17	.62
Increased likelihood to continue education.	.70	.04	.12	.20	.54
Increased awareness of college access.	.73	.11	-.03	.38	.69
Increased awareness of career pathway opportunities.	.63	.07	.13	.30	.50
Less financial burden.	.33	.42	.25	.47	.57
Had one meeting with counselor about dual enrollment or career.	.06	.02	.83	-.23	.74

**Bolding denotes factorability based on $p < .01$*

Research Question 3

Does participation in a dual enrollment program provide greater development of workplace development skills? The factorability of the second grouping, workforce skill development, examined 18 components (Questions 25-40). The same recognized criteria as used previously with college participation for the factorability of a correlation were used. All 18 components correlated 0.5 or greater with at least one other component, suggesting reasonable factorability. Second, the Kaiser-Meyer-Olkin measure of sampling adequacy was 0.87, within the recommended value of 0.6 or higher, and Bartlett's test of Sphericity was significant ($\chi^2 (153) = 1.328E3, p < .01$). The diagonals of the anti-image correlation matrix were the majority all over 0.5, supporting the inclusion of each component in the factor analysis. Finally, the communalities being all

above 0.5 (see Table 10) further confirmed each component shared some common variance with the other items. Given these overall indicators, factor analysis was conducted with all 18 items.

Principal component analysis was used because the primary purpose was to identify factors to determine the efficacy of career and technical education dual enrollment programs to raise the awareness and development of workplace readiness skills. The initial eigen values showed the first factor explained 40% of the variance, the secondary factor 9% of the variance, the third factor 7% of the variance, and the fourth factor 5% of the variance. A three factor solution, which explained 56% of the variance, was preferred because of its previous theoretical support for the leveling off of eigen values on the scree plot after three factors.

A principal components factor analysis of 18 components, using Varimax with Kaiser Normalization was conducted, with three factors noted above. All components had primary loadings over .5 and six components had a cross loading above .3. These components were described as (a) “Demonstrating understanding of big picture” with a primary factor loading of .54 and a cross-load factor of .39; (b) “Demonstrating work ethic” with a primary factor loading of .64 and cross-loading factor of .36; (c) “Demonstrating positive attitude” with a primary factor loading of .70 and cross-loading factor of .30; (d) “Demonstrating self-presentation skills” with a primary factor of .62 and cross-loading factor of .48; and (e) “Being a team member” with a primary factor of .62 and cross-loading factor of .32.

Table 10

Factor Loadings & Communalities for Workplace Readiness Skills (n = 161).

Items	Factors			
	Workforce Skill Development	Skill/Education Need	College Attendance	Communality
Demonstrate reading skills	.73	.20	.05	.58
Demonstrate math skills	.70	.20	-.00	.50
Demonstrate writing skills	.64	.29	-.02	.49
Demonstrate speaking & listening skills	.64	.26	-.09	.49
Demonstrate computer literacy	.56	.03	.25	.49
Demonstrate reasoning, problem-solving, & decision-making skills.	.64	.23	.19	.37
Demonstrate understanding of “big picture”	.39	.54	-.01	.50
Demonstrate work ethic	.36	.64	.03	.44
Demonstrate positive attitude	.38	.66	.09	.54
Demonstrate independence & initiative	.70	.31	.07	.58
Demonstrate self-presentation skills	.62	.48	-.08	.61
Maintain satisfactory attendance	.57	.18	.15	.38
Team Member	.62	.31	.03	.49
Increased awareness for additional education & training beyond HS	.20	.79	.03	.67
Having some college provides advantage to workforce entry	.21	.74	.25	.65
Plan to attend college after high school	.09	.27	.82	.76
Planned to attend college prior to DE enrollment	.07	.03	.87	.77
Increased awareness of career choices	.17	.77	.22	.67

**Bolding denotes factorability based on $p < .01$*

The three-factor solution was rotated by using a Varimax rotation to yield interpretable factors. After inspection of loaded components, the emerged factors were labeled (a) workforce skill development, (b) skill/education need, and (c) desire to attend college. Internal consistency for each of the scales was examined using Cronbach's alpha. The alpha for workforce skills development (13 components) was excellent at .90; for skill/education need (9 components) was excellent at .88; and for desire to attend college (3 components) was good at .57. No substantial increases in alpha for any of the scales could have been achieved by eliminating more components. Table 10 shows the factor loadings matrix for this final solution on all three factors.

Limitations of the Methodology

The findings described need to be tempered by the limitation that there was a small percentage of minority students available for this survey; however, this number was reflective of the area's demographics and the majority of the sample did coincide with the United States Census (2005) findings for the area based on economical, racial, and cultural backgrounds. This study's focus was limited upon the career and technical education dual enrollment student. An additional limitation lies within the fact that while the structural equation modeling is appropriate for the analyses conducted within the study, the small sample size ($n=161$) should warrant caution when interpreting the results.

Summary

This chapter provided the analysis of data received from the sample of students surveyed as related to each of the three research questions contained within this study. The instrument and data coding used were presented to discuss the development of the

data and their importance to the analyses. Analysis results were provided for the instrument used.

Research question findings were discussed. The grouping of the data into three areas provided focus to each of the research questions independently. Research Question 1 (RQ1) sought to find the demographics and characteristics of dual enrollment students within the four-county service area of rural southwest Virginia. Collected demographic data from Questions 1-11 revealed the rural, southwest Virginia career and technical education dual enrollment student was primarily Caucasian, female in her senior year of high school, and maintaining a 3.0 – 3.49 GPA. These findings concur with the characters provided by the United States Census Bureau. Two surprising outcomes that resulted from the survey found a majority of the students were not first-generational college students and did not qualify for free or reduced lunch; however it is to be noted the qualifying annual income was at or below \$25,000. The career and technical education area with the largest enrollment was that of business education subjects which included typing, accounting, and medical transcription. This finding agrees with the VCCS report for the area that denotes 21% of dual enrollment FTE's were from business subject areas (VCCS, 2009). Since the 2004-05 year, the first year all high school students were considered dual enrollment students within the service area community college, a shift has developed from the dominance of Arts and Sciences offerings toward business technology offerings from earlier years (MECC, 2009).

Research Question 2 (RQ2) inquired if participation in the dual enrollment program encouraged student participation to the postsecondary level of education. Data analysis on Questions 11-24 found that indeed participation did encourage students to

pursue an education to the postsecondary level. Four resulting factors provided descriptive assessments of (a) college/career awareness, (b) affordable challenging courses, (c) guidance assistance, and (d) student motivation accounted for 54% of the variance. The criteria used to guide the analysis were briefly discussed. These confirmed the components revealed were reliable. Cronbach's α 's for these four components was reported as significant ($p < 0.01$) with a Kaiser-Meyer-Olkin measure of sampling adequacy of .63 or very good validity. The college/career awareness factor was the strongest component having five variables at .6 or higher. The variable "less of a financial burden" (Question 23) was the only variable cross-loading on all components suggesting cost was the strongest indicator in the issue of college/training continuance.

Research Question 3 (RQ3) inquired if participation in a dual enrollment program provided greater development of workplace skill readiness. Data analysis on Section 5, Questions 25-42, returned three factor loadings for providing assessment of (a) workforce skill development, (b) skill/education need, and (c) desire for college, which accounted for 56% of the variance. Cronbach's α for these three components was reported as significant ($p < 0.1$) with a Kaiser-Meyer-Olkin measure of sampling adequacy of .87 or excellent ranking. Workforce skill development was the strongest component composed of 10 workforce skill variables while skill/education need was a close second with seven variables loading at 0.7 or above. These findings suggest career and technical dual enrollment courses are indeed succeeding in the development of workplace readiness skill awareness within program objectives as well as the need for additional education/training beyond high school.

Chapter V provides a summary of the findings provided. The value of the preliminary analyses will be clarified as well as the conclusions they support in the effort to understand the components revealed. Conclusions will be stated summarizing the findings drawn from data supporting the research questions. Recommendations for future studies regarding the research questions or related topics will be made.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter begins with a restatement of the problem, presentation of the research questions, and the highlights of the study's background, significance, setting, limitations, and assumptions. A synopsis of the literatures' significant points regarding this study are followed by a brief review of the methodology employed, the sample obtained, the findings reported, and the results of the principal component analysis conducted. Conclusions were drawn regarding each of the research questions. Each outcome was discussed. The chapter concluded with recommendations regarding the review of current dual enrollment policy and procedures in effect for rural, southwest Virginia.

Summary

The problem of the study was to determine if participating in a high school dual enrollment program provided a mechanism through which rural, southwest Virginia career and technical students were encouraged to participate in postsecondary education and increase workplace readiness skill levels. Three research goals were developed to (a) determine students' perceptions of a high school dual enrollment program as reflected through their academic, financial, and career experiences; (b) determine if enrollment in a high school dual enrollment program encouraged students to continue their education to the postsecondary level; and (c) determine if dual enrollment affects the workplace readiness level of students.

The study's setting was established within the service area of a rural, southwest Virginia community college serving a four county area and one incorporated township.

The United States Census Bureau (2005) described the area as predominately female, largely economically disadvantaged, and with less than two percent minority representation. The community college represented the only two-year higher education institution available within the service area. One four-year college located within the same county existed while two satellite distance learning sites were located on the community college's campus. The majority of the service area students travel approximately one-hour, one-way in order to attend any higher education institution, as the institutions were geographically located in the middle of the service area.

The research population included participants dual enrolled during the 2008-09 academic school year. Each student was enrolled in at least one career and technical education course within one of four career and technical centers having active dual enrollment programs with the community college ($N=221$). Surveyed students were those who met the 2008 Virginia Dual Enrollment eligibility requirements.

Proper permissions were obtained from the four district superintendents and the principals/directors of the four career and technical centers. Students were provided a copy of the survey protocol containing an introduction and purpose of the research as well as directions for proper survey completion. It was agreed with the administrators that participants would complete the 42-question survey within their respective career and technical centers at a specified time and date. This procedure resulted in a sample size of 161 ($n=161$).

Limitations of the study included those established as entrance criteria or eligibility requirements by the 2008 Virginia Dual Enrollment Plan. These included tuition costs, course availability, minimum freshmen status, and valid placement test

scores. The study was confined to those career and technical courses approved under the 2008-09 Virginia Dual Enrollment Memorandum of Agreements. Further, a small sample size of 161 (n=161) warranted caution when interpreting the results. Additionally, findings resulted from a small percentage of minority students available for this survey. This lower number was reflective of the area's demographics, which coincided with the United States Census (2005) findings for the area revealed less than 2% were minority.

The literature review included a historical progression of dual enrollment's development throughout the United States as a whole. Notations of dual enrollment programs were evidentiary in 1876 with the Three-Year Collegiate Program (Greenberg, 1988) as well as in 1880 when the Massachusetts Teachers' Association passed resolutions constructing early partnerships between high schools and postsecondary institutions. Harvard University's President, Charles Eliot, was credited with the first national attempt to standardize high school curriculum and coordinate secondary and postsecondary education (Fincher-Ford, 1997), ultimately setting the stage for the expansion of the community college and the development of articulation agreements between secondary and postsecondary institutions (Bring & Karabel, 1989; Cohen & Brawer, 1994). This dual enrollment philosophy continued until 1959 when the College Board granted students the option of earning college credits through advanced placement examinations (Boswell, 2000). New York, Maine, Michigan, Washington, and others attempted to capitalize on this progressive step by creating partnerships with high schools utilizing the basic concept of dual enrollment. The intent was to integrate the program's philosophy by providing high-level education with tougher graduation standards all the

while developing career pathways and job readiness. One of the largest and best known for its nationwide partnerships was Syracuse University.

Virginia's progressive development and contingency for the 21st century was reviewed, specifically highlighting the Virginia Plan for Dual Enrollment 1988, revised in 2008. Virginia's Plan outlined such areas as (a) course offerings, (b) student eligibility, (c) credit awarded, (d) faculty selection, (e) assessment, (f) state funding, and (g) tuition and fees (Catron, 2001). However, while many of Virginia's rural area's per capita income was found well below that of the state's median average of \$68,000, the plan continued to be vague in terms of tuition and fees for dual enrollment. Individualized financial agreements agreed upon within each of the 23 community college service areas allowed students to participate in dual enrollment courses at no direct cost, or reduced cost, thereby increasing the program's popularity.

Virginia took the broad step to eliminate all articulation agreements during fall 2008, citing students did not benefit universally from the "credit-in-escrow" model. The addition of sixteen career cluster concentrations provided dual enrollment options beginning as early as the ninth grade with grades posted to official college transcripts. Additionally, this modification allowed Virginia to meet the challenge of reducing the number of high school graduates who placed into developmental courses as well as comply with Tech Prep regulations mandated by the 2006 Perkins IV Act. In March 2009, the Virginia Department of Education adopted a new Tech Prep definition, which described the secondary Tech Prep student as one who is currently or was previously enrolled in at least one career and technical education dual enrollment course. This

adoption launched the Commonwealth's statewide system used to identify and track students from high school into community college and/or into the workplace.

As dual enrollment developed into a mechanism creating a smoother and more successful transitions from high school to college, advocates believed students in these programs were more likely to remain engaged in and challenged by rigorous courses by eliminating the fragmentation that currently exists between the secondary and postsecondary systems of education (Karp & Bailey, 2003; Venezia, Kirst, & Antonia, 2003). Yet, while all 50 states registered some instance of dual enrollment, only 40 currently have active dual enrollment programs (Karp, Bailey, Hughes, & Fermin, 2005). Active programs must have met two or more of the following criteria: students would have (a) paid little or no tuition, (b) earned both high school and college credit, and/or (c) limited restrictions.

Advantages and disadvantages of dual enrollment's development were reviewed, which included issues of student target population realignment, funding, course rigor and relevancy, and program awareness. While dual enrollment historically targeted high-achieving high school students, its focus has expanded to include strategies to encapsulate and assist a broader range of students as they transition from high school to college. These program's provisions provided linkages between all levels of education as well as career pathways (Marshall & Andrews, 2002; NCES, 2001).

One apparent widespread disadvantage hampering development was the lack of a nationwide or even statewide standard transferability operating policy. While the Commonwealth of Virginia has been a noted forerunner with its progressive plans, disparity in how Virginia's community colleges administer the programs remains. These

differences represent possible unequal opportunities for potential students (Wallace, 2006) thus leading to irregular program development and maintenance.

The review of the literature concluded with an examination of the development of workforce skills, specifically outlining Virginia's progressive stance. Findings throughout the 20th century, the basic "Three R's" of reading, writing, and arithmetic were the focus of all educational curricula. For most students, a rigorous curriculum meant having to memorize more vocabulary words and do more mathematics problems at night. However, in the 21st century, mastery of the basic skills no longer sufficed. As the world transitioned to a knowledge-based economy, the globalization of business and industry demanded the workforce to know how to think – to reason, analyze, weigh evidence, solve problems, and of the utmost importance, communicate effectively (ACTE, 2008).

Rey-Alicea and Scott (2007), along with the ACT (2006), established definitions that described the 21st century's workforce skills as a baseline of hard- and soft-skills, transferable from one position to another across industries as well as valuable for any skilled or professional occupation at any level of education. In 2007, Virginia aligned itself with these standards by developing its own list, known as workplace readiness skills, expanding upon the basic three R's to include character-building skills such as listening, work ethics, and positive attitudes. The Commonwealth of Virginia recognized these as fundamental to career success by fully integrating them into all career and technical education programs of study.

As for the methods and procedures proposed and used in this study, these were addressed simultaneously in order to reduce redundancy. This research, characterized as an exploratory study, examined dual enrollment programs as a mechanism to encourage

students in rural, southwest Virginia to participate in college as well as develop workplace readiness skills. Each of the research questions were answered and goals addressed.

Having collected a large number of variables, principal component analysis was used to determine the efficacy of dual enrollment programs. Tabachnick and Fidell (2007) suggested that variables correlated with one another but largely independent of other subsets of variables be combined into components. Once completed, these components reflected the underlying processes created by the correlations among the variables.

Data for variables representing student demographics and enrollment motivation, teacher and counselor motivation, as well as workplace readiness skill development were collected. The instrument had been developed based upon the data required to answer the study's three research questions. The data were grouped into three sets of variables for analysis in order to answer the three research questions presented.

The first grouping contained Questions 1-7 and was utilized to establish the characteristics and demographics of rural, southwest Virginia dual enrollment students. These were nominal scale items. Group 2 contained Questions 8-24 and provided the variables to determine the efficacy of the dual enrollment program to increase the participation into college for those identified within the study. Finally, in Group 3 Questions 25-30 contained 18 variables. Question 25 contained 13 of these variables, which included each of Virginia's workplace readiness skills asked separately. These components focused upon the efficacy of workplace readiness skill awareness students developed as they progressed through the career and technical education dual enrollment

course. All variables within this group were coded based on the five-point Likert scale. Table 11 has provided a complete description of each group's items and coding schema.

A pilot study provided validity and reliability of the survey instrument as it was original. Twenty-four ($n=24$) participants comprised the pilot study. These students met all dual enrollment requirements and were currently enrolled in (a) the service area community college or (b) a service area high school but not attending a career and technical education center, thus eliminating any duplication of data. Data from the pilot study provided information used for clarification and modification purposes. Three questions were modified to add clarity, readability, and provide additional response option. The addition of one question listed each of Virginia's 13 workplace readiness skills separately in order to gain a valid assessment of each skill.

The survey response rate from eligible dual enrolled career and technical students was 73 percent. One hundred sixty-one ($n=161$) surveys were returned from a sample population of 221 ($N=221$). Surveys contained five distinct sections to gather students' opinions of the efficacy of the dual enrollment program in promoting college participation and workplace skill readiness awareness. These five sections were further correlated into three groups of variables to provide data in answering the study's three research questions.

Conclusions

The exploration of efficacy for career and technical education dual enrollment programs in rural, southwest Virginia resulted in the development of characteristics and demographics of the dual enrollment student. Quantitative data reflective of students'

Table 11

Description of Three Data Groupings for Research Question Development.

Group # ~ Research Question	Question/Variable	Coding Schema
Group 1 ~ Research Question 1 {Demographic development}	Questions 1-7 (gender, grade level, academic standing, first generation, ethnicity, income level, and career and technical education program area)	All Nominal Scale
Group 2 ~ Research Question 2 {Efficacy of the dual enrollment program to increase participation into college.}	<p>Questions 8 – 24</p> <ul style="list-style-type: none"> -Source of dual enrollment information -Enrollment in regular dual enrollment classes -Enrollment in CTE dual enrollment classes -Greatest dual enrollment challenge -Teacher choice -Dual enrollment course difficulty level -Expected higher level of performance -Did not matter who the student was -Treated like an adult -Dual enrollment content linked to real-life goals -Dual enrollment content was more challenging -Guidance counselor provided dual enrollment information -Enrollment increased likelihood to continue education/training -Increased awareness of college access programs -Increased awareness of career pathways -Less of financial burden -Had at least one meeting with counselor regarding dual enrollment 	<p>Dichotomous</p> <p>Dichotomous</p> <p>All remaining were on a Five-point Likert scale</p>

(table continues)

Table 11 (continued)

Group # ~ Research Question	Question/Variable	Coding Schema
Group 3 ~ Research Question 3 {Efficacy of workplace readiness skills awareness}	<p>Questions 25 – 30</p> <p><i>Item 25 listed each of the 13 workplace readiness skills provided 13 variables demonstrated as:</i></p> <ul style="list-style-type: none"> -Reading -Mathematics -Writing -Speaking and listening -Computer literacy -Reasoning, problem-solving, and decision-making -Understanding of “big picture” -Work ethic -Positive attitude -Independence and initiative -Self-presentation -Satisfactory attendance -Team member <p><i>Questions 26-30:</i></p> <ul style="list-style-type: none"> -Increased awareness for additional education/training beyond high school -Knowledge of having some college provides advantage to workforce entry -Plan to attend college after high school -Would have attend college without involvement in dual enrollment program -Increased awareness of career choices 	Five-point Likert scale

experiences, knowledge, and opinions of the dual enrollment program were collected.

These data were analyzed to answer each of the study's research questions.

Research Question 1 was, "What are the demographics and characteristics of dual enrollment students within the four-county service area of rural southwest Virginia?" Study findings revealed a student enrolled in a career and technical education dual enrollment program was closely aligned with United States Census Bureau reported regional demographics. Further analysis showed the southwest Virginia dual enrollment student to be a Caucasian (white) female, in her senior year of high school with a 3.0 – 3.49 grade point average, was enrolled in a business education program of study, and was not the first member of her family to attend college.

Student gender results were almost evenly divided with 49.1 percent males (n=79) but still slightly lower than the females at 50.9 percent (n=82). While grade classification data revealed the majority of the sample was comprised of seniors and juniors (72.7 percent), sophomores and freshmen enrollments were present (27.3 percent) thereby suggesting dual enrollment programs have been successful in targeting the upperclassman and have succeeded at making course options available to lower classmen as well. This early exposure to college level courses has laid the groundwork for a seamless transition into college, ultimately setting the stage for life-long learning development.

While the review of literature revealed dual enrollment programs have traditionally targeted gifted and talented students, this study's findings did not support this. Virginia classified an average student as one having a "B" average or 2.5-3.5 grade point average based upon a 4-point scale. Study findings revealed 49.1 percent of the students had a 3.0-3.49 grade point average while 16.8 percent with 2.5-2.99. Supporting

the inclusion of the average achieving student is the 2008 Virginia Dual Enrollment Plan that provided and promoted additional opportunities through career and technical education programs. Furthermore, with the application of the new definition of a Tech Prep student suggests career and technical education programs should see an increased number of average students gaining access to a postsecondary level of education/training.

The only area of exception that did not coincide with the area's demographics was the percentage of first-generation college students. At 49.7 percent, this was not the study's majority but rather just the opposite. This suggested the number of first-generation students was on the decline for the service area. Virginia had steadfastly promoted dual enrollment as a program for college access, which findings suggested had occurred.

Research Question 2 was, "Does participation in the dual enrollment program encourage student participation into the postsecondary level of education?" This question examined participation in a career and technical education dual enrollment program, which, as variables, represented student, teacher, and counselor educational motivational factors. As was explained, principal component analysis extracted four components suggesting participation in the career and technical education dual enrollment program does encourage student participation into the postsecondary level of education.

The first component was labeled as college/career awareness and was based on the results of (a) being treated as an adult (Question 16), (b) dual enrollment course's content was linked to real-life goals (Question 17), (c) increased likelihood to continue education (Question 20), (d) increased awareness of college access opportunities (Question 21), and (e) increased awareness of career pathway opportunities (Question

22). These appeared to be valid as all loading factors (0.620, 0.654, 0.679, 0.730, and 0.625, respectfully) were greater than 0.600 (Guadagnoli & Velicer, 1988; Stevens, 2002). This component showed an increased awareness of programs associated with college and career continued education/training along with the benefit of being treated as an adult through the courses' real-life related content. This supported the findings of Karp and Hughes (2008) where dual enrollment programs built and improved career and technical education pathways by incorporating authentic style learning approaches.

The second component, based on (a) dual enrollment's content being more challenging (Question 13), (b) higher level of performance expected (Question 14), and less of a financial burden, was valid as the factors (Question 23) (.0736, 0.514 and 0.417, respectively) and had only one factor greater than or equal to 0.600; however, two factors loaded within close proximity on the number line (Green & Salkind, 2005). Due to the number line closeness as well as the factor, less of a financial burden, cross-loading on all components, would be retained for further examination and retested with a larger sample. This component suggested courses within dual enrollment provided affordable, challenging courses where students were expected to perform at a higher level of competency. These results agreed with the recommendations of the *National Commission on the High School Senior Year* (2001) citing a more demanding, rigorous, and relevant secondary school curriculum would enable students to successfully enter the workforce upon high school graduation or confident of success if they chose to continue their education or training.

The third component, labeled guidance assistance, was based on the factors associated with (a) the guidance counselor having provided dual enrollment information

(Question 8) and (b) students having at least one meeting with a counselor concerning dual enrollment or career planning (Question 24), were found valid as the factors (0.767 and 0.828, respectively). This component suggested the opposite of what the initial demographics noted regarding how students received their dual enrollment information. This may be a result of misunderstanding in that students are required to meet with their guidance counselor in order to receive permission to enroll as a dual enrollment student, leading to the notion these questions may or may not represent a valid component given the low percentage recorded during the demographics/background characteristics portion.

The fourth component, labeled student motivation, was based on the variables (a) it did not matter who the student was (Question 15), (b) the choice of teacher (Question 12) and (c) having less of a financial burden (Question 23) (0.560, 0.646, and 0.474, respectively). Once again, only one factor greater than or equal to 0.600 was contained within the matrix; however, the two factors loaded within close proximity on the number line (Green & Salkind, 2005). Due to the number line closeness as well as the factor of less of a financial burden cross-loading on all components, this component would be retained for further examination and retested with a larger sample. This component suggested students enroll in career and technical education dual enrollment courses because their identity did not matter. Dual enrollment while once reserved for the elite or economically advantaged group within high school appears to be changing as more students classified as average enroll. The remaining factors, teacher choice, combined with, less of a financial burden, suggested students increased their awareness to continue their education/training into the postsecondary level.

To summarize the impact of all components drawn from the student, teacher, and guidance motivational factors, it was suggested the affirmation of Research Question 2 is supported. Student motivation for enrolling in the career and technical education dual enrollment program was not affected by the choice of teacher; rather it was found the teacher served as the primary source of program information. The result of time management would be the primary concern was not surprising, in that student realization of college-level work was present. Noting the low return of financial concerns was surprising. Students within the service area school districts enjoy tuition reduction by 80% to 90 %, which may have influenced the results.

Student awareness of the dual enrollment program was found to be high by noting enrollment in regular education as well as career and technical education courses returned a large percentage. Additionally, students enjoyed adult-like treatment within the dual enrollment classes, which focused upon real-life goals, providing challenging content, and prepared them for today's workforce. Dual enrollment programs benefited from a high rate of awareness among students who enjoyed challenging, authentic-style learning environments where teachers treated them as adults. Finding the first component comprised 23.5% of the variance, along with five or more factors loading above the required 0.6, it was reasonable to suggest career and technical education dual enrollment programs were effective at increasing student participation to the postsecondary level. Table 12 summarizes these factors. Concluding mechanisms such as dual enrollment have indeed encouraged students to participate in postsecondary education. Supporting the findings made by Karp and Hughes (2008) that connections between colleges and high school career and technical programs should be strengthened so middle-achieving

students have additional opportunities to engage in college coursework while in high school.

Table 12

Summation of RQ2 Components, Encouragement of Student Participation into the Postsecondary Level of Education

Components	Cronbach's alpha	Scale	Percent of Variance
College/Career Awareness	.72	Great	23.57
Affordable, Challenging Courses	.54	Good	10.70
Guidance Assistance	.46	Fair	10.45
Student Motivation	.43	Fair	9.29

Research Question 3 asked, "Does participation in a dual enrollment program provide greater development of workplace readiness skills?" This question examined a select listing of workplace readiness skills developed and approved by Virginia Department of Education along with four items inquiring the students' awareness of training/educational requirements expected upon entry into the workforce.

There were three components extracted. The first component, labeled as workplace skill development, extracted eight variables representing analysis that demonstrated reading skills (loading factor 0.729), mathematics skills (0.679), writing skills (0.638), speaking and listening skills (0.644), reasoning, problem-solving, decision-making skills (0.642), independence and initiative (0.695), self-presentation skills (0.615), and being a team member (0.622). Eight factors were greater than 0.600 (Guadagnoli & Velicer, 1988). This component identified students had increased their awareness of eight of the thirteen skills identified by Virginia as being critical to successful workforce entry. While the remaining five loaded as demonstrated (a)

computer literacy (0.555), (b) understanding of “big picture” (0.386), (c) work ethic (0.360), and (d) positive attitude (0.377). These would be held for consideration with a larger population study as they extracted on the number line (Green & Salkind, 2005).

Analysis showed that students gained an increased awareness of all the 13 workplace readiness skills. This conclusion was consistent with the literature regarding the inclusion of workforce skills within the career and technical education content areas. The ability to document a “planned” approach to career attainment assisted students in the development of marketable skills as well as provided a pipeline of skilled employees for the nation’s workforce to remain competitive in a global economy (Daggett, 2008; Morrison, 2008; Reese, 2008).

The second component was labeled education/skills. The extraction of five variables that demonstrated (a) work ethic (loading factor 0.641), (b) positive attitude (0.657), (c) increased awareness for additional education/training beyond high school (0.792), (d) having some college provides advantage to workforce entry (0.737), and (e) increased awareness of career choices (0.770). While two of the variable, demonstrated work ethic and positive attitude, failed to load at the 0.6 level on the workplace skill, they did cross-load lower on the number line, however loading higher when correlated with the need for additional education/skills for successful workforce entry. Requirement for these two skills was especially evident in today’s global economic situation, and while the U.S. Department of Labor (2006) predicts there will be approximately four million new job openings and 90% of these requiring postsecondary education or training, the findings did affirm student awareness of this need.

The third component appeared to assess the students' desire for college participation with two variables loading. The first variable, plan to attend college after high school (Question 28), loaded at 0.824 while the second variable, would have attended college without dual enrollment (Question 29), loaded at 0.874. The loading of these two variables supported the suggestion students were aware of postsecondary education and training opportunities but dual enrollment may not necessarily be the sole element.

Workplace skill development was the strongest component in deciding the efficacy of the dual enrollment program. Students overwhelmingly agreed their awareness and understanding of Virginia's 13 workplace readiness skills were being developed as a result of their enrollment in the career and technical education dual enrollment course. Promotion of programs, providing access to postsecondary education, as well as the need for continued education/training, were all strong motivational factors for enrollment. By understanding the necessity of additional education/training, students were encouraged to continue into the postsecondary level of education. This information supports the statement that dual enrollment has affected the workplace readiness level of rural, southwest Virginia students through increased awareness in (a) workplace skill development, (b) skill/education need, and (c) desire to attend college.

By summing the impact of the three components drawn from the workplace skill readiness variables, affirmation of Research Question 3 was supported. An awareness as well as the development of Virginia's 13 workplace readiness skills was accomplished, as all thirteen loaded or cross-loaded, thereby resulting in the students' increased awareness these are requirements for workforce entry. This supports a report by the American

Society for Training and Development (2006) that a significant gap in such areas as technical, soft-skills, as well as basic employability skills in the areas of reading, writing, and communication exists. The observation was the inclusion of these thirteen skills into Virginia's career and technical education core curriculum objectives has had an increased awareness and was effective in the development of these skills within Virginia's future workforce.

Recommendations

These research findings and conclusions support recommendations for further research. The first recommendation, noting the exceptional and expected statewide growth of dual enrollment, would have Virginia develop a statewide agreement between secondary school systems and its community college system. If projections by VCCS Chancellor, Glenn DeBois, that dual enrollment numbers will reach 45,000 within the next two years (VCCS, 2009c), the lack of a uniformed policy uniformity will result in unequal opportunities for students (Wallace, 2006). The alternative is to provide a system that would invite student, faculty, and parent inclusion rather than create obstacles preventing student enrollment and success. Reiterating that the ultimate goals and benefits of dual enrollment are to engage, recruit, and retain high school students in college programs for the benefit of the student and community (Duffy, 2002), implementation would allow Virginia to streamline issues such as faculty eligibility and compensation, student eligibility, tuition funding, credit transfer, and establish a seamless transition system. This would provide a support structure encouraging student access to postsecondary education as well as establishing systematic linkages between all levels of education.

While the first recommendation appealed on a state level, the second recommendation focused more on the local school systems. The recommendation would be for local school districts to investigate funding programs to encourage and support career and technical education faculty to pursue advanced degrees in order to attain eligibility status with accrediting agencies. By doing so, this would lend itself to provide a broader range of faculty qualified to offer additional career and technical education dual enrollment programs.

This concern was brought to the forefront within this study's research findings as each career and technical center varied in the number and kinds of programs qualifying for dual enrollment status. Local school systems find themselves in a constant struggle to maintain compliance with the Southern Association of Colleges and Schools Accreditation requirement of holding a master's degree in the instructional area or master's degree with 18 hours of graduate credit in the instructional area in order to be a dual enrollment faculty within the high school (VDOE, 2006). Often a difficult requirement to achieve, this is especially evident in rural areas where the availability of career and technical education graduate programs of study currently requires extended amounts of travel or must be completed through distant education options.

A final recommendation was based on the study's findings where students received only 28 percent of their dual enrollment information from guidance counselors. The recommendation is for school systems to examine this situation. They may find a need to develop an educational program for existing counselors or possibly employ a guidance counselor specifically for dual enrollment students. Positional duties would focus upon training and education opportunities directly related to the career pathways to

assist students with enrollment, funding, and transportation options. School guidance counselors have a general awareness of career and technical education programs but lack an acute understanding of the programs of study, academic level requirements, career pathways, or training options. A fallacy of the current system is not providing a knowledgeable, well-informed guidance counselor within each of the career and technical centers or servicing high schools. This becomes a paramount issue as students prepare to enter today's economic challenging world of work where in a majority of the career pathways require education and/or training beyond high school.

Career and technical education continues to struggle in its efforts to gain awareness beyond the mindset of, if not college bound then career and technical education. Unfortunately, many educators, administrators, and program development teams still insist only gifted and talented students are capable of college-level study in high school. Some states even go as far as targeting dual enrollment to academically advanced students and direct funds away from career and technical education students reducing enrollment opportunities (Boswell, 2000). However, Bragg and Kim (2005) as well as Burns and Lewis (2000) research supports the enrollment of motivated students in dual enrollment programs. By doing so, possible benefits and potential gains to society result from encouraging middle achieving students to participate in a dual enrollment program, ultimately moving away from the traditional, limited view of their capabilities (Wallace, 2006; Wellman, 2004).

Based upon the research findings and conclusions, the researcher included these recommendations for further study. This study reviewed career and technical dual enrollment students enrolled in an approved career pathway within the service area of one

southwest Virginia community college. The reasoning was to ascertain if student participation in postsecondary education increased along with their awareness of workplace readiness skills. As an alternative design, a follow-up study was proposed with design changes that would include students enrolled in regular dual enrollment courses as well as those not enrolled in any dual enrollment course. In this situation, effectiveness of educational as well as career readiness could be evaluated by comparing data gathered from each of the three distinct groups (career and technical dual enrollment, regular dual enrollment, and non-dual enrollment). This would effectively establish the need for postsecondary program awareness across curriculum boundaries as well as integration of workplace skill development leading to possible improvements in student academic as well as career pathway achievement.

Secondly, this study was limited to one service area contained within the Virginia Community College System of twenty-three available service areas. This resulted in a small population sample size, small minority representation, and low socio-economic diversity. State comparison data would provide a larger sampling size as well as a broader diversity in income, ethnicity, and program areas thus allowing for more reliable data validation.

Finally, factors that loaded within close proximity on the number line during Research Question 2 factorization of the second component, (Questions 13 and 14) along with the fourth component (Questions 15 and 23) would be retained for further examination and retested with a larger sample. Continued factor assessment associated with students' motivations for enrollment into a career and technical education dual enrollment program was warranted. As was the development of workplace readiness

skills in that while all 13 of Virginia's workplace skills loaded or cross-loaded, five failed to load at the required 0.6 level but appeared in close proximity which would contend a larger population study may have them extract higher. While this population provided one source of career and technical education dual enrollment opportunity and correlated with factors associated with being located in a rural area, foundational data for further comparison with a larger population of students to include those located in an urban area was well supported. A larger, more diverse population would ultimately provide for a more comprehensive understanding of student academic, social, and financial concerns while dual enrolled.

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(Appendix A)**VIRGINIA PLAN FOR DUAL ENROLLMENT
BETWEEN
VIRGINIA PUBLIC SCHOOLS AND COMMUNITY COLLEGES**
(Document in effect as of September 1988)

Broadly speaking, dual enrollment allows high school students to meet the requirements for high school graduation while simultaneously earning college credit. The Virginia Plan for Dual Enrollment gives a state-wide framework for dual enrollment arrangements between the public schools and community colleges. These arrangements may be made at the local level, i.e., between the representatives or boards of the participating public school and the participating community college authorized to contract such agreements. These arrangements may be formed in three distinct ways. First, high school students may be enrolled in the regularly scheduled college credit courses with the other college students taught at the community college. Second, high school students may be enrolled in specially scheduled college credit courses exclusively for high school students taught at the high school. Third, high school students may be enrolled in specially scheduled college credit courses exclusively for high school students taught at the community college. In the latter two cases where the college credit courses are specially scheduled for the high school students, these courses shall have the same academic rigor as, and meet all the college accreditation standards of, the regularly scheduled college credit courses. In all cases, the particular courses to be offered shall be determined through the mutual agreement of the participating public school and community college.

PURPOSE OF DUAL ENROLLMENT

The purpose of the Virginia Plan for Dual Enrollment is both to provide a wider range of course options for high school students and to avoid the unnecessary duplication of programs, in the academic, fine arts, and vocational subject areas where appropriate. As such, the plan promotes rigorous educational pursuits and encourages learning as a lifelong process; it recognizes that high school students who accrue college credit are more likely to continue with their education beyond high school than those who do not. The plan also offers a direct cost benefit to the Commonwealth of Virginia, especially as it avoids the unnecessary duplication of facilities and equipment, and to the individual families of the high school students.

STUDENT ELIGIBILITY

All high school juniors and seniors who are sixteen years of age or older are eligible to participate in the dual enrollment arrangement between the public school and community college. However, appropriate public school and community college officials should take the necessary steps to assure that every student who is registered under the dual enrollment arrangement is qualified, i.e., is amply prepared for the demands of a college level course and can benefit from the enrichment opportunity. (Exceptions to this policy for student eligibility may be made on a case by case basis, with the approval of the public school superintendent and appropriate community college officials.)

ADMISSIONS REQUIREMENTS

First, the public school principal must approve the cross-registration of the high school student to the community college. Second, the community college must accept the high school student for admission to the college level course. In other words, the high school student must be recommended by the public school and must meet the admissions requirements established by the community college.

COURSE ELIGIBILITY

Courses may be drawn from the academic, fine arts, and career/technical education subject areas. The courses must be offered for college credit and may be part of a degree, certificate, or diploma program at the community college. Regardless of the subject area, no developmental or health and physical education courses shall be eligible for a dual enrollment arrangement.

CREDIT AWARDED

College credit shall be awarded by the community college to the participating high school students upon successful completion of the course. The award shall be in compliance with state and regional accrediting standards. High school credit shall also be awarded to the participating high school students upon successful completion of the course. The award shall be based on the college credit hour, with one high school unit equivalent to six semester hours of college credit.

SELECTION OF FACULTY

The faculty shall be selected and employed by the participating community college. They shall meet the minimum requirements set by Form VCCS-29 (See Appendix A). If a particular part-time faculty member of the community college is employed simultaneously full time by the public school, the college may reimburse the public school board for the services of its faculty member in lieu of direct compensation to the faculty member; alternate faculty compensation plans may be negotiated by the participating community college and public school.

TUITION AND FEES

According to Section 7 of Standard C of the 1988-89 "Standards for Accrediting Public Schools in Virginia," Schools and colleges are encouraged to provide high school students the opportunity for dual enrollment at no tuition cost to them or their families. In addition, neither the public school nor the community college shall be penalized in their respective state appropriations for developing and implementing the dual enrollment arrangement. The public school shall receive average daily membership credit for its students who participate in the dual enrollment arrangement, and the community college shall receive FTES (full-time equivalent student) credit for the participating high school student. (As of Fall 2001, dual enrollment courses are usually provided at little or no cost to the student. There are certain circumstances where a student would be required to pay a fee to obtain college credit for the course and/or purchase the course textbook. Tuition and fees for dual enrolled courses varies from school to school and county to county.)

ASSESSMENT

Assessment has long been recognized in Virginia as an important aspect of an effective instructional program. In this spirit, all dual enrollment arrangements developed and

implemented under the auspices of the Virginia Plan for Dual Enrollment shall include a formal mechanism for evaluation. (See Appendices D, E and E)

COMPLIANCE WITH ACCREDITATION STANDARDS

The Virginia Plan for Dual Enrollment is designed to comply with the criteria of the Southern Association of Colleges and Schools and with the 2000 Regulations Establishing Standards for Accrediting Public Schools in Virginia, 8 VAC 30-131-10 et. seq.

(Appendix B)**VIRGINIA PLAN FOR DUAL ENROLLMENT
BETWEEN
VIRGINIA PUBLIC SCHOOLS AND COMMUNITY COLLEGES**

(Document in effect as of March 2008)

Broadly speaking, dual enrollment allows high school students to meet the requirements for high school graduation while simultaneously earning college credit. National research has demonstrated that dual enrollment is a vehicle for increasing post-secondary participation rates. The Virginia Plan for Dual Enrollment gives a state-wide framework for dual enrollment arrangements between the public schools and community colleges. These arrangements may be made at the local level, i.e., between the representatives of boards of the participating public school and the participating community college authorized to contract such agreements. These arrangements may be formed in three distinct ways. First, high school students may be enrolled in the regularly scheduled college credit courses with the other students taught at the community college. Second, high school students may be enrolled in specially scheduled college credit courses conducted exclusively for high school students taught at the high school. Third, high school students may be enrolled in specially scheduled college credit courses conducted exclusively for high school students taught at the community college. In the latter two cases where the college credit courses are specially scheduled for the high school students, these courses shall have the same academic rigor as the regularly scheduled college credit courses and meet all of the college accreditation standards. In all cases, the particular courses to be offered shall be determined through the mutual agreement of the participating public school and community college. Some colleges and school divisions may choose to also enter into partnerships whereby validated course credits are awarded to high school students. These validated credit arrangements must follow accepted VCCS guidelines and be agreed upon by both the college and the school division.

Purpose

The purpose of the Virginia Plan for Dual Enrollment is to provide a wider range of course options for high school students in academic, career/occupational-technical subject areas where appropriate. As such, the plan promotes rigorous educational pursuits and encourages learning as a lifelong process. It recognizes that high school students who accrue college credit are more likely to continue with their education beyond high school than those who do not. The plan also offers a direct cost benefit to the Commonwealth of Virginia, especially as it avoids the unnecessary duplication of facilities and equipment when students receive credit towards a post secondary credential while enrolled in high school.

Collaboration Between Community College and Public School Divisions

Dual enrollment agreements are partnerships between secondary and postsecondary entities, both of whom play essential roles in the educational pipeline. As such, the community college and public school division will collaborate to identify need and select dual enrollment course offerings available to students. Further, the community college

will identify a coordinator of dual enrollment to serve as a liaison to the high school whose responsibilities shall include offering informational sessions to high school students and their parents and facilitating meetings between college and high school stakeholders to discuss logistics.

Student Eligibility

Dual enrollment coursework is restricted to high school juniors and seniors. Exceptions may be considered for freshman and sophomore students who are able to demonstrate readiness for college level course work through the colleges' established institutional policies. It is required that all freshmen and sophomore students meet established institutional placement criteria prior to enrolling in dual enrollment coursework. Appropriate public school and community college officials should take the necessary steps to assure that every student who is registered under the dual enrollment arrangement is amply prepared for the demands of a college-level course and can benefit from the enrichment opportunity.

Admissions Requirements

The Virginia Board of Education *Regulations Establishing Standards for Accrediting Public Schools in Virginia* govern the student's participation in dual enrollment arrangements. First, the public school principal must approve the cross-registration of the high school student to the community college. Second, the community college must accept the high school student for admission to the college-level course. All Virginia Community College System and institutional placement criteria must be met by the student prior to enrolling in a dual enrollment course. The community college will assume responsibility for administering the placement test to students recommended for dual enrollment course, and for registering students in the courses.

Course Eligibility

Courses may be drawn from all the college subject areas. The courses must be offered for college credit and must meet course enrollment requirements at the community college. The community college has the responsibility to ensure that all dual enrollment courses taught are equivalent to other instruction offered by the college, specifically in terms of course objectives, components of the syllabi, level and rigor of content, evaluation of students, textbooks, student outcomes and assessment and faculty evaluation.

Compliance with Accreditation Standards

The Virginia Plan for Dual Enrollment complies with the all criteria of the Southern Association of college and Schools and with the *Regulations Establishing Standards for Accrediting Public Schools in Virginia*.

Credit Awarded

College credit shall be awarded by the community college to the participating high school students upon successful completion of the course. The award shall be in compliance with appropriate accrediting standards for community colleges.

High school credit also shall be awarded to the participating high school students upon successful completion of the course. The award shall be in compliance with state standards.

Selection of Faculty

The faculty shall be selected and employed by the participating community college and shall meet the faculty hiring criteria established by SACS and the State Board for Community Colleges. For credentialing guidelines, the SACS criteria state, "Faculty teaching associate degree courses designed for transfer to a baccalaureate degree: doctor's or master's degree in the teaching discipline or master's degree with a concentration in the teaching discipline (a minimum of 18 graduate semester hours in the teaching discipline)."

If a part-time faculty member of the community college is employed simultaneously full-time by the public school, the college may reimburse the public school board for the services of its faculty member in lieu of direct compensation to the faculty member. Alternate faculty compensation plans may be negotiated by the participating community college and public school.

Tuition and Fees

According to the *Regulations Establishing Standards for Accrediting Public Schools in Virginia*, the public school will not be penalized in its state appropriation for developing and implementing dual enrollment. Schools and colleges are encouraged to provide high school students the opportunity for dual enrollment at no tuition cost to them or their families. In addition, neither the public school nor the community college shall be penalized in state appropriations it receives for developing and implementing the dual enrollment arrangement. The public school shall receive average daily membership (ADM) credit for its students who participate in the dual enrollment arrangement, and the community college shall receive full-time equivalent (FTE) student credit for the participating high school students.

Assessment

Assessment has long been recognized in Virginia as an important aspect of an effective instructional program. In this spirit, all dual enrollment arrangements developed and implemented under the auspices of the Virginia Plan for Dual Enrollment shall include a formal mechanism for evaluation. The community college has the responsibility to ensure that all dual enrollment courses taught are equivalent to other instruction offered by the college, specifically in terms of course objectives, components of the syllabi, level and rigor of content, evaluation of students, textbooks, student outcomes and assessment and faculty evaluation.

Student and faculty evaluations are an integral component of the assessment process for a college course. The Commission on Colleges Southern Association of Colleges and Schools (SACS) states, within its document *Principles of Accreditation*, that an institution should regularly evaluate the effectiveness of each faculty member in accord

with published criteria, regardless of contractual or tenured status. Part of the faculty evaluation process should include student evaluation of faculty effectiveness.

- (1) Faculty Evaluation—The community college will conduct faculty evaluations for dual enrollment instructors using the college guidelines adopted for all adjunct faculty. A copy of the evaluation results will be submitted to the designated school division representative.
- (2) (2) Student evaluations on all dual enrollment adjunct instructors will be conducted each semester for each course offered through the dual enrollment program . Results of the student evaluation will be compiled and shared with the Dean, Program, Lead, faculty member, and designated school division representative.

(Appendix C)

Student Survey ~ Dual Enrollment Efficacy

Background—Demographics

1. What is your gender?
 - A. Male
 - B. Female

2. What is your current high school grade level?
 - A. Freshmen
 - B. Sophomore
 - C. Junior
 - D. Senior

3. What is your current academic standing?
 - A. 3.5 - 4.0
 - B. 3.0 - 3.49
 - C. 2.5 - 2.99
 - D. 2.0 - 2.49

4. Has anyone in your immediate family attended college?
 - A. Yes
 - B. No

5. What is your ethnic background?
 - A. Caucasian (White)
 - B. African-American
 - C. Hispanic
 - D. Asian
 - E. Mixed Racial
 - F. Other

6. Are you currently receiving free or reduced lunch? (*Establishment of financial income level – State of Virginia has established income levels for lunch programs.*)
 - A. Yes
 - B. No

7. Which of the career and technical education area are you currently participating in for the dual enrollment program (check all that applies)?
 - Industrial Technology
 - Business Education
 - Agriculture
 - Health Occupations
 - Family & Consumer Science
 - Welding
 - Networking (Information Systems)
 - Drafting Design (Engineering)
 - Other _____

Motivation ~ Student

8. How did you find out about the Mountain Empire Community College dual enrollment program? (Mark all that applies.)
- A. Brochure/Announcement/Billboard
 - B. Guidance Counselor
 - C. Teacher
 - D. Parents
 - E. Friends
9. How many **regular** dual enrollment classes are you currently enrolled?
- A. 0
 - B. 1-2
 - C. 3-4
 - D. 5 or more
10. How many **career and technical** dual enrollment classes (e.g., business education, welding, information systems, etc) are you currently enrolled?
- A. 0
 - B. 1-2
 - C. 3-4
 - D. 5 or more
11. What has been your **greatest** challenge while taking dual enrollment courses?
- A. Time management
 - B. Difficult content level
 - C. Financial concerns
 - D. Social concerns
 - E. Other _____
12. Did the choice of teacher affect your decision to enroll in the dual enrollment program?
- A. Yes
 - B. No
13. Was the difficulty level of assignments tough to manage?
- A. Yes
 - B. No

Educational ~ Teacher

The following questions will use the following scale: 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, and 5=Strongly Agree.

14. Unlike regular high school courses, I am pushed to perform at a high level more often.
- 1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

15. Unlike regular high school courses, it does not matter who I am.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

16. I am treated as an adult in the dual enrollment program classes.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

17. The dual enrollment course's content is linked to real-life goals.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

18. The dual enrollment course's content is more challenging than regular high school courses.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

Educational ~ Counselor

19. The guidance counselor (school) provided dual enrollment program information along with its benefits to all students.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

20. Participating in the dual enrollment program has increased the likelihood that I will continue my education into college.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

21. Participating in dual enrollment has made me more aware of the available programs providing access to college.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

22. Participating in dual enrollment has made me more aware of available career pathways options.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

23. By participating in the dual enrollment program, there will be less of a financial burden of continuing my education into college.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

24. I have had at least one meeting with the guidance counselor to discuss college or career plans.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

Workplace Development

25. Participating in the dual enrollment program has prepared me in the following *Virginia's Workplace Readiness Skills*: (Please circle your answer to each area.)

Demonstrate reading skills on a level required for employment in a chosen career field.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

Demonstrate math skills on a level required for employment in a chosen career field.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

Demonstrate writing skills on a level required for employment in a chosen career field.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

Demonstrate speaking and listening skills on a level required for employment in a chosen career field.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

Demonstrate computer literacy on a level required for employment in a chosen career field.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

Demonstrate reasoning, problem-solving, and decision-making skills.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

Demonstrate understanding of the "big picture."

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

Demonstrate a strong work ethic.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

Demonstrate a positive attitude.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

Demonstrate independence and initiative.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

Demonstrate self-presentation skills.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

Maintain satisfactory attendance.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

Participate as a team member to accomplish goals.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

26. Participating in the dual enrollment program has increased my awareness of the need for education/training beyond high school in order to be competitive in the workforce.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

27. I feel having some college credit provides an advantage to workforce entry?

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

28. I plan to attend college after graduation (part- or full-time).

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

29. I would have attended college even without participating in the dual enrollment program.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

30. Participating in the dual enrollment program has increased my awareness of career choices.

1=Strongly Disagree 2=Disagree 3=Neutral 4=Agree 5=Strongly Agree

Thank you for taking time out of your busy schedule to answer questions about your dual enrollment experiences. I wish you the best of luck in your future education and career development endeavors.

(Appendix D)

Pilot Study Survey ~ Dual Enrollment Efficacy

Background—Demographics

1. What is your gender?
 - A. Male
 - B. Female

2. What is your current high school grade level?
 - A. Freshmen
 - B. Sophomore
 - C. Junior
 - D. Senior

3. What is your current academic standing?
 - A. 3.5 – 4.0
 - B. 3.0 – 3.49
 - C. 2.5 – 2.99
 - D. 2.0 – 2.49

4. Are you a first-generation college student (*Has anyone in your immediate family graduated from college*)?
 - A. Yes
 - B. No

5. What is your ethnic background?
 - A. Caucasian (White)
 - B. African-American
 - C. Hispanic
 - D. Asian
 - E. Mixed Racial
 - F. Other

6. Are you currently receiving free or reduced lunch (*goes to establishing financial income level –State of Virginia has established income levels— students generally don't know the parent's income level but do know if they are on reduced lunch or not*)?
 - A. Yes
 - B. No

Motivation ~ Student

7. How did you find out about the Mountain Empire Community College dual enrollment program?
 - A. Brochure/Announcement/Billboard
 - B. Guidance Counselor
 - C. Parents
 - D. Friends
 - E. Teacher

8. How many **regular** dual enrollment classes are you currently enrolled?
 - A. 0
 - B. 1-2
 - C. 3-4
 - D. 5 or more

9. How many **career and technical** dual enrollment classes (e.g., business education, welding, information systems, etc) are you currently enrolled?
 - A. 0
 - B. 1-2
 - C. 3-4
 - D. 5 or more

10. What has been your **greatest** challenge while taking dual enrollment courses?
 - A. Time management
 - B. Difficult content level
 - C. Financial concerns
 - D. Social concerns

11. Did the choice of teacher affect your decision to enroll in the dual enrollment program?
 - A. Yes
 - B. No

12. Was the difficulty level of assignments tough to manage?
 - A. Yes
 - B. No

Educational ~ Teacher

The following questions will use the following scale: 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, and 5=Strongly Agree.

13. Unlike regular high school courses, I am pushed to perform at a high level more often.

1=Strongly Disagree

2=Disagree

3=Neutral

4=Agree

5=Strongly Agree

14. Unlike regular high school courses, it does not matter who I am.

1=Strongly Disagree

2=Disagree

3=Neutral

4=Agree

5=Strongly Agree

15. I am treated as an adult in the dual enrollment program classes.

1=Strongly Disagree

2=Disagree

3=Neutral

4=Agree

5=Strongly Agree

16. The dual enrollment course's content is linked to real-life goals.

1=Strongly Disagree

2=Disagree

3=Neutral

4=Agree

5=Strongly Agree

17. The dual enrollment course's content is more challenging than regular high school courses.

- 1=Strongly Disagree
- 2=Disagree
- 3=Neutral
- 4=Agree
- 5=Strongly Agree

Educational ~ Counselor

18. The guidance counselor (school) provided dual enrollment program information along with its benefits to all students.

- 1=Strongly Disagree
- 2=Disagree
- 3=Neutral
- 4=Agree
- 5=Strongly Agree

19. Participating in the dual enrollment program has increased the likelihood that I will continue my education into college.

- 1=Strongly Disagree
- 2=Disagree
- 3=Neutral
- 4=Agree
- 5=Strongly Agree

20. Participating in dual enrollment has made me more aware of the available programs providing access to college.

- 1=Strongly Disagree
- 2=Disagree
- 3=Neutral
- 4=Agree
- 5=Strongly Agree

21. Participating in dual enrollment has made me more aware of available career pathways options.

1=Strongly Disagree

2=Disagree

3=Neutral

4=Agree

5=Strongly Agree

22. By participating in the dual enrollment program, there will be less of a financial burden of continuing my education into college.

1=Strongly Disagree

2=Disagree

3=Neutral

4=Agree

5=Strongly Agree

23. I have had at least one meeting with the guidance counselor to discuss college or career plans.

1=Strongly Disagree

2=Disagree

3=Neutral

4=Agree

5=Strongly Agree

Workplace Development

24. Participating in the dual enrollment program has helped me to developed skills that will increase my workforce preparation.

1=Strongly Disagree

2=Disagree

3=Neutral

4=Agree

5=Strongly Agree

25. Participating in the dual enrollment program has increased my awareness of the need for education/training beyond high school in order to be competitive in the workforce.

1=Strongly Disagree

2=Disagree

3=Neutral

4=Agree

5=Strongly Agree

26. I plan to attend college after graduation (part- or full-time).

1=Strongly Disagree

2=Disagree

3=Neutral

4=Agree

5=Strongly Agree

27. I would have attended college even without participating in the dual enrollment program.

1=Strongly Disagree

2=Disagree

3=Neutral

4=Agree

5=Strongly Agree

28. Participating in the dual enrollment program has increased my awareness of career choices.

1=Strongly Disagree

2=Disagree

3=Neutral

4=Agree

5=Strongly Agree

Thank you for taking time out of your busy schedule to answer questions about your dual enrollment experiences. I wish you the best of luck in your future education and career development endeavors.

(Appendix E)**Letter to School District Superintendents**

March 15, 2009

School Division Name
Superintendent's Name
Address
City, State ZIP

Subject: Permission to administer survey to Dual Enrollment students.

Dear (*Superintendent's Name*):

My name is Karen Carter and I am a Ph.D. candidate student with Old Dominion University currently doing research for my dissertation entitled *The Efficacy of Dual Enrollment in Rural Southwest Virginia*. This research will focus upon junior and senior career and technical students who are currently dual enrolled within their career pathway.

With your permission, career and technical education dual enrollment students will be asked to complete a survey. The survey has questions regarding student demographics, enrollment, teacher, and workforce development motivations as factors in their decision to enroll in the dual enrollment program. The focus of the research is to determine if participating in the dual enrollment program has affected their outlook to continue into postsecondary education as well as their workforce development. The survey may take approximately 25 minutes to complete. It will be in written format thus requiring no electronic media or accessibility. Student responses will help provide useful information about the effectiveness of the dual enrollment program for rural areas.

Student participation in this study is voluntary. I will personally be available for the administering and completion of the survey. All of the results of this study will be kept confidential and the results and information in this study will not be released in any way that may reveal the identification of participants without the participants' lawful agreement.

Thank you for your time and attention to allowing permission to survey the students of (*enter name of CTE center*). I look forward to hearing from you.

Sincerely yours,

Karen G. Carter
Ph.D. Candidate
Old Dominion University
kcart021@odu.edu
(276)346.0299

(Appendix F)
**Dual Enrollment
Student Survey Protocol**

Brief explanation of the purpose of the survey (to be shared with the students):

Schedule survey appointments with each county's superintendent and career and technical center's principal. There are four counties (Lee, Scott, Wise, and Dickenson) contacted first by letter, then follow by telephone contact to set the date in which each career and technical center would be visited in order to administer the survey. The surveyor will contact each career and technical school one week in advance to confirm the appointment.

Introduction – Assumes that a prior contact has been made and the principal, instructors, and students are willing to be surveyed regarding involvement in and with dual enrollment courses. Thank you for agreeing to be surveyed about your dual enrollment experiences. The information gathered today will be used as research data for my dissertation with Old Dominion University this spring. For my study, I will be exploring a clearer explanation of the mechanisms through which dual enrollment can effectively help average achieving students gain greater access to college. You were selected because of your association with the dual enrollment program and appreciate your willingness to share your experiences.

At any time during the survey, please let me know if you need more information about a question or if you do not wish to answer a question. Your name will not be recorded or associated with any of your answers. No one else will have access to the data from this survey, and the data itself will be destroyed upon completion of the study. Participation in this study will have no impact on your grade in any dual enrollment course, and I will keep all information confidential.

Purpose: The problem of this study is to determine the efficacy of dual enrollment as a credit-based transition program mechanism in helping middle and lower achieving students located in rural southwest Virginia gain greater access to college and workforce development skills.

Directions: Please read each question and as you read think about the motivational factors (teacher, guidance counselors, or parents) behind your decision to enroll into the dual enrollment program. There will be questions about your educational and career plans. Answer these with your current plans in mind. It is asked that you answer each question truthfully. If you do not understand a question, please raise your hand and I will be happy to assist. Taking this survey is completely voluntary as described in the consent forms and has no impact upon your grade or standing within the dual enrollment program. You have the option of not completing the survey if you so choose. All information gathered today is complete confidential, will not be shared with anyone, and will be maintained in a locked filing cabinet until the completion of this study upon which time all data will be destroyed. Thank you for your cooperation and willingness to be a part of this study.

Do you have any questions before we get started?

VITA

Karen Glass Carter

Route 4, Box 4852
Jonesville, VA 24263

(276) 346-0299
kcart021@odu.edu

EDUCATION

- Ph.D. in Education, Occupational and Technical Studies Concentration, Old Dominion University, Norfolk, Virginia, 2009.
- M. S. in Management of Information Science, Bowie State University, Bowie, Maryland, Rota, Spain Campus conducted by University of Maryland, 1999.
- B. S. in Business Education, Radford University, Radford, Virginia, 1988.

EXPERIENCE

Instructional Technologist, Lincoln Memorial University, Harrogate, Tennessee, October 2008 – Present.

Dual Enrollment/Governor's School Coordinator, Mountain Empire Community College, Office of Vice-President of Academic and Student Affairs, Big Stone Gap, Virginia, October 2006 – October 2008.

GRANT EXPERIENCE

Administer the Virginia's Department of Education Gifted and Talented \$33,000 grant for the development, monitoring, and reporting of the Governor's School budgetary items to Wise County School Board, Virginia Department of Education, and Mountain Empire Community College 2006 – 2008.

PUBLICATIONS

Carter, K. (2009). Book Review: *A Whole New Mind: Why Right-Brainers Will Rule the Future* by Pink, Daniel H. (2006). New York, NY Penguin Group (USA) Inc. in *Journal for Workforce Education* (1)2, 30-33.

PRESENTATIONS

Carter, K. (2009, October 17). *Taking Note with OneNote 2007*. Appalachian College Association Education Summit 2009, Abington, Virginia.

HONORS

- Old Dominion University's Occupational Technology Education Dissertation Fellowship 2007-08 recipient.

- Virginia Workforce Development Services Chancellor's Award Outstanding Trainer/Instructor, recipient, May 2006.
- VCCA Virginia Master Teacher Seminar scholarship recipient, July, 2004.

ORGANIZATION MEMBERSHIPS

- American Career and Technical Education Association
- Epsilon Pi Tau Honor Society
- Golden Key Society
- International Technology Education Association
- Iota Lambda Sigma Honor Society
- National Career Pathways Network
- Virginia Technology Education Association

RESEARCH INTERESTS

I have interests in best practices of how P-16 education levels will integrate curriculum avenues that include Career Pathways, STEM resources, and workplace skills readiness. Additionally, my interests lay in increased opportunities of access to a post-secondary education or training can be made available to a wider range of students, especially those in rural America.

CURRENT RESEARCH

Currently researching factors associated with the assessment of district-level school board effectiveness. This study is based upon completed surveys from Tennessee statewide district level school boards to ascertain what factors, if any, boards utilize during the development of self-assessment procedures.

REFERENCES

John M. Ritz, Ed.D.
Old Dominion University
Darden College of Education
228 Education Building
Norfolk, Virginia 23529

Philip A. Reed, Ph.D.
Old Dominion University
Darden College of Education
228 Education Building
Norfolk, Virginia 23529

Sherilyn Emberton, Ed.D.
Lincoln Memorial University
Provost & VP Academic Affairs
6265 Cumberland Gap Parkway
Harrogate, Tennessee 32507

Gary Peevley, Ed.D.
Lincoln Memorial University
Moyers & Carter College of Education
6265 Cumberland Gap Parkway
Harrogate, Tennessee 32507