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THE RELATIONSHIP BETWEEN LOCAL WEALTH AND DUAL ENROLLMENT
PARTICIPATION IN VIRGINIA'S COMMUNITY COLLEGES: RURAL, URBAN,
AND SUBURBAN PATTERNS AND SUBSEQUENT POSTSECONDARY
ENROLLMENT STATUS

by

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A Dissertation Submitted to the Faculty of
Old Dominion University in Partial Fulfillment of the
Requirements for the Degree of

DOCTOR OF PHILOSOPHY
COMMUNITY COLLEGE LEADERSHIP
OLD DOMINION UNIVERSITY
May 2013

Approved by:

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ABSTRACT

LOCAL WEALTH AND DUAL ENROLLMENT PARTICIPATION IN VIRGINIA'S COMMUNITY COLLEGES: RURAL, URBAN, AND SUBURBAN PATTERNS AND SUBSEQUENT POSTSECONDARY ENROLLMENT STATUS

Ellen Richardson Davenport
Old Dominion University, 2013
Director: Mitchell R. Williams

In Virginia, the availability of dual enrollment classes for high school students has varied, depending on the interest of the local school division and the community college's president in whose service region the school division is located. HB 1184, which passed in the 2012 session of the Virginia General Assembly, stipulates that the opportunity must be available for all high school students throughout the Commonwealth to be able to participate in dual enrollment and either receive a Uniform Certificate of General Instruction or an associate degree. Utilizing data from 2006 dual enrollment students, this study's purpose was to determine if there is a relationship between the wealth of the locality in which each student's school division is located and the rate of dual enrollment participation in community colleges serving Virginia school divisions. Utilizing the composite index of local ability-to-pay, calculated every biennium by the Virginia Department of Education as a measure of local wealth to determine the state and local shares of mandated expenditures for K-12 public education, research questions measured whether local wealth influenced participation in dual enrollment. The relationships between local wealth and dual enrollment rate in urban, suburban, and rural school

divisions respectively were examined. Finally, local wealth was analyzed to determine if it was a statistically significant predictor of the rate of dually enrolled students who subsequently enrolled in a community college or in a four-year institution.

For the predictive models calculated, a linear relationship was not established between local wealth and dual enrollment participation. In addition, local wealth did not predict enrollment in a Virginia community college in the fall after the student's spring graduation from high school. There was a moderate relationship between local wealth and subsequent enrollment of dual enrollment students in a public or private four-year institution in the fall following spring graduation. Local wealth's moderate relationship to enrollment in a four-year institution after high school graduation indicates that some uniform model of cost-sharing between community colleges and local school divisions, and the state and local funding streams that support them, should be investigated.

This dissertation is dedicated to my family. I thank all of them—my husband, Jack, my daughters, Alice and Julia, and my parents, Nell and Barrett Richardson, for their encouragement and support during the last five years.

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CHAPTER I: INTRODUCTION

Statement of Problem

The rapidly changing global marketplace requires more education than ever before. Because of this, young people must have the opportunity to further their education beyond high school. Research in the United States has led to the conclusion that the U. S. will no longer be competitive in the global marketplace unless American postsecondary education levels begin to increase (Katsinas, D'Amico, & Friedel, 2011).

Other countries are now educating a higher percentage of their citizens to more advanced levels than is occurring in the United States (U. S. Department of Education, 2006). According to the Organization for Economic Cooperation and Development, the United States ranked first in the world thirty 30 years ago in the percentage of 25-to 34-year olds with at least a two-year degree. In 2009, the United States was fifteenth among the countries measured, with Korea, Canada, Japan, and Russia leading the list of countries ahead of the United States in educational attainment (Wessel & Banchemo, 2012). President Barack Obama has promised to change that trend, vowing that the United States will once again have the highest proportion of college graduates in the world by 2020 (Greene, 2009). Citing the disparity in educational attainment between the U.S. and other countries, Governor Robert McDonnell of Virginia, as one of his first acts after assuming office, established the Commission on Higher Education Reform, Innovation, and Investment, in order to develop a strategy leading to the issuance of 100,000 cumulative additional associate and bachelor's degrees by 2025 (Executive Order No. 9, 2010).

One of the problems cited which has contributed to the decline in postsecondary education on a national scale in the United States is that many public school systems and their leadership teams do not view that preparation of all pupils for postsecondary education is their responsibility (U. S. Department of Education, 2006). In Virginia alone, approximately 10,000 students per year drop out of high school (Kapsidelis, 2008). Kirst and Venezia (2004) suggested that the separate and distinct systems of secondary and postsecondary education in the United States create a significant barrier for students moving from high school to college.

A practice that is gaining momentum which enables a broad range of students not only to complete high school on time but also to receive credit toward some kind of postsecondary credential is dual enrollment (Edwards, Hughes & Weisberg, 2011). Dual enrollment is defined as a program that allows high school students to enroll in college courses and is also called dual credit, concurrent enrollment, college in the high school, and joint enrollment (Hoffman, Vargas, & Santos, 2008). Dual enrollment is intended to foster a collaborative partnership between high schools and their local community college (Virginia Community College System [VCCS], February, 2012). Although establishment of dual enrollment programs is complex with “multiple school districts feeding into a fewer number of community colleges” and formal agreements being required to implement dual enrollment arrangements, initiatives throughout the country to expand dual enrollment programs have continued in recent years (Cohen and Brawer, 2008).

The need to provide low-cost, quality higher education is more acute than ever (Friedman, 2012). By receiving college credit while in high school, students save their families and the state money. One of the documented barriers to higher education has

been the cost, which in recent years has further denied access to students (Hendrick, Hightower & Gregory, 2006). It has also meant that postsecondary education has been able to provide less and less of the skills that employers demand (Katsinas, D'Amico, & Friedel, 2011). Research to date has documented that the total amount of outstanding student debt in the United States now eclipses the total amount owed on credit cards, with \$828 billion owed in credit card debt and \$850 billion owed in student loans (Tompson, 2010). The average debt load for a college student today is \$23,186, and two-thirds of college students borrow to pay for college (Chaker, 2009). Student debt even became a focus of the 2012 presidential campaign between Barack Obama and Mitt Romney (Nelson, 2012). There is now a wave of public perception that costs for higher education are escalating at an unpredictable, runaway rate and rival the trend that has occurred for health care costs (Nelson, 2012).

Background of the Study

As Dr. Glenn DuBois, the Chancellor of the Virginia Community College System has said repeatedly in front of various audiences, “twelfth grade is no longer the finish line” (VCCS, 2011). Indeed, the importance of achieving a postsecondary high school credential is increasingly important. Dual enrollment allows qualified high school students to enroll in college coursework while still in high school. By taking a dual enrollment class, the student receives both high school credit toward achievement of the high school diploma and college credit which can count toward attainment of a community college associate degree or a four-year college baccalaureate degree. Dual enrollment students are one of the fastest growing segments of the higher education population (Hoffman, Vargas, & Santos, 2008). The course content in a dual enrollment

class is the same as the course content of a traditional college course (Schmidt, 2010). Course offerings may include both transfer courses and career and technical education courses. Courses are taught by faculty who meet the credential requirements of regional accrediting organizations, courses follow college course syllabi, and admissions for students reflect the current admission standards at community colleges (Catron, 2001; Schmidt, 2010).

Brief history of dual enrollment in Virginia.

The Virginia Community College System has taken the lead to develop collaborative relationships with local high schools in order to offer academically prepared high school students with the opportunity to earn high school and college credits concurrently through a program known as dual enrollment. The *Virginia Plan for Dual Enrollment* was developed by the Virginia Secretary of Education, the Virginia Superintendent of Public Instruction, and the Chancellor of the Virginia Community College System in 1988 to govern partnership agreements between public schools and community colleges in Virginia; this document outlined basic parameters for dual enrollment program offerings but left the authority for implementing the plan to each of the 23 community colleges (Catron, 2001). High school juniors and seniors are eligible for participation in dual enrollment as long as they meet college placement requirements and receive the recommendation of a high school official. Home schooled students are also eligible (Schmidt, 2010).

The impetus for a dual enrollment relationship between public schools and colleges in Virginia was derived from the increased emphasis on articulation between public schools and colleges during the 1980s (Catron, 2001). At that time, public schools

were implementing 2 + 2 programs which established agreed-upon curricula to allow students to complete two years of a vocational degree in high school and the subsequent two years at a community college (Catron, 2001). Community colleges became the logical partner to offer dual enrollment because of their presence throughout the Commonwealth of Virginia in 23 locations.

Dual enrollment patterns and landscape.

There were 12,267 students in dual enrollment programs at Virginia's community colleges during the 2005-2006 academic year (VCCS, February 2012). In 2009-2010, over 30,000 students participated in dual enrollment, a 16,000 student increase since 2003-2004 (Schmidt, 2010). Since 2003, the number of high school seniors in dual enrollment has increased 63% (VCCS, February 2012). A study of 2007-2009 dual enrolled seniors identified that one in ten had accumulated more than 24 credits and one in 20 had accumulated more than 36 credits; moreover, two out of three dual enrolled seniors were enrolled in a transfer curriculum (Schmidt, 2010).

House Bill 1184, which passed in the 2012 session of the Virginia General Assembly, stipulates that the opportunity must be available for all high school students throughout the Commonwealth of Virginia to be able to participate in dual enrollment and receive either a Uniform Certificate of General Instruction or an associate degree (Legislative Information System, 2012). At the time of the bill's passage, all school divisions did not participate in dual enrollment (S. Wood, personal communication, March 13, 2012). Research conducted by the Virginia Department of Planning and Budget as background for the legislation prior to it being heard in committee and debated by legislators revealed that dual enrollment participation appeared to be more established

and available in school jurisdictions in rural and economically disadvantaged parts of Virginia than in school divisions with a more affluent local population.

Benefits of dual enrollment include students entering college with accumulated credits, therefore saving college tuition costs. In addition, students gain an understanding of the rigors of college work while still in high school. Students may also be exposed to career and technical training while still in high school through dual enrollment. The senior high school year becomes more meaningful with the enrollment in college courses (Schmidt, 2010). Another advantage is that there are improved communications between secondary and postsecondary institutions.

At the present time, the availability of dual enrollment classes for high school students has varied, depending on the interest of the local school division and the community college's service region in which the school division is contained. Research conducted by the VCCS in February 2012 concluded that community colleges offering dual enrollment to high schools in rural areas in 2006 had a higher concentration of dual enrollment participation than community colleges serving students in urban or suburban regions (VCCS, February, 2012).

Funding environment.

Both community colleges and local school divisions in Virginia receive funding from state and local sources. Community colleges' operating funding in Virginia is primarily derived from state general fund appropriations and tuition (VCCS, 2010). The state general funds are distributed in one lump sum amount to the Chancellor of the Virginia Community College System and the individual college allocations are determined by an internal formula which takes into account enrollment and efficiency

factors (K. Petersen, personal communication, March 30, 2011). Financial support to each college from local governing bodies is negotiated individually between each college president and the local governments in the college's service region.

Elementary and secondary public education in Virginia is funded by a combination of local, state, and federal funds (Joint Legislative Audit and Review Commission [JLARC], 2002) with the local funding largely dependent on local fiscal capacity and tax effort (Salmon, 2011). According to Mary Jo Fields, director of research for the Virginia Municipal League, "school divisions in Virginia receive the bulk of their operating funding from the Commonwealth of Virginia and from the local governing body in which the school division is located." With the exception of three joint school divisions which contain students from contiguous localities, every school division in Virginia shares the same geographic boundaries as the locality which provides the local funding (M. J. Fields, personal communication, May 12, 2012). The minimum required local funding is determined every biennium by a calculation driven by the "composite index of local ability-to-pay" measure (Virginia Department of Education, 2012a). The composite index is applied to a prescribed cost of education to determine the apportionment of education costs between the state and the local school division. Since school divisions in Virginia are not fiscally autonomous (i.e., school boards which govern school divisions do not have taxing authority nor the authority to issue debt), the local governing body appropriates the local match as required by the formula and often provides additional funding beyond the requirement. Therefore, the funding to support dual enrollment can be reliant on the local government's tax base and local wealth.

In Virginia, both the high school and their community college partner receive funding from the state for dual enrollment students through average daily membership (ADM) formulas and full-time equivalents (FTE) (Westcott, 2009). An analysis has not been conducted on the varying financial agreements that currently exist with regard to which party pays for dual enrollment. The entire cost to provide dual enrollment may be shared between the school division, the student's family, and the community college. In some instances, the school division absorbs the cost of dual enrollment; in other cases, the school division passes along some or all of the costs to the student's family. Another practice has been for colleges to provide the dual enrollment classes at no charge to the school division or the family.

The variety of financial arrangements in Virginia is not unusual compared to a review of policies in other states. Karp, Bailey, Hughes and Fermin in 2005 (as cited in Cohen and Brawer, 2008) described a variety of practices to share the cost of dual enrollment between students, school districts, community colleges, and the state in which the dual enrollment arrangements were being offered. In a guide written for state policymakers who are considering implementation or expansion of dual enrollment, Hoffman, Vargas and Santos (2008) recommend waiving or discounting tuition for dual enrollees.

Purpose Statement

The purpose of this quantitative, ex post facto study was to determine if there is a relationship between the wealth of the locality in which each student's school division is located and the rate of dual enrollment participation in community colleges serving Virginia school divisions. Utilizing the composite index of local ability-to-pay, calculated

every biennium by the Virginia Department of Education as a measure of local wealth to determine the state and local shares of mandated expenditures for K-12 public education, research questions were designed to measure whether local wealth influenced participation in dual enrollment. The relationships between local wealth and dual enrollment rate in urban, suburban, and rural school divisions respectively were examined. Finally, local wealth was analyzed to determine if it was a statistically significant predictor of the rate of dually enrolled students who subsequently enrolled in a community college or in a four-year institution.

Research Questions

The study was guided by the following research questions:

1. Is there a predictive relationship between local wealth and the rate of student participation in dual enrollment programs at school divisions in Virginia?
2. Is there a predictive relationship between local wealth and the rate of student participation in dual enrollment programs at school divisions in Virginia by jurisdiction?
 - 2(a) Is there a predictive relationship between local wealth and the rate of student participation in dual enrollment programs at urban school divisions?
 - 2(b) Is there a predictive relationship between local wealth and the rate of student participation in dual enrollment programs at suburban school divisions?
 - 2(c) Is there a predictive relationship between local wealth and the rate of student participation in dual enrollment programs at rural school divisions?
3. Is there a predictive relationship between local wealth and the rate of enrollment in community colleges for dual enrollment participants at school divisions in Virginia?

4. Is there a predictive relationship between local wealth and the rate of enrollment in four-year institutions for dual enrollment participants at school divisions in Virginia?

Professional Significance

The study will have significance to community college leaders and policy-makers. Should local wealth predict dual enrollment participation, public policy measures could be considered so that local wealth is taken into consideration in determining dual enrollment pricing. In addition, local wealth could be utilized as a factor to devising funding formulas to make dual enrollment a more widespread option for students in less wealthy jurisdictions. The study could also illuminate that the composite index has implications beyond public K-12 funding and is a significant determining factor for enrollment and success in higher education in the Commonwealth of Virginia. The findings of the study will help community college leaders when making decisions about resource appropriation to expand dual enrollment participation. Since increasing participation in postsecondary education in Virginia and in the United States is a goal, findings to expand affordable access to higher education through programs such as dual enrollment should be noteworthy.

Overview of the Methodology

The research perspective was quantitative. Kumar (2005) noted that a quantitative structured methodology is appropriate in determining the extent and variation of a phenomenon such as the effect of local wealth on dual enrollment participation which will be measured in this study.

The study utilized three sources of ex post facto data. Ex post facto, or “after the fact,” data means that the data have already been collected and there is not a need for the

researcher to collect new data. Ex post facto research is a non-experimental effort to investigate the possible cause-and-effect relationship between the independent variable(s) and the dependent variable(s) (Creswell, 2003; Kumar, 2005). This view concurred with that of Cohen, Manion, and Morrison (2007) who explained ex post facto research as searching back in time for the possible factors seemingly associated with certain occurrences.

The source for local wealth data from the 2004-2006 biennium as measured and determined by the composite index of local ability-to-pay was obtained from the website of the Virginia Department of Education. The source for dual enrollment and postsecondary enrollment data was obtained from the Department of Academic Services and Research at the Virginia Community College System; postsecondary enrollment data originated from the National Student Clearinghouse. The source for school division codes was obtained from the website of the National Center for Education Statistics.

The composite index is considered to be a measure of local wealth which is utilized to calculate the state and local required shares of budgets for school divisions in the Commonwealth of Virginia. Composite index data was analyzed with dual enrollment participation data by school division and by urban, suburban, and rural categories. The composite index data was collected from the Commonwealth of Virginia's Department of Education and the Superintendent of Public Instruction's web site. Data elements in the calculation of the composite index include school division's average daily membership, local and state population, the local and state true assessed value of real estate, local and state adjusted gross income, and local and state taxable retail sales. Dual enrollment participation data from the 2004-2006 biennium was

obtained from the Virginia Community College System's Office of Institutional Effectiveness within the Department of Academic Services and Research which purchased the data from the National Student Clearinghouse.

Delimitations

The research perspective was quantitative. The study was conducted utilizing the 2004-2006 composite index of local ability-to-pay values from the Virginia Department of Education, dual enrollment data obtained from the Department of Academic Services and Research at the Virginia Community College System, and postsecondary enrollment data from the National Student Clearinghouse obtained through the Department of Academic Services and Research at the Virginia Community College System. The researcher chose to study dual enrollment students and the related composite index data because the data was already available and preceded the 2012 legislation which requires that dual enrollment be available to students in every high school in Virginia and that every school division have signed dual enrollment agreements with the community college serving their jurisdiction by April 15, 2013. New data was not collected.

Definition of Key Terms

The following key terms will be used during this research study:

Average daily membership is the total aggregate daily membership divided by the number of days school was in session from the first day of the school term through the last school day in March of every year (VDOE, 2012b).

Community college is an accredited institution of higher education that awards certificates and associate degrees (Vaughan, 2006).

Composite index is a formula which determines a school division's ability to pay education costs which are fundamental to the Commonwealth of Virginia's Standards of Quality (SOQ). The composite index is calculated using three indicators of a locality's ability to pay: true value of real property (weighted 50%), adjusted gross income (weighted 40%), and taxable retail sales (weighted 10%). Each locality's index is adjusted to maintain an overall statewide local share of 45% and an overall state share of 55% (Virginia Department of Education, 2012a). (See Appendix A for list of school divisions and 2004-2006 composite index values and Appendix B for formula computation).

Degree is an academic award given by a college to a student who has completed the required course of study.

Dual enrollment is a program which permits high school students to enroll in college courses. It is also called dual credit, concurrent enrollment, college in the high school, and joint enrollment (Hoffman, Vargas, & Santos, 2008).

Full Time Equivalent (FTE) is a standard measure for identifying student enrollment. An FTE is typically a formula based on the total number of credit hours being taken by a student body divided by what is considered to be a full-time, credit-hour load.

Funding formula is a tool utilized to substantiate the acquisition of public funds and delineate the cost of education. It is a method of allocation that allows the allocation of public resources (Mullin & Honeyman, 2007).

Governor's Commission on Higher Education is the Commission on Higher Education Reform, Innovation, and Investment appointed by Governor Robert F.

McDonnell of the Commonwealth of Virginia in March, 2010. The Commission began its work in July 2010 and issued its final report in October 2011 (Executive Order No. 9, 2010).

Tuition is the fee (charge) to a student for attending a postsecondary educational institution. Typically, the charge for tuition is calculated based on the credit hours in which a student is enrolled during a specific term (semester).

State general fund appropriations are funds received by a governmental entity, university, or college through the budgetary process of the state legislature.

Under-represented populations is a term describing students who meet at least one of the following criteria: *location*—live in localities with lower higher education participation rates; *low income*—recipients of Pell financial aid awards; *first generation*—first in their family to attend college; and/or of minority race or ethnicity.

Summary

The remainder of the study will be organized into four additional chapters, a bibliography, and appendixes in the following manner. Chapter Two will present a review of the related literature dealing with evolving trends in dual enrollment practices nationally and the economic, social, and political factors which have led to increased emphasis on dual enrollment around the United States. Review of the literature with regard to the rising cost of higher education, the financial aid crisis, and the public demand for accountability will be included. Chapter Two will also contain a discussion of the public K-12 funding formula in Virginia, the role of the local composite index, and a description of each data element in the composite index. Chapter Three will delineate the research design and methodology of the study. An analysis of the data and a

discussion of the findings are to be presented in Chapter Four. Chapter Five will contain the summary, conclusions, and recommendations of the study. The study will conclude with a bibliography and appendixes.

CHAPTER II: LITERATURE REVIEW

Community colleges are the entry point for many students seeking bachelor's degrees. Dual enrollment programs offered through community colleges represent a proven path to transition students successfully between high school and college and to steer them toward attainment of a postsecondary degree. Forty states now have policies, regulations, or funding initiatives to support college access while in high school (Abell Foundation, 2007).

By offering college-level classes to high school students in a high school setting, students get an accelerated start on college. Dual enrollment serves to increase access to education and promotes collaboration with public school systems and has been adopted as a key initiative by community college systems across the United States (Allen & Dadgar, 2012). Dual enrollment has also provided postsecondary access to students who may not be the top achievers in their high school or who are at risk of dropping out of high school (Abell Foundation, 2007). The programs for high school students to receive college credit in their high schools through dual enrollment are available in high schools that are not necessarily located in wealthy jurisdictions nor comprised of students who are primarily from wealthy families (Hoffman, 2003). Other opportunities for high-achieving students in high school have traditionally included Advanced Placement (AP) classes and International Baccalaureate (IB) programs.

A study of college readiness in the Commonwealth of Virginia concluded that an increased level of collaboration between local school divisions and their local community college was warranted so that the number of under-prepared students entering

postsecondary education would decrease (Schmidt, Jovanovich & Downing, 2007).

Collaboration between the VCCS, the Virginia Department of Education, and local public school divisions was recommended for a broader, long-term, ongoing remediation study.

Based on placement tests administered between 2003 and 2006, almost 80% of public high school graduates who entered the Virginia Community College System in those years needed remediation in math and 40% needed remediation in reading and writing (Schmidt et al., 2007). These statistics have also led to recent re-engineering efforts at the Virginia Community College System to redesign developmental math and developmental reading and writing. Dual enrollment participation in high school has shown demonstrable success in preparing students for college (Ward & Vargas, 2012).

Method of the Literature Review

The literature review provides a foundation for examining dual enrollment programs offered by community colleges, the funding of these dual enrollment programs, the integration and association between secondary schools and community colleges, and the pathways of students between secondary schools and community college. Previous research on the broad topic of funding and dual enrollment participation is limited. The only research that has linked dual enrollment funding to dual enrollment participation was conducted in Florida by Erika Hunt (2007) and examined the extent to which state funding for dual enrollment influenced participation. Hunt's qualitative study, which consisted of document analysis and semi-structured interviewing, concluded that financial incentives did have an effect on dual enrollment participation. Hunt concluded that Florida's approach of funding dual enrollment students through community colleges

on a full-time equivalent (FTE) basis and through the school division on an average daily attendance (ADA) basis should be continued (Hunt, 2007).

The first focus of the literature review involved the examination of the public and private value of higher education by exploring the national landscape for degree attainment. This exploration included not only a comparison of the competitive position of the United States relative to other industrialized countries but also a review of human capital theory which links productivity and educational attainment as a means to increase human capital. A portion of this overview captured the role of the American community college in providing affordable access to higher education. The second focus analyzed and provided an in-depth discussion of obstacles that students may face in completing their degrees, including a discussion of the lack of preparation in students' secondary school environment, public school funding disparity issues, and P-16 trends. A third focus involved the current spotlight on affordability, trends in public higher education funding and public expectations of transparency and accountability. A fourth area focused on the Commonwealth of Virginia and public higher education and K-12 funding formulas, including an extensive description of the composite index of local ability-to-pay. The fifth section involves an exploration of dual enrollment.

Theoretical framework.

An instrumental guide for the beginning of the review of the literature and the initiation of the fifth section on dual enrollment was Catron's *Dual Enrollment in Virginia*, published in 2001. Kirst and Venezia's *From High School to College: Improving Opportunities for Success in Postsecondary Education* was also a seminal work which contained multiple case studies on the challenges faced by high school

students as they transition to college. A review of this work led to meaningful avenues to explore additional research studies.

An examination of documents dating to 1984 in the archives of the State Council of Higher Education in Virginia formed the basis for background in the origins of higher education public finance in the Commonwealth of Virginia. Communications with state and local officials familiar with both higher education and K-12 public finance supplemented these documents.

The ERIC database was used extensively to search for studies for this review. Studies included in this literature review included research studies dated 1998 through 2013 using a combination of search terms such as: (a) dual enrollment, (b) dual credit, (c) community college, (d) funding formulas, (e) school funding, (f) school finance, and (g) school equity. Other sources included policy briefs from the Education Commission of the States, the National Center for Public Policy and Higher Education, the National Center for Higher Education Management Systems, the American Association of State Colleges and Universities, and Jobs for the Future. Other resources used were educational texts and policy studies, as well as previously authored literature reviews.

The National Landscape for Degree Attainment

Comparative position of the United States.

Rapid changes in the global economy have made it increasingly important for individuals to achieve more education. In a report issued in 2011 based upon 2009 data, the Organization for Economic Cooperation and Development (OECD) listed the United States as fifteenth among all countries measured in the percentage of 25- to 34-year olds with at least a two-year degree. In 1979, the United States had ranked first in the world

in the same category (Organization for Economic Cooperation and Development [OECD], 2011; Wessel & Banchero, 2012). Researchers have concluded that there is mounting evidence that the United States will no longer be competitive in the global marketplace unless American students increase their postsecondary educational attainment beyond the level identified in the OECD report (Katsinas, D'Amico, & Friedel, 2011).

Both the President of the United States and the Governor of Virginia have promised to reverse the trend of America's secondary educational attainment position compared to the rest of the world. President Barack Obama has vowed that the United States will once again have the highest proportion of college graduates in the world by 2020 (Greene, 2009). Virginia Governor Robert McDonnell, as one of his first acts after assuming office, established the Commission on Higher Education Reform, Innovation and Investment in order to develop a strategy leading to the issuance of 100,000 cumulative additional associate and bachelor's degrees by 2025 (Executive Order No. 9, 2010). McDonnell cited the disparity in educational attainment between the U. S. and other countries as his motive for creating the Commission.

For the past 20 years, only 30% of the U. S. population has earned a four-year degree, and the inability to expand the college-educated workforce has alarmed employers who need highly skilled workers (Abell Foundation, 2007). As a result, there is a heightened emphasis among policy makers and educators to determine how to strengthen the connection between high school and college and to consider programs such as dual enrollment so that more students enter the postsecondary education pipeline.

Public and private benefits of higher education.

Historical perspective.

A wide range of public and private benefits are believed to be derived from higher education. Private economic benefits refer to monetary benefits which accrue to individuals resulting from their participation in higher education (Institute for Higher Education Policy, 1998, Leslie & Brinkman, 1988). The benefits may include direct financial gains which are measured by increases in earnings. These “wage premiums” can be directly attributed to additional levels of higher education. Studies of the benefits of higher education have found that, although the cost of education is higher than it was three decades ago, there is private economic benefit that is derived from earning a postsecondary diploma (Vedder, 2004).

Additional public benefits of higher education beyond the private benefits of financial gain and economic success have been found. The OECD (2011) documented the social outcomes of education which provide a public benefit. The study found that adults aged 25 to 64 with higher levels of educational attainment are more satisfied with life, are more engaged in society, and are likely to report that they are in good health. A body of literature also exists which suggests that education is positively associated with a variety of social outcomes including better health, stronger civic engagement, and reduced crime. Grossman (2006) suggested that education has a positive causal effect on these social outcomes. Education can also be a relatively cost-effective means to improve health and reduce crime (Lochner and Moretti, 2004) as well as improve civic engagement (OECD, 2011). A similar view was found by Rephann, Knapp, and Shobe (2009), who listed improved community productivity, higher community educational

attainment, better community health, lower crime, and greater social engagement as social benefits of higher education. These researchers estimated that total annual lifetime savings for public assistance, Medicaid, unemployment compensation, workers compensation, and corrections costs amounted to \$16,027 for an associate degree holder and \$22,548 for a bachelor's degree holder in terms of present value. Approximately \$350 million in state and local government expenditures would be saved as a result of the additional education received by public higher education degree holders in FY 2007 who continued to reside in Virginia for their lives; a total of \$358 million in savings for state and local government expenditures would result if there were 70,000 more degrees issued between 2010 and 2020 (Rephann et al., 2009).

By espousing the values of open access and high-quality education, the community college contributes to society and to human capital development (Laanan, Hardy, & Katsinas, 2006). Herndon (2008) concluded that increases in state spending per capita on public and private higher education predict the formation of additional human capital and increases in human capital lead to increases in productivity, which, in turn, lead to economic growth.

The role of community colleges.

Community colleges are the only distinctly American form of higher education (Mellow & Heelan, 2008) and have a unique mission and philosophy. Their mission is to provide open and affordable access to postsecondary education and other services, leading to stronger and more vital communities (Vaughan, 2006). One of the most important roles of a community college today is educating the citizens in its service region to be able to thrive and compete in the global economy. Americans can no longer

count on staying with an employer for their entire working career. In fact, the concept of “lifetime employment” rarely, if ever, exists anymore in the world identified by Friedman as “flat” (Friedman, 2007). Workers will need to keep attending school over the course of their lives in order to keep up with the changes and demands of our global society. Community college leaders are at the forefront in identifying economic and employment trends. By identifying these trends, they can make adjustments to curriculum and program offerings in order to provide the best educational choice to the residents of the community that they serve. Community colleges are not a “one-size-fits all” institution, as each college is continually adjusting to the needs of the residents it serves, local employers, and the global economy.

Community college enrollments have rapidly increased in the past four years. The number of students enrolled in credit-bearing courses at community colleges in the fall of 2009 increased by 11.4% from the previous fall and 16.9% from the fall of 2007 and full-time enrollment at community colleges in the United States increased 24.1% from the fall 2007 to the fall of 2009 (American Association of Community Colleges [AACC], 2009). By 2014, the National Center for Education Statistics (NCES) estimates that 7,398,000 students will be enrolled in community colleges, representing 44.9% of all higher education undergraduate enrollments (Tollefson, 2009).

Respondents to a survey conducted by the American Association of Community Colleges in October and November of 2009 identified four factors contributing to the unprecedented enrollment increase. One of the factors noted was the cost savings associated with community colleges; the limited financial resources of once fiscally secure families made community colleges a much more viable option because of lower

tuition and fees (AACC, 2009). Community college enrollments tend to rise as the unemployment rate goes up (EdSource, 2009). Banjo (2008) held that a declining economy makes community colleges a more viable option for fiscally stressed families. Enrollment caps and increased tuition at public universities are also pushing students to community colleges (Katsinas, Tollefson, & Reamey, 2008).

Increases in public support have not accompanied the enrollment growth, however. During the same period of time, community colleges in states with community college funding formulas did not receive full funding (Katsinas et al., 2008). Public support of community colleges has been scrutinized more carefully and more accountability for the expenditures has been demanded. Even in states where legislatures attempted to fund additional enrollment growth, the amount appropriated was well below actual enrollment increases (EdSource, 2009). The combined factors of higher enrollment growth and declining state support have led to higher community college tuition (Katsinas, Tollefson, & Reamey, 2008). These factors have also threatened the traditional open door policy of public community colleges (Hendrick, Hightower, & Gregory, 2006).

Dedication to the community.

A distinctive feature of community colleges is proximity to the students that are served and the dedication to meet not only their educational needs but often recreational, social, and cultural needs as well. A community college is within commuting distance of most Americans and is established to meet the needs of the population in a designated geographic area (Vaughan, 2006). Since community colleges have service regions that cover virtually every square inch of the country, they have a local orientation which

makes them unique in postsecondary education and have a strong commitment to their community (Mullin & Phillippe, 2013). Community college leaders do not operate in the context of an insular academic environment but frequently interact with the political and business leaders in the community in which the college is located. Community college leaders actively engage in the state and national debate on the trends affecting higher education in general and community colleges in particular.

Open and increased access.

Open access to higher education is the hallmark of the American community college system and it is essential to the mission of every single community college (Vaughan, 2006). In other words, every potential student who applies for admission is granted acceptance into a community college. Open access does not mean any student can enter any program without meeting the necessary prerequisites but that the initial barrier of getting into college is removed (Vaughan, 2006). Some students may want to ultimately obtain a bachelor's degree. They must qualify for a transfer track by taking some prerequisite courses such as college preparatory math in order to finish the first two years of a bachelor's degree at a community college before they transfer to a four-year institution. Other students may desire to obtain a workforce credential, specific vocational training, or may just need to take a class or two to improve their skills for their current job or to gain a skill for their next job.

Almost half of all college students in the United States now attend community colleges (Mellow & Heelan, 2008). Students from all ethnic, social, and economic backgrounds can attend community colleges, and no one is discriminated against in any academic program or service offered by the college. Community colleges serve a

disproportionate number of students from ethnic and racial minorities and a large majority of those from the lowest socio-economic quartile who access post-secondary education (Mellow & Heelan).

Community colleges have traditionally offered opportunities to non-traditional students including minorities, students who are the first generation in their family to attend college, and older students. Community colleges are the vehicle for greater educational attainment for the plurality of minority students and the majority of low-income students (Mullin & Phillippe, 2013). Many of the older students are already working and continue to be employed while enrolled at a community college. Over 44% of all African-American undergraduate students, 52% of all Hispanic undergraduate students, and 45% of all Asian/Pacific Islander undergraduate students attend community colleges (AACC, 2011). In 2012, community college student ethnicity included students of whom 16% were Hispanic, 14% were African-American, 6% were Asian-Pacific Islander, and 1% were Native American (AACC, 2012).

Forty-eight percent of community college students work at jobs to support their education (Draut, 2009). It is estimated that 21% of full-time community college students are working full-time and 59% of full-time community college students are working part-time (AACC, 2011). For part-time students, 40% are employed full-time and 47% are employed part-time (AACC, 2011).

Affordability.

National statistics indicate that a community college student pays \$2,963 annually in tuition and fees (AACC, 2012). Tuition and fees paid by a student attending a public,

four-year college or university are now more than double the cost, or \$8,244 per year at the present time (AACC, 2012).

The same pattern holds true in Virginia; community college tuition is less than half that of public, four-year institutions and the goal to maintain tuition at less than half of public, four-year institutions is outlined in the strategic plan of the Virginia Community College System, *Achieve 2015*. In FY 2013, average tuition and fees for a VCCS student was \$3,735 (VCCS, May 2012) compared with the \$9,919 cost of a public, four-year college or university (SCHEV, 2012). Tuition at the VCCS institutions represented 37.65 % of the average cost at a public, four-year institution (SCHEV, 2012).

Significant responsibility of community colleges.

It is important to establish public policies which make lifetime learning more attainable for more of the population. As Chancellor of the Virginia Community College System Glenn DuBois has said repeatedly in front of various audiences, “high school is no longer the finish line” (VCCS, 2011). Unfortunately, many high schools do not see that preparing students for postsecondary education as their responsibility (U. S. Department of Education, 2006). At least some college education has become the minimal entry requirement to the middle class and to a good job (Bailey & Morest, 2006).

Workers will need to keep attending school over the course of their lifetime in order to keep up with the changes and demands of our global society. The concept of life-long learning is still not fully embraced in the Commonwealth of Virginia or in the United States. Many times, the individuals who are in the most need of education are often the most resistant to continuing their education (Mellow & Heelan, 2008).

Bridging the gap between education and the skills that are necessary to succeed in the workplace requires alliances and partnerships with other schools, businesses, and corporations (Jones, 2002).

Other countries are now educating more of their citizens to more advanced levels than is occurring in the United States (U. S. Department of Education, 2006). In Virginia alone, approximately 10,000 students per year drop out of high school (Kapsidelis, 2008). One of the issues to be faced in Virginia, as well as throughout the United States, is that many public school systems and their leadership teams do not view that preparation of all pupils for postsecondary education is their responsibility (U. S. Department of Education, 2006). In addition to inadequate preparation from their high schools, one of the biggest barriers to students in accessing higher education is the cost. Measures to lower the cost for these students should be a public policy goal. (Callan, Ewell, Finney & Jones, 2007; SCHEV, 2009).

Obstacles to Degree Completion

Demographic trends.

Race, income, and family educational background are predictors of success in higher education (Hoffman, 2003). Students with college-educated parents are less likely to withdraw from college by their second year than are first-generation college students and students from upper-income families are seven times more likely than low-income students to earn a college degree by age 24 (Hoffman, 2003). Roy (2005) highlighted that there are great disparities in college completion based on socioeconomic data and that wealth makes a difference in a student's level of educational attainment. Dual enrollment programs are viewed as mechanisms for making access to postsecondary

education more equitable and increasing the likelihood that disadvantaged and academically disengaged students will be successful in college (Morest & Karp, 2006). Struhl and Vargas (2012) concluded that Texas high school students who completed college courses through dual enrollment were nearly 50 percent more likely to earn a college degree from a Texas college within six years than were students who had not participated in dual enrollment and that dual enrollees from low-income families were particularly more likely to attend a four-year college after high school.

Separate and distinct systems of secondary and postsecondary education.

Kirst and Venezia (2004) suggested that the separate and distinct systems of secondary and postsecondary education in the United States create a significant barrier for students to move from high school to college. Many states are now attempting to strengthen the connections between secondary and postsecondary education. High school reforms, including more standardized testing and measures which focus more on performance of schools and districts than on strengths and weaknesses of individual student learning, are becoming more and more prevalent and are considered a means of making secondary education more relevant for postsecondary purposes (Koretz, 2008). Dual enrollment programs, which allow students to engage in college-level work while still in high school, can promote student access to and success in college and may encourage students to enter into postsecondary education when they otherwise might have chosen to forego college (Morest & Karp, 2006).

Inequality of public school funding formulas.

Alan Odden, in a 1983 policy brief about public school funding inequality written for the Education Commission of the States entitled *School Finance Reform: Past,*

Present and Future, wrote that “finance policies must be linked specifically to quality improvements” (in education) (Odden in Education Commission of the States [ECS], 2012). Researchers and practitioners have long recognized that there is a relationship between education of students and how a state’s public school funding system is structured. Many officials cite their state’s K-12 funding formula and resulting allocation of resources to public education as a barrier for student success and a reason why students from wealthier jurisdictions are more prepared for college than students from less wealthy jurisdictions.

Chronology of public school funding formulas.

In the early 1900s, states distributed funding to school districts based on an equal dollar amount per student in each district, regardless of the district’s wealth or need (ECS, 2012). Since the same dollar amount was provided for each student, districts with greater funding needs such as having to accommodate students from low-income or special education backgrounds or school districts with lower ability to raise their own revenue to supplement the state money were on unequal footing. Recognition of the resulting inequalities gradually led state policymakers to revise their funding systems to take into account both a district’s funding need and local wealth. In the 1920s, states began to utilize a new education funding system known as “foundation formulas” which included both a standard amount per student and an additional amount of funding, allocated on a sliding scale basis, to account for inequalities in wealth (ECS, 2012). The formulas received an additional adjustment in the 1930s to address “at risk” students and students for whom English was not the primary language. In the 1950s, states became even more active participants in school funding when funding formulas began to direct

more money to school districts which had greater financial needs or other difficult-to-serve student populations such as special education students. Other refinements to state aid formulas for public school districts began anew in the 1960s to create greater equity among school districts.

During the 1980s, additional funding formula enhancements, such as differential amounts for regional costs, district size, and performance incentives, were introduced (ECS, 2012). The result is that school districts across the United States do not receive a set dollar amount per student but instead receive their funding based on a series of very complex formulas.

School funding litigation.

During the late 1960s and into the 1970s, several lawsuits were filed which challenged state funding formulas or the wide variations in per student funding that existed in some states. *Burruss v. Wilkinson* was filed in Virginia in 1968 in which plaintiffs representing local school districts complained about disparate and inadequate resources (Salmon, 2012). In the same year, the *Serrano v. Priest* case in California was filed on behalf of individuals in low-wealth districts who argued that their schools were unable to provide as good an education as students in wealthier districts because of the disparity in resources available from the local real property tax (Serrano v. Priest, 1971). In 1973, the Supreme Court ruled that education is not a fundamental right under the U. S. Constitution but is to be provided by the 50 states, which resulted in a rapid increase in court cases which challenged state methods of funding public schools. In *Scott v. Commonwealth* (1994), the plaintiffs sought a declaratory judgment that the current system of funding public elementary and secondary schools violated the Virginia

Constitution by denying some children "an educational opportunity substantially equal to that of children who attend[ed] public school in wealthier divisions; the Virginia Supreme Court ruled that education was a fundamental right under the state constitution, but that the state constitution does not require equality in funding or programs (Education Law Center, 443 S.E.2d 138 [1994] 2012). The Education Commission of the States (2012) reported that there have been lawsuits against state funding methods and formulas in 44 out of 50 states.

P-16 trends.

Since 2008, an increasing number of states have established P-16 Councils which are charged with coordinating policies and improving communication between school districts and colleges and universities in the state in which all of the entities are located. The trend to establish P-16 Councils began in 2001 and has been influenced by the national public school reform movement (Callan, Kirst, Shulock, Spence, Walsh, & Usdan, 2009). Also known as P-16 forums, the Councils facilitate collaboration among and between P-12 and postsecondary institutions (Callan et al., 2009). Thirty-eight states now have P-16 councils or governance structures that support that role according to "Diplomas Count," *Education Week's* June 2008 publication cited in Callan et al, 2009.

In 2005, former Virginia Governor Mark Warner appointed a P-16 Council to improve the connections and ease the transition among all sectors of education in the Commonwealth (National Governor's Association, 2006). The P-16 Council continued its work and its first report issued in October 2006 called for a substantial increase in postsecondary attendance rates, the alignment of graduation requirements from high school with entrance requirements for college, and establishment of a longitudinal data

base which will track students from high school to postsecondary education to employment. Governor Tim Kaine, who succeeded Warner, continued the P-16 Council after his inauguration in January of 2006. The work of the P-16 Council continues today under Governor Robert McDonnell, with the current emphasis being on the completion of the components of the longitudinal data base.

Callan et al (2009) concluded that state finance is underutilized to promote cooperation among secondary and postsecondary institutions in the P-16 continuum. States have not used financial incentives to promote P-16 alignment, and state funding for dual enrollment is used in only half of the states (Callan et al., 2009). A total of 27 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 (Boswell, 2001 in Hunt, 2007).

Cost and Affordability

History of community college funding patterns and public support.

Public support of higher education designated for community colleges may include state funds, direct or indirect revenue from local property taxes, other local tax revenue, and federal funds (Mullin & Honeyman, 2008). Proceeds from state lotteries are directed to higher education in at least 38 states (Tollefson, 2009). Tuition and student fees are not considered to be part of the definition of public support.

Funding formulas are tools utilized to substantiate the acquisition of public funds, delineate the cost of education, and allocate resources (Mullin & Honeyman, 2007). Funding formulas for community colleges exist in at least 40 of the 50 states (Katsinas et al., 2008; Mullin & Honeyman, 2008). In 24 of these states, community colleges have a

funding formula separate from other state public higher education entities (Mullin & Honeyman, 2008). The elements of funding formulas which support the community colleges vary from state to state (Zimmerman, 2010). The authority to develop and alter funding formulas resides with the state legislatures of each state which has a funding formula. The administration of the funds distributed through the funding formula typically rests with state departments of education, coordinating boards, boards of regents, and higher education commissions (Mullin & Honeyman, 2008). During the first half of the twentieth century, funding for two-year institutions was distributed by a formula emanating from a centralized state board on the basis of budget requests from the two-year institutions, or were financed by local property taxes and distributed by K-12 school districts alongside funding for secondary schools (Mullin & Honeyman, 2007). Tuition was another major source of funding for community colleges during this time (Pederson, 2005).

By 1956, three patterns of funding for community colleges emerged: direct appropriation from the state legislature, a flat grant in the form of a fixed amount per student, and a flat grant plus a minimum level of support (Mullin & Honeyman, 2007). A classification system was established by Wattenbarger and Starnes in 1976 consisting of four kinds of state support to community colleges. The four kinds of state support were negotiated budget funding, unit-rate formulas based upon operating costs, minimum foundation funding (which adjusted state funding based on local wealth) and cost-based program funding, which extended unit-rate formulas by aligning funding to various types of costs incurred by institutions such as instructional costs and facility costs (Mullin & Honeyman, 2007).

A study conducted in 2007 by Mullin and Honeyman of 48 states (excluding Louisiana and South Dakota) further explained previous community college funding models by identifying three categories and five subcategories. The main categories identified were: no formula, responsive funding, and functional component funding. The five subcategories were: cost of education funding, equalized funding, option funding (under the “responsive” category) and generalized funding and tiered funding (under the “functional component” category).

When the study was conducted, eight states had no funding formula. Alaska and Hawaii fell in this group; community colleges in Alaska and Hawaii are absorbed into the state university system (Mullin & Honeyman, 2007). The other six states had very low community college enrollments and so funding formulas were not utilized (Mullin & Honeyman, 2007).

Mullin and Honeyman in 2007 described responsive funding to include three subcategories which encompass both a base level of operating funding plus an additional component which acknowledged funding disparities. States that fell within this category were further divided into three subcategories: cost of education funding, equalized funding, and option funding.

- The cost of education funding model utilizes student enrollment and a basic cost of education amount.
- Equalized funding bases allocations on a threshold, and the attempt is made to have parity among all public institutions of higher education. The Commonwealth of Virginia is listed as one of the states with an equalized funding approach.

- Option funding is the third subcategory. States in this category have multiple funding formulas that allow either state leaders or economic conditions to determine which formula will be utilized. The option funding subcategory may include a base formula, a marginal cost adjustment, and an enrollment growth component.

The third major category of community college funding models is the functional component category, which contains two subcategories: generalized funding (delineated costs in terms of functional components such as instructional costs) and tiered funding (which incorporates further refinements that account for the distinct differences in programs and levels of study).

Community college funding in general, and the aforementioned funding models, are seen as relatively stable although some can be complicated (Mullin & Honeyman, 2007). The formulas and the regular funding streams for community colleges are generally thought to meet the needs of the states and taxpayers in which they are utilized (Mullin and Honeyman, 2007). Although state funding for community colleges is not considered a volatile revenue source, recent state budget reductions due to overall state revenue shortfalls have led to concerns of future declines in revenue for community colleges (Katsinas et al., 2008).

Recent national economic changes, which have caused state budget shortfalls, have put public funding for all higher education funding at risk. Higher education funding becomes a lower priority when put in competition with other state priorities such as corrections, transportation, K-12 public education funding, and Medicaid (Katsinas et al., 2008). States' largest spending obligations are Medicaid (22% of states' budgets),

and K-12 funding (21% of states' budgets), both of which are dictated by outside forces (AASCU, 2011). Implementation of the new federal health care reform package will prevent states from reducing eligibility or increasing requirements for individuals to apply for coverage and the Congressional Budget Office estimates that this requirement alone will force states to spend another \$20 billion annually (AASCU, 2011). States face other spending pressures including the exhaustion of federal stimulus funding in FY 2012, unemployment insurance, and public pension programs, many of which have been severely underfunded for years (AASCU, 2011). Compounding the situation of budget factors which do not include public higher education as a priority is the increase in anti-tax voter sentiment, leading to the political inability for lawmakers to raise taxes and fees to pay for public services (AASCU, 2011).

The call for accountability and transparency.

College completion and educational attainment are in the spotlight nationally. The spotlight is not new. The trend to seek better performance from higher education institutions has actually been occurring for the last 30 years (Dougherty & Natow, 2009). Linking funding to outcomes and accountability has been driven by policymakers' desire for lower operating costs, improved responsiveness to state and local economies, and increased rates of graduation and retention (Dougherty & Natow, 2009). A sentiment also exists that better-informed college enrollment decisions will reward strong institutions and poor performers will be punished by the market and either improve or fail (McCormick, 2010).

A focus on outcomes in addition to access became the central point of accountability in higher education as set out by the Commission on the Future of Higher

Education (Mullin & Honeyman, 2008). In an attempt to track and justify the expenditure of public dollars for higher education to such outcomes as graduation rates, the structure and components of funding formulas have been increasingly scrutinized (Mullin & Honeyman, 2008). Between 1979 and 2007, 26 states enacted performance funding but 14 of those states later discarded the funding formulas (Dougherty & Natow, 2009). Reasons cited for terminating performance funding in three states (Florida, Illinois, and Washington) included dissatisfaction by community colleges with the model combined with lack of interest from the business community in continuing the model, a drop in state funding which made continuation of performance funding politically unjustifiable, and the loss of key political supporters of performance funding within several years after its implementation (Dougherty & Natow, 2009).

Measuring success in terms of graduation and retention rates in exchange for funding is problematic for community colleges. The most common accountability measures for community colleges are rates of remedial and developmental success, graduation from the community college, transfer to a four-year institution, and employment after leaving the community college (Dougherty, Hardy & Natow, 2009). Only 28% of first-time, full-time associate degree-seeking community college students graduate with a certificate or associate degree within three years. (Community College Survey of Student Engagement, 2010). The majority of students who enroll in community college require remediation in math or English (Schmidt et al, 2007) before they can move on to the studies leading to a certificate or degree (VCCS, 2009). In Virginia's community college system, one in four students must take developmental math and one in three students must take developmental English (VCCS, 2010). The reality of

these statistics, which indicate that many students are not ready for college, is a contrast to the renewed calls for community college accountability, fiscal restraint, and outcome measures including improved graduation rates.

In July 2009 President Barack Obama unveiled the American Graduation Initiative and called upon the nation's community colleges to "figure out what's keeping students from crossing that finish line, pursue innovative strategies that promote student completion, and make informed choices about which programs work" (The White House, 2009). Community colleges are expected to respond to these external demands by improving assessment and demonstrating improvements in student completion and graduation.

Revenue Diversification

Public financial support has declined across the board for all institutions of higher education in the past decade, especially since 2009 (American Association of State Colleges and Universities [AASCU], 2010). A recession, that began in 2008, drastically reduced state revenue and ended the growth in state appropriations to public institutions of higher education which had occurred between 2004 and 2008 (State Higher Education Executive Officers [SHEEO], 2010). State and local funding on a per student basis, and measured in constant dollars, for public colleges and universities decreased between 2009 and 2010 (SHEEO, 2010). In FY 2009, state appropriations for higher education fell by 2%, but this was offset by the State Fiscal Stabilization Fund from the American Recovery and Reinvestment Act by 1% (AASCU, 2010). As a result, institutions of higher education increased tuition in response to this reduction in state aid (AASCU, 2010).

Public colleges and universities have had to become much more reliant on funds raised privately in the wake of state funding cuts and rising tuition. Budget pressures are forcing some community colleges to become fiscally creative (Hendrick, Hightower, & Gregory, 2006). Colleges have had to become more entrepreneurial in private fundraising, contract training, grants procurement, and workforce development (Mullin and Honeyman, 2008). Community colleges are looking to their alumni organizations and to local organizations for support. In addition, community colleges are actively seeking grants from foundations (Hendrick, Hightower, & Gregory, 2006).

Virginia Overview

Community colleges do not have a separate and distinct formula for funding. The formula for funding community colleges in the Commonwealth of Virginia is the same as the formula for funding all public four-year institutions of higher education.

Explanation of public education funding.

Public higher education funding.

Prior to the recession of the early 1990s, funding for public colleges and universities in the Commonwealth of Virginia was allocated through a process known as Appendix M (D. Hix, personal communication, March 30, 2011). Appendix M included a recognition of enrollment decreases or growth as part of its calculation. Additional funds associated with expected enrollment growth were held in an institution-specific escrow account and released after enrollment growth had been confirmed (SCHEV, 1984). The additional funding element of the Virginia funding formula was beneficial to Virginia's community colleges which experienced some level of enrollment growth every year (D. Hix, personal communication, March 30, 2011). Appendix M also outlined a

funding split between state support and tuition at a 70/30 level with 70% of the cost to be provided by the state and 30% from tuition; for community colleges, this cost sharing was 80/20, with 80% of the cost provided by the state and 20% from tuition (SCHEV, 1984, 2012). All institutions of higher education were fully funded by the formula outlined in Appendix M (Newlin, 1998).

During the recession of the early 1990s, significant cuts were made to higher education and funding shifted to other state priority areas during this time (Newlin, 1998). The 70/30 and 80/20 policies were abandoned because the Commonwealth would not maintain its previous level of general fund support. As a result, large tuition increases were authorized in order to assist in offsetting general fund budget reductions. By the end of the recession, in-state students contributed up to 40% of the cost of education at some institutions. The former approach was abandoned and a new funding formula was devised (SCHEV, 2012). The 1998 General Assembly established the Joint Subcommittee on Higher Education Funding Policies to re-establish funding guidelines which could be used as a benchmark for funding for all public institutions of higher education (SCHEV, January 2007). The General Assembly sent out a Request for Proposal (RFP) to select a consultant who would develop new guidelines for funding which would incorporate some components from Appendix M, examine institutional historical and projected needs, and accommodate themes from models utilized in other states (K. Petersen, personal communication, March 30, 2011).

Explanation of current public higher education funding formula.

The 1998 Joint Subcommittee on Higher Education Funding Policies developed the “base budget adequacy” formula. Four principles were used to develop the guidelines:

1. The guidelines would complement current funding policies for higher education.
2. To the extent possible, the guideline factors would be developed through an assessment of actual experiences, or national “best practice.”
3. To the extent possible, the guidelines would balance the desire for simplicity with the need to recognize institutional differences.
4. Not all institutional resource requirements would, nor should, be met through the guidelines (SCHEV, January 2007).

The next step determined that the primary cost drivers of higher education were students and faculty. The number of faculty needed was determined by the types of programs offered and the level of instruction (undergraduate, master’s, doctoral). Student to faculty ratios were then calculated based on the number of faculty required in different types of programs and at different levels of instruction. The final ratios also took into consideration the guidelines used in other states, Virginia’s old guidelines (“Appendix M”), recommendations from Virginia’s colleges and universities, and accreditation standards on staffing requirements. A “non-faculty instructional costs” component was added, which included support staff and equipment and supplies. The “non-faculty instructional costs” component was calculated at a ratio of 40% of instructional faculty costs (SCHEV, September 2007).

During the 2000 legislative session, the Governor and General Assembly reaffirmed the policy that in-state undergraduate students should pay a consistent percentage of the cost of education. They directed institutions to begin reducing in-state student tuition charges to 20% of the average cost at the community colleges and 25% at the public four-year institutions. By the 2001-02 academic year, 13 of the 15 four-year institutions met this goal with an average cost of 23% for the in-state student share. The guidelines were completed and approved in 2001, a recession year. By default because of the lack of full funding in its implementation year, funding for higher education was calculated at 91% instead of at 100% of the guidelines (K. Petersen, personal communication, March 30, 2011). The state budget reductions that took place in the 2002-2004 biennium reduced the funding to 84% of the guidelines (SCHEV, 2007). In the 2002-04 biennium, the cost-sharing relationship between the state and its students changed dramatically due to the large general fund budget cuts to higher education, and the larger tuition increases enacted to help offset the cuts. Between FY 2002 and FY 2004, the students' share of cost increased from 23% to 36%, while the state's share decreased from 77% to 64% (SCHEV, 2012). In 2007, the General Assembly requested that the State Council of Higher Education in Virginia should review the guidelines and processes related to base adequacy. Meetings were held between SCHEV and fiscal analysts from the House Appropriations Committee and the Senate Finance Committee to review the existing formula, and four areas were discussed and agreed upon. The first area of discussion was whether the base budget adequacy model would capture all institutional resource requirements. The decision was made that not all institutional resource requirements would be met through this goal. Certain budget items such as

faculty salary (peer group) needs, the Higher Education Equipment Trust Fund, and initiatives that were specific to certain institutions would not be included in the base budget adequacy guidelines (K. Petersen, personal communication, March 30, 2011).

The next item was standard data collection. The policy-makers agreed that a common data base from the Virginia Department of Planning and Budget should be utilized. The third item was how often the model should be run and updated. The decision was made to run the model and update it every two years in the year preceding the even-year legislative session. The last decision point was how enrollment would be handled. It was decided to use the latest enrollment data in the model prior to the even year legislative session (SCHEV, September 2007).

Between FY 2002 and FY 2013, tuition grew to help cover increasing operating costs, such as faculty salaries and fringe benefits, equipment, library materials, electronic materials, and the maintenance of buildings. Tuition also grew to help offset the numerous state budget reductions that were necessary over the period. As a result, the student share of the cost of higher education in FY 2013 is estimated to be at 48%, a 1% decrease from the record high student share of 49% set in FY 2012, but 10 percentage points higher than the previous historical high set in FY 1994 (SCHEV, 2012).

In 2004, the Joint Subcommittee on Higher Education Funding Policies approved a state general fund share policy of 67%/33% between general fund support (67%) and tuition revenue (33%) for in-state students (SCHEV, January 2007). The fund share policy was viewed as a serious departure from the former funding split of 70% from the state and 30% from tuition (K. Petersen, personal communication, March 30, 2011).

Community college funding distinctions.

Since the 2002-2004 biennium, institutions of higher education generated more revenue from tuition than they have from state general fund support (SCHEV, 2012). The contrast is startling for the Virginia Community College System. In FY 2006, tuition and fees comprised 43% of the cost of a community college education and the state general fund provided 57%. For FY 2012, tuition and fees comprised 60% and the state general fund portion was only 40% (VCCS, State Board for Community Colleges, May 2012). For all Virginia institutions of public higher education, the average general fund amount per in-state student, on a constant dollar basis, dropped from \$10,019 per FTE in FY 2001 to \$8,016 per FTE in FY 2007 (SCHEV, January, 2007).

An assessment of the base budget adequacy funding model for all Virginia institutions of higher education was conducted by Jones and Wellman of the National Center for Higher Education Management Systems (NCHEMS) in October, 2010. The researchers concluded the model is typical of other states' models based on historical cost factors and it reflects good practices in designing such models. The study's findings indicate that if the model were fully funded, it would yield appropriate funding levels for the four-year institutions and Richard Bland College but is low by any standard for the Virginia Community College System. In comparison to other states, the funding model for the Virginia Community College System is inadequate by at least 15% (NCHEMS, 2010). The base budget adequacy model also does not recognize enrollment growth, new physical plant costs, and the cost of delivering class instruction through technology (K. Petersen, personal communication, March 30, 2011).

The NCHEMS report highlighted the fact that the current base budget adequacy funding formula in Virginia perpetuates funding advantages and disadvantages between and among institutions. The report also highlighted a disparity in the current formula which does not reward or penalize performance and made the recommendation that future funding models should establish targets of higher performance and higher efficiency. In addition, the report found student credit hours completed (rather than student credit hours enrolled) should be used as a measure. The report recommended consideration of the institution's contribution to state priorities as part of the funding formula. A component for community colleges which recognizes the need for remedial education, as well as factors for transfer and the conferral of degrees and production of certificates, should be considered (NCHEMS, 2010).

Internal funding formula and differential tuition for Virginia's community colleges.

The Virginia Community College System receives a lump sum state general fund appropriation through the base budget adequacy formula which encompasses all 23 colleges and the central administration. The State Board adopted a six-year financial plan in 2010 with the goal of funding all 23 colleges at no less than 88% of base budget adequacy guidelines. The remainder of funds would be generated from tuition. The appropriation is then distributed to the 24 entities, predicated upon an internal allocation model which includes efficiency factors incorporating faculty-to-student ratios and three-year enrollment averages (VCCS, June 2012). The three-year average of enrollment serves to ameliorate any immediate negative impact to community colleges with stagnant or declining enrollment and somewhat limits potential funding for community colleges

with significant enrollment increases (K. Petersen, personal communication, March 30, 2011). Colleges with an efficiency factor of one or greater as set forth in the internal allocation model may also charge an increment above regular approved tuition, which must be approved by each participating college's local board and then by the State Board for Community Colleges (Virginia Community College System Policy Manual, n. d.). At the present time, only Northern Virginia Community College and J. Sargeant Reynolds Community College charge a differential tuition amount.

Upcoming changes in Virginia's funding formula.

In 2010, Governor Robert F. McDonnell established a Commission on Higher Education Reform, Investment and Innovation (Executive Order 9). Appointed to serve on this Commission were business and community leaders as well as presidents of both public and private institutions of higher education in Virginia. After studying reports and receiving testimony from July until December of 2010, the Commission made a series of recommendations which were codified by the 2011 General Assembly in the form of two pieces of legislation: SB 1459 and HB 2510 (Virginia Higher Education Opportunity Act of 2011 [VHEOA], 2011). The purpose of the legislation was "to fuel strong economic growth in the Commonwealth of Virginia and prepare Virginians for the top job opportunities in the knowledge-driven economy of the 21st Century" (VHEOA, 2011). Among the recommendations is that the existing funding formula will be replaced with a standardized formula which will include not only a continuation of base budget adequacy, but also a component that will "follow the student" as the student moves through higher education (VHEOA, 2011). The new funding formula will be designed by a Higher Education Advisory Council (whose membership is outlined in the legislation)

whose members started work in October of 2011 and whose work product is still in development.

Research to date has not uncovered a similar funding formula for higher education which contains a per student calculation. The per student model is more frequently utilized in public K-12 systems (Mullin & Honeyman, 2008). Colorado did attempt to enact a higher education voucher system, which was unsuccessful (Western Interstate Commission of Higher Education [WICHE], 2008). Enacted in 2004, Colorado's College Opportunity Fund (COF) was created which established a stipend available to all lawfully present Colorado residents to use to offset their in-state tuition costs. Established as a way to circumvent the limitations that had been imposed on public institutions by Colorado's Taxpayer Bill of Rights, the vouchers were intended to make institutions of higher education more disciplined and efficient, able to accommodate more state residents, and increase access for underrepresented populations (low income residents, members of non-dominant groups, and males) (WICHE, 2008). In fact, overall enrollment fell when the vouchers went into effect, the percentage of in-state students declined, and underrepresented populations became even less likely to be enrolled in higher education than had previously been enrolled (WICHE, 2008). Among Colorado's two-year institutions, a dramatic decline in enrollment was noted (WICHE, 2008).

K-12 public education funding.

Elementary and secondary public education in Virginia is funded by a combination of local, state, and federal funds (Joint Legislative Audit and Review Commission, 2002). The Virginia Constitution and the Code of Virginia require each

unit of local government to provide its portion of the costs of public school education by local taxes or other local funds (Virginia Association of Counties, 1998). The local funding is largely dependent on local fiscal capacity and tax effort (Salmon, 2011). According to Mary Jo Fields, director of research for the Virginia Municipal League, “school divisions in Virginia receive the bulk of their operating funding from the Commonwealth of Virginia and from the local governing body in which the school division is located.” With the exception of three joint school divisions which contain students from contiguous localities, every school division in Virginia shares the same geographic boundaries as the locality which provides the local funding (M. J. Fields, personal communication, May 12, 2012).

Under the Constitution, the General Assembly of Virginia is given the responsibility to determine the manner in which funds are to be provided to school divisions for the cost of maintaining an education program which meets the Standards of Quality (Joint Legislative Audit and Review Commission [JLARC], 2002). State funding in Virginia is provided to help school divisions pay for the costs of the state Standards of Quality (SOQ) as well as for other costs. The preponderance of state funding for education is based on local ability to pay. Funding adjustments or reductions by the State most negatively affect funding levels in poorer localities (JLARC, 2002).

The minimum required local funding is determined every biennium by a calculation driven by the composite index of local ability-to-pay measure (Virginia Department of Education [VDOE], 2012a). The composite index is applied to a prescribed cost of education to determine the apportionment of education costs between the state and the local school division. Since school divisions in Virginia are not fiscally

autonomous (i.e., school boards which govern school divisions do not have taxing authority nor the authority to issue debt), the local governing body appropriates the local match as required by the formula and often provides additional funding beyond the requirement. In FY 2006, local funding for Virginia's public schools was \$5,804,255,290 compared to state funding of \$3,858,274,469 (VDOE, 2012c). Therefore, the funding to support public schools can be reliant on the local government's tax base and local wealth.

In the 2004-2006 biennium, the locality with the composite index that was the lowest was Lee County at .1845. The highest allowable composite index is .8000 and eight localities had this composite index: Arlington County, Bath County, Goochland County, Surry County, the City of Alexandria, the City of Falls Church, the City of Fairfax City, and the City of Williamsburg. (See Appendix A for complete listing of localities and their composite index values).

Composite index of local ability-to-pay.

The composite index of local ability-to-pay is a formula used to measure ability to pay for the minimum requirements for school divisions in Virginia to provide a program of high quality for public elementary and secondary education. The composite index determines the division of funding responsibility between the state and local shares of the Standards of Quality and is applied to the cost of education. The Standards of Quality are outlined by the state Constitution and are administered by the State Board of Education. The General Assembly determines the state and local shares of the costs of the Standards of Quality (JLARC, 2002). The Standards of Quality being used for this study as delineated by JLARC (2002) were:

1. Basic skills, selected programs, and instructional personnel

2. Support services
3. Accreditation, other standards and evaluation
4. Literary Passports, diplomas and certificates
5. Training and professional development
6. Planning and public involvement
7. Policy manual

The local real property tax is a major component of the composite index. The local real property tax is the largest unrestricted source of local revenue and is not subject to limits either on tax rate or property valuation assessment. From 1946 until the early 1970s, the true value of real estate for each locality was the standard used to measure local fiscal capacity and to distribute state education funds (JLARC, 2002). When the adoption of local sales taxes and urbanization in localities occurred, leading to expansion of non-property tax revenue, commissions studying education funding concluded that a multi-component formula to measure local ability to raise revenue should be developed. As a result, the composite index was first developed by the Governor's 1972-1973 Task Force on Financing the Standards of Quality (JLARC, 2002).

Most state funding to public schools is distributed using this measure (JLARC, 2002). In addition, the 1% sales tax that is returned to localities based on school-aged population and is transferred to schools is the other significant component of state aid to school divisions. The state aid returned as a result of the application of the composite index thereby provides relatively more funding per pupil to school divisions with few available local resources than to school divisions which are located in cities or counties with more abundant resources.

The composite index formula.

The composite index formula of local ability-to-pay is calculated every two years by the Virginia Department of Education. The composite index determines a school division's ability to pay education costs fundamental to the Commonwealth's Standards of Quality (SOQ). The Composite Index is calculated using three indicators of a locality's ability-to-pay:

- True value of real property (weighted 50%)
- Adjusted gross income (weighted 40%)
- Taxable retail sales (weighted 10%)

Each locality's index is adjusted to maintain an overall statewide local share of 45% and an overall state share of 55% (Appendix B). An example of the mechanics of the calculation for one locality, Arlington County, is located in Appendix C.

The JLARC study (2002) recommended that the current composite index could be modified to provide for a population density adjustment, an update of the weights that are given to the real property, sales tax, and other revenue components, and to utilize median adjusted gross income instead of adjusted gross income for localities which have skewed income distributions.

The researcher for this dissertation utilized the Composite Index from the 2004-2006 biennium, which was calculated by the Department of Education using 2001 base-year data provided by the Department of Taxation for adjusted gross income, taxable retail sales, and true value of real property. The estimates of local population for 2001 were provided by the Weldon Cooper Center for Public Service at the University of

Virginia. The March 31, 2002 average daily membership figures were derived from the data reported by school divisions to the Department of Education.

Overview of Dual Enrollment

History of dual credit.

Dual enrollment is a practice that is gaining momentum which enables a broad range of students to complete high school on time and receive credit toward some kind of postsecondary credential (Edwards, Hughes, & Weisberg, 2011). Dual enrollment is defined as a program allowing high school students to enroll in college courses. It can also be known as dual credit, concurrent enrollment, college in the high school, and joint enrollment (Hoffman, Vargas, & Santos, 2008). Dual enrollment strengthens the connection between the local school district and the local community college sponsoring the dual enrollment program.

Benefits of dual enrollment.

Dual enrollment agreements represent partnerships between secondary and postsecondary entities, which both play essential roles in the education of students. In the broadest sense, dual enrollment allows high school students to receive credits that are required for high school graduation while earning college credit at the same time. Dual enrollment programs allow students to create a “nest egg” of college credits which ultimately encourage them to complete their postsecondary education (Swanson, 2010). Studies from several states have indicated that high school students who accrue college credits are more likely to continue with their education beyond high school than those who do not. In 2007, the Texas P-16 Council reviewed their dual credit program and discovered that students enrolled in dual credit courses attended college and earned some

type of degree faster than those who do not participate in dual credit while in high school (Karp, et al., in Westcott, 2009). In 2010-2011, 93% of high school graduates who attempted dual enrollment earned college credit, 56% earned two or more years of college credit, and 24% earned an Associate's degree or college certificate (Ward & Vargas, 2008).

Dual enrollment improves the preparation of high school students for college by exposing them to the academic demands of a postsecondary education (Ward & Vargas, 2012). It also motivates students who did not previously envision themselves as college material (Caradona, 2012; Ward & Vargas, 2012). By offering college-level courses during regular school hours, high school students can take advantage of extracurricular high school activities. A student can get college credits and enter college with credits applicable to their college degree program while saving money and living at home. Students can also receive access to college facilities and to college services such as advising and counseling.

Dual enrollment compared to Advanced Placement.

Both dual enrollment and Advanced Placement are programs which allow high school students to receive college credit for college course work while still in high school and are often regarded as mostly equivalent (Speroni, 2011). Advanced Placement (AP) programs differ from dual enrollment programs in a number of ways. The primary difference is the curriculum used and testing methods employed to measure student mastery of the subject matter. Dual enrollment students take a college course attached to an actual college syllabus and they receive college credit and a college transcript when they pass the course.

Advanced Placement courses utilize a standard curriculum intended to replicate a college level course and students receive college credit after they pass an examination at the end of the course, which is optional. The program has been described as a stalactite that extends down to K-12 schools from universities, which dictate the course syllabus and exam (Callan et al., 2009). The examination is administered by the College Board. The cost for a student to take an examination at the present time is \$89 (College Board, 2013). In most cases, students who have a score of 3 or higher on a 5-point scale are given college credit, however postsecondary institutions have discretion to establish their own policies for granting college credits or placing the students into higher level sections of the courses. Often, class sizes in AP courses are smaller than in dual enrollment courses, more class hours are provided, there is continual monitoring of the students and their progress, and there is a standardized curriculum. Kirst and Bracco (2004) found that students enrolled in advanced or honors high school classes, including Advanced Placement classes, receive signals that they are college-bound and start getting recruitment materials from interested colleges. Speroni (2011) concluded that high-ability students with AP credits received more favorable treatment in college admissions than students with dual enrollment credits.

In a study of Florida high school students, Speroni (2011) found that although dual enrollment students were more likely than Advanced Placement students to go to college after high school, they were less likely to first enroll in a four-year college. Some of the fastest-growing courses in high school are college courses such as Advanced Placement (Callan et al., 2009).

Dual enrollment is viewed by many politicians as more cost-effective than Advanced Placement for a number of reasons. By taking dual enrollment classes in high school, the number of courses that student will have to take in college is decreased, along with the associated time to take the courses and ultimately receive the degree. A study by the Florida Office of Program Policy Analysis and Government Accountability in 2006 found that the rate at which course participants earn college credits is considerably higher in dual enrollment than in Advanced Placement. This study also found that dual enrollment courses are more economical because they are offered by the community colleges. In Florida, incentive funds are paid by the State of Florida for each credit hour earned by passing an AP exam, which makes AP even more costly (Hunt, 2007).

Design of Dual Enrollment Programs

Dual enrollment courses are created using agreements, which are administered by community colleges in partnership with secondary schools. The community colleges generally take the lead in identifying instructors, recruiting students, administering course assessments, subsidizing or deferring tuition and fees, and monitoring quality (Barnett, Gardner, & Bragg, 2004).

Issues Related to Time to Completion

Time-to-degree is a key component in higher education, particularly at a time when resources are constrained and there is a growing emphasis on completion (Mullin, 2012). Nationwide, approximately 30% of first-time, full-time students who enrolled in two-year institutions in the fall of 2007 completed a certificate or an associate degree within 150% of the normal time required to complete such a degree (National Center for

Education Statistics [NCES], 2012). The completion rate of students who enrolled in two-year institutions in the fall of 2007 varied by type of institution, with 60% of students graduating within 150% of the normal time at private for-profit institutions, 51% at private non-profit institutions, and 20% at public institutions (NCES, 2012).

Swanson (2010) compared high school and college transcripts of students who participated in dual enrollment with the transcripts of students who had similar grade point averages and class rankings and determined that students who participated in dual enrollment were 11% more likely to persist through the second year of college and were 12% more likely to enter college within seven months of high school graduation than nonparticipating students. Students who participated in dual enrollment in high school who completed 20 or more credits in the first year of college were more likely to persist through the second year than were students who did not complete college dual enrollment courses (Swanson, 2010).

Virginia Plan for Dual Enrollment

The *Virginia Plan for Dual Enrollment* was developed in 1988 by the Secretary of Education, the Superintendent of Public Instruction, and the Chancellor of the Virginia Community College System to govern partnership agreements between public schools and community colleges in Virginia. The document outlined the basic parameters for dual enrollment program offerings but left the authority for implementing the plan to each of the 23 community colleges (Catron, 2001).

An increased emphasis on articulation between public schools and colleges during the 1980s (Catron, 2001) led to the development of the dual enrollment relationship between public schools and colleges in Virginia. Catron's research in 2001 revealed that

public schools were implementing 2 + 2 programs which established agreed-upon curricula to allow students to complete two years of a vocational degree in high school and the subsequent two years at a community college.

High school juniors and seniors are eligible for participation in dual enrollment as long as they meet college placement requirements and receive the recommendation of a high school official. Home schooled students are also eligible (Schmidt, 2010). There are three basic types of arrangements. A high school student may be enrolled in regularly scheduled college credit courses with other community college students and taught at the community college, high school students may be enrolled in specially scheduled college credit courses that are conducted exclusively for high school students taught at the high school, or high school students may be enrolled in specially scheduled college credit courses conducted exclusively for high school students and taught at the community college (Virginia Plan for Dual Enrollment, 2008).

Dual enrollment coursework is restricted to high school juniors and seniors; however, freshmen and sophomore students who are able to demonstrate readiness for college level coursework by meeting established institutional placement criteria are also eligible to participate. At any public high school in Virginia, the principal must approve the cross-registration of the high school student to become a dual enrolled student at the community college. Next, the college has to accept the high school student for admission to the college-level course. Finally, the community college must assume responsibility for administering placement tests to students who are interested in dual enrollment courses and for registering students in the courses.

Dual enrollment courses include all of the college subject areas. The courses are all offered for college credit and must meet course enrollment requirements at the community college. The dual enrollment courses must be identical to the other courses taught at the college in terms of course objectives, syllabi, level and rigor of content, evaluation of students, textbooks, student outcomes, and assessment and faculty evaluation (Virginia Plan for Dual Enrollment, 2008).

Caradona (2012) found that 93% of Virginia's dual enrollment coordinators indicated that their community colleges' dual enrollment collaboration goals included encouraging academically advanced students, students of average academic abilities, students from diverse socio-economic backgrounds, and first-generation college students to participate in their dual enrollment programs. Conversely, 59% of the coordinators also indicated that students who were "at risk" were not considered a primary goal for enrollment in dual enrollment programs at their community colleges.

Pricing and funding.

In Virginia, state appropriations "hold harmless" both secondary and postsecondary institutions for dual enrollment (Abell Foundation, 2007; Catron, 2001). In other words, school divisions continue to receive funding for students in average daily membership and community colleges are allowed to count the high school students toward their Full Time Equivalent (FTE) count, even if the students attend college classes during the normal K-12 school day. No uniform policies governing costs are currently in place. Some community colleges offer dual enrollment at no cost to students, some charge the school division, and others charge tuition to the parents.

The recommended dual enrollment contract in Virginia between community colleges and school divisions encourages school divisions and colleges to provide high school students with the opportunity for dual enrollment at no cost to them or their families. If tuition will be charged, the school will pay on behalf of the student or students or the student will pay the college the mandatory tuition and fees that are at the rate in effect at the time that classes begin. When the school agrees to pay the tuition and fees, the college will bill the school on a semester basis. If the parties agree that the student is responsible for the payments, the College will bill the students directly (VCCS, September, 2012). Textbooks are either purchased from the college's bookstore or rented from the high school.

Pricing of Advanced Placement classes is similar. Some school divisions pay tuition and exam fees for eligible students, but students in other school divisions have to pay. The current fee for each Advanced Placement examination is \$89 (College Board, 2013); a federal subsidy of \$45 is available from the U. S. Department of Education and a College Board fee reduction of \$25 is available for low-income students whose families cannot afford the examination fee (U. S. Department of Education, 2013).

ADM versus FTE.

The bulk of public school funding in Virginia is based on "average daily membership" which is defined as the total aggregate daily attendance divided by the number of days school was in session from the first day of the school term through the last school day in March of every year (VDOE, 2012b).

Public college funding is based upon "full time equivalent" funding. Students in dual enrollment are both counted toward the public school division's "average daily

membership” number as well as toward the college’s “full time equivalent” number. Neither the public school nor the community college is penalized in their state funding for developing and implementing dual enrollment. The public school division still receives “average daily membership” credit for students participating in dual enrollment and the community college receives full-time equivalent student credit for the participating high school students.

Assessment and evaluation.

The faculty who teach dual enrollment classes in Virginia are evaluated on the basis of the adjunct faculty evaluation guidelines by the community college which employs them. In addition, students evaluate their dual enrollment instructors every semester. The results are compiled and shared with the dean, program lead, faculty member, and designated school division representative (Virginia Plan for Dual Enrollment, 2008).

A profile of the typical dual enrollment instructor has not been located in the research. The National Alliance for Concurrent Enrollment Partnerships (NACEP) is an accrediting organization which has developed standards for quality in dual enrollment programs, including faculty qualifications. Standards for faculty include approval by the respective college/university academic department for teaching the courses, discipline-specific training and orientation regarding course curriculum, assessment criteria and pedagogy, and professional development activities with ongoing collegial interaction to address course content, course delivery, assessment, and evaluation (National Alliance for Concurrent Enrollment Partnerships, 2012).

Dual Enrollment Landscape in Virginia

Dual enrollment in rural and urban areas.

In FY 2000, dual enrollment FTEs accounted for 3.8% of the total FTEs in the VCCS and as much as 17% to 21% of the total FTEs at some individual colleges (Catron, 2001). Research by Catron in 2000 showed that community colleges which served predominantly rural areas had the largest dual enrollment programs in the Virginia Community College System. The trend was attributed to cooperative relationships between public schools and community colleges and financial agreements which allowed participation at no direct cost to the students. Presidents of community colleges located in rural areas of Virginia who were interviewed believed that this trend was also attributable to community colleges being the higher education first choice in rural areas (Catron, 2000). Presidents of community colleges in urban areas believed that competition from well-established advanced placement (AP) programs was a deterrent to dual enrollment in urban areas. Research conducted by the VCCS in February 2012 concluded that community colleges offering dual enrollment to high schools in rural areas continue to have a higher concentration of dual enrollment participants than community colleges serving students in urban or suburban regions (VCCS, February, 2012).

Summary

The literature review contained in this chapter substantiates the need to pursue research to determine if there has been a relationship between local wealth and the rate of participation of high school students in dual enrollment in community colleges throughout the Commonwealth of Virginia. Because legislation passed in the 2012 General Assembly which requires that all school divisions in Virginia offer dual

enrollment to their students and there is currently no standard sharing of costs between students, school divisions, and community colleges, an analysis to determine the relationship of local wealth on dual enrollment participation and subsequent postsecondary enrollment is justified. Recent state funding reductions to the Virginia Community College System and its 23 colleges which have increased the share of the cost shouldered by families and students, the development of a new funding formula for higher education which has not yet been announced, and interest in strengthening the alliance in the P-16 continuum further confirm the need for study. Although there has been considerable research conducted on dual enrollment patterns and the funding of public schools separately, the researcher has located only very limited research on the pricing of dual enrollment. There is a gap in the research measuring the relationship between local wealth and dual enrollment participation in any state. The relationship between local wealth and postsecondary enrollment status of dually enrolled students after they graduate from high school has also not been explored.

The next chapter will contain a description of the research methodology and research design that formed the basis of the research study.

CHAPTER III: METHODOLOGY

This chapter will present the procedures and methodology for the study, including the context of the study, the population of the study, the instrumentation utilized, data collection procedures, and data analysis.

The purpose of this quantitative, ex post facto study was to determine if there is a relationship between the wealth of the locality in which each student's school division is located and the rate of dual enrollment participation in community colleges serving Virginia school divisions. Utilizing the composite index of local ability-to-pay, calculated every biennium by the Virginia Department of Education as a measure of local wealth to determine the state and local shares of mandated expenditures for K-12 public education, research questions were designed to measure whether local wealth influenced participation in dual enrollment. The relationships between local wealth and dual enrollment rate in urban, suburban, and rural school divisions respectively were examined. Finally, local wealth was analyzed to determine if it was a statistically significant predictor of the rate of dually enrolled students who subsequently enrolled in a community college or in a four-year institution.

No previous research has been conducted which examines a relationship between the measure for local wealth that is the basis for public funding for K-12 public school divisions in Virginia and the rate of participation of students in that school division in dual enrollment and subsequent college enrollment. It may not be feasible for the community colleges which currently subsidize all or a portion of the cost of dual enrollment for high school students to be able to continue this approach. Community colleges which will be expanding dual enrollment to high schools and school divisions

which were previously not participating may be unable to fund dual enrollment in the manner in which they had funded it previously.

The study utilized four sources of ex post facto data. Ex post facto or “after the fact” data means that the data have already been collected and there is not a need for the researcher to collect new data. Ex post facto research is a non-experimental effort to investigate the possible relationship between the independent variable(s) and the dependent variable(s) (Creswell, 2003; Kumar, 2005). This view is consistent with that of Cohen, Manion, and Morrison (2007) who explained ex post facto research as searching back in time for the possible factors seemingly associated with certain occurrences.

In examining this relationship through a quantitative methodology, the study was guided by the following research questions:

1. Is there a predictive relationship between local wealth and the rate of student participation in dual enrollment programs at school divisions in Virginia?
2. Is there a predictive relationship between local wealth and the rate of student participation in dual enrollment programs at school divisions in Virginia by jurisdiction?

2(a) Is there a predictive relationship between local wealth and the rate of student participation in dual enrollment programs at urban school divisions?

2(b) Is there a predictive relationship between local wealth and the rate of student participation in dual enrollment programs at suburban school divisions?

2(c) Is there a predictive relationship between local wealth and the rate of student participation in dual enrollment programs at rural school divisions?

3. Is there a predictive relationship between local wealth and the rate of enrollment in community colleges for dual enrollment participants at school divisions in Virginia?

4. Is there a predictive relationship between local wealth and the rate of enrollment in four-year institutions for dual enrollment participants at school divisions in Virginia?

For research questions one and two, this study examined the predictive relationship between local wealth and the dual enrollment participation rate in local school divisions in Virginia. For research questions three and four, this study examined the predictive relationship between local wealth and the dual enrollment participants' continuation in higher education.

Research Design

The research perspective was quantitative. Kumar (2005) noted that a quantitative structured methodology is appropriate in determining the extent and variation of a phenomenon.

An ex post facto design is appropriate since the primary purpose of the study is predictive and the independent variables have already been established and cannot be manipulated (Johnson and Christenson, 2008). The study examined the predictive relationship between local wealth, measured by the local composite index of ability-to-pay, and the percentage of students participating in dual enrollment in each school division and their subsequent postsecondary enrollment status in Virginia.

Context of the Study

The study was based in Virginia which had an estimated population in 2012 of 8,096,604 (Weldon Cooper Center for Public Service, 2012). The population of the state

for the year which marked the beginning of measurement for this study (2006) was 7,683,718 (Weldon Cooper Center for Public Service, 2012). The total number of pupils in Average Daily Membership in 2006 was 1,185,051 (VDOE, 2012d). The study includes 130 school divisions and 8,621 students who were participating in dual enrollment in the spring of 2006 who were measured through the fall of 2006.

Population

Participating school divisions.

The unit of the study was school divisions. In the current study, all school divisions are located in Virginia. The actual number of the participating school divisions for this study was 130 even though there were 133 school divisions in Virginia in 2006. Among those 133 school divisions, three school divisions are considered joint operations and removed from the study because they educate students from an adjacent county and city. James City County and the City of Williamsburg, Greensville County and the City of Emporia, and Bedford County and the City of Bedford each operate one school division jointly instead of separate school divisions. These three school divisions were removed from the study because students attending the schools in these school divisions were not able to be separated for the purposes of this study by their home jurisdiction. The Town of West Point in King William County and the Town of Colonial Beach in Westmoreland County also operate school divisions. The original number of all students participating in dual enrollment in the 133 school divisions was 9,062; when removing the three joint school divisions, the remaining number of dual enrollment students measured for this study was 8,621.

Instrumentation

Utilizing the composite index of local ability-to-pay, calculated every biennium by the Department of Education as a measure of local wealth to determine the state and local shares of mandated expenditures for K-12 public education, research questions were designed to measure whether local wealth has influenced participation in dual enrollment and subsequent continuation in postsecondary education.

The dual enrollment and postsecondary enrollment data were obtained from the Virginia Community College System, which compiles data from all 23 community colleges in Virginia. Data were delivered in a SAS file and the data was incorporated for utilization by SPSS Version 17 via the “import SAS” feature. The composite index data were obtained from the website of the Virginia Department of Education and the Superintendent of Public Instruction.

Questions one and two utilized high school student dual enrollment data obtained from the Office of Institutional Research and Effectiveness within the Department of Academic Services and Research at the Virginia Community College System which was first gathered from the National Student Clearinghouse. Participation rates were operationalized as a percentage, and calculated by dividing the number of students dually enrolled in each school division by the total number of students in Average Daily Membership in that school division in 2006. Student data were first segregated by high school and then aggregated by school division. The local composite index of ability-to-pay, obtained from the Virginia Department of Education, was used as the independent variable in questions one and two.

For the sub-questions for question two, a “locale code” system to classify urban, suburban, town, and rural school divisions in Virginia was accessed from the National Center for Education Statistics for classifications in effect for the year 2006. There were 11 school divisions initially classified as “town;” this classification was incompatible with the study and therefore school divisions in this classification were converted to the locale code of the adjacent school division’s locale code. Appendix D contains the list of the 11 school divisions which initially were classified as “town,” the adjacent school division, and the resulting local code name and code for each school division.

School divisions classified as urban were coded as “1,” school divisions coded as suburban were coded as “2,” and rural school divisions were coded as “3.” The locale codes for each school division were then entered into a field in the SPSS data file. Three separate linear regressions were completed, with the cases (urban, suburban, or rural) selected and separated out for each subquestion. Appendix E contains a listing of each school division measured in the study, its composite index, its dual enrollment participation rate, and locale code.

Questions three and four captured the same group of students measured in questions one and two who have graduated from high school in the spring of 2006 and who were enrolled in postsecondary education in the fall of 2006. By school division, the percent of students who enrolled in a community college were entered into one field, and the percent of students who enrolled in a four-year institution were entered into another field. For questions three, a linear regression was run with local wealth as the independent variable and postsecondary enrollment in a Virginia community college as the dependent variable. For question four, a linear regression was run with local wealth

as the independent variable and four-year enrollment in the fall of 2006 as the dependent variable.

Research variables.

Local wealth.

The independent variable was local wealth. The local wealth data from the 2004-2006 biennium as measured by the composite index of local ability-to-pay were collected from the Commonwealth of Virginia's Department of Education and the Superintendent of Public Instruction's website. The composite index is a measure of local wealth which is utilized to calculate the state and local required shares of budgets for school divisions in the Commonwealth of Virginia. Composite index values were analyzed with dual enrollment participation data by school division and community college service region. Data elements in the calculation of the composite index include each school division's average daily membership, local and state population, the local and state true assessed value of real estate, local and state adjusted gross income, and local and state taxable retail sales.

Dual enrollment participation rate.

The dependent variables were the dual enrollment participation rates for questions one and two and the subquestions to question two. Participation rates were operationalized as a percentage, and calculated by dividing the number of students dually enrolled in each school division by the total number of students in Average Daily Membership in that school division in 2006.

Postsecondary enrollment.

The dependent variable for question three was postsecondary enrollment in a Virginia community college in the fall of 2006. The dependent variable for question four was postsecondary enrollment in a four-year public or private college or university in the fall of 2006.

Data Collection Procedures

Data were utilized from students who were registered for dual enrollment classes concurrently at a Virginia high school and at a community college and who graduated in the spring of 2006. The records for these students were examined through the fall 2006 semester. In the spring of 2006, there were 9,062 students who participated in dual enrollment and graduated from a Virginia high school.

Authorization to utilize the data of students who participated in dual enrollment in high school and who graduated in the spring of 2006 through their college enrollment in the spring of 2010 was requested from the Research Review Team of the Virginia Community College System on July 25, 2012. The Research Review Team had already obtained the data from VCCS records for high school students who were seniors and pursuing dual enrollment who graduated in the spring of 2006. Data for postsecondary paths of the dually enrolled students originates from the National Student Clearinghouse and was obtained jointly with the Curry School of Education at the University of Virginia. Approval to utilize the data was granted on August 21, 2012. A meeting was held with members of the VCCS Research Review Team on September 20, 2012 to determine the data elements to be provided and the format of these data. Members of the VCCS Review Team include the Assistant Vice Chancellor for Institutional

Effectiveness, the Director for Institutional Research for the VCCS, the Vice President for Institutional Research at John Tyler Community College, and the VCCS Research Analyst. For every student who participated in dual enrollment in the spring of 2006, the following data were reported:

- Student identifier
- High School
- Location of dual enrollment class(es), i.e., whether the dual enrollment class(es) were taught at the high school or at a community college
- School division
- Postsecondary enrollment level (student enrolled in a community college or student enrolled in a four-year college or university)

Data were delivered in a SAS file and the data were incorporated for utilization by SPSS Version 17 via the “import SAS” feature. The request for Human Subjects Review was submitted to Old Dominion University’s Darden College of Education Human Subjects Review Committee on December 10, 2012 and was deemed exempt on December 13, 2012.

Data for the composite index of local ability-to-pay for 2006 were obtained from the website of the Virginia Department of Education and Superintendent of Public Instruction for the 2004-2006 biennium. The students who participated in dual enrollment and who graduated in the spring of 2006 were in school divisions whose state and local funding in the spring of 2006 was determined by the composite index in effect for the FY 2005-2006 school year. The composite index is calculated to coincide with the Commonwealth of Virginia’s biennial budget process. The composite index utilized

for this study also determined state and local funding shares for the FY 2004-2005 school year.

For each school division, data were aggregated so that a total number of students in each school division could be determined. The total number was then divided by the number of students in Average Daily Membership in that school division in order to determine the percentage of dual enrollment participation in that school division.

The study utilized ex post facto data to analyze data from students who participated in dual enrollment in the spring 2006 semester of their senior year in high school and examined records for those students through the fall 2006 semester. The time frame of this sample was chosen to allow data to be collected to allow students who graduated from high school in the spring of 2006 to be enrolled in postsecondary education the following fall.

Data Analysis

Data were analyzed utilizing SPSS Version 17. A series of simple linear regression analyses was conducted for this study. Simple linear regression allows the prediction of one variable from another. The independent variables were the composite index values for each school division. Independent variables are variables that the researcher controls or manipulates in accordance with the purposes of the investigation and can be either manipulated or classifying variables (Hinkle, Wiersma, & Jurs, 2003). The composite index of local ability-to-pay is a formula which determines the state and local government shares of K-12 education program costs. It is calculated for every locality in Virginia. The calculation for each locality determines the locality's share of operating expenses for the school division which is operated in that locality. The

composite index is expressed as a ratio and indicates the local percentage share of the cost of education programs.

For research questions one and two this study examined the predictive relationship between local wealth and the dual enrollment participation rate in local school divisions in Virginia. A simple linear regression analysis was conducted to determine whether local wealth predicts the rate of dual enrollment participation in research questions one and two. A simple linear regression analysis was performed for the sub-questions to question two, comparing the effect of the composite index on dual enrollment students' participation in urban, suburban, and rural community colleges. For each sub-question, cases were selected for the data to determine if the question addressed urban, suburban, or rural school divisions.

A separate linear regression analysis was conducted for research questions three and four, comparing the composite index with postsecondary enrollment of students in community college and four-year institutions. Each data field contained the percent of dual enrolled students who were enrolled in a Virginia community college or in a four-year public or private institution of higher education, respectively. Students who became enrolled in a community college were counted in a separate data field from students who became enrolled in a four-year institution.

For each regression analysis, the R Square, also known as the coefficient of determination, was computed. The R Square provides the proportion of the variance of the dependent variable that can be explained by the variation in the independent variable and provides specific information about a given correlation's predictive accuracy

(Sprinthall, 2007). If the value was less than .05, significant linear regression was determined to have occurred. The test of significance to be utilized was the *F* test.

Descriptive statistics were calculated on the demographic status and postsecondary enrollment profile of the dual enrollment students and reported in table form. A demographic profile was also constructed of dual enrollment students by Virginia community college. Descriptive statistics were calculated on the independent and dependent variables for research questions one and two. A cross tabulation of postsecondary enrollment by school division was performed and the results reported in table form.

Data Screening.

There were a total of 9,062 students who were identified as participating in dual enrollment programs at Virginia's 23 community colleges in the spring of 2006 who graduated from high school the same spring. Data for this study were reported in two separate files. The first file included a listing of each student, home high school, school division name, high school graduation year, gender, race, community college name where the student was participating in dual enrollment classes, enrollment status at a Virginia community college in the fall of 2006, enrollment status at a four-year institution in the fall of 2006, the public or private status of the four-year institution, the name of the four-year institution, and graduation data from both the Virginia community college and the four-year institution in the fall of 2010. The second file contained an aggregated version of certain elements of the first file and included school division name, number of participating dual enrollment students by school division, percentage of dual enrollment students by school division, number of students who enrolled in a Virginia community

college in the fall of 2006, and number of students who enrolled in a four-year institution in the fall of 2006. The second file was expanded by the researcher to add a field for the local wealth measure (the local composite index of ability to pay for each school division) obtained from the Virginia Department of Education, and the rate of dual enrollment participation as represented by the percent of dual enrollment participants in the school division. The rate of dual enrollment participation was calculated on a separate EXCEL spreadsheet by the researcher as the total number of dual enrollment participants divided by the number of students in Average Daily Membership in that school division in March 2006 and operationalized as a percentage. There were no missing data for any student for any variable.

The second file was utilized for the predictive models of this study. The researcher deleted six localities which operate jointly as three school divisions: the City of Bedford and Bedford County which operate a joint school division, the City of Emporia and Greensville County which operate a joint school division, and the City of Williamsburg and James-City County which operate a joint school division. This adjustment reduced the total number of students considered for the predictive model to 8,621.

Summary

Chapter Three delineated the research design and methodology of this quantitative, ex post facto study. The comparison of local wealth, as measured by the composite index of ability-to-pay, with dual enrollment participation and subsequent enrollment in postsecondary education is a valid area of research interest which merits

further exploration. The next chapter will contain an analysis of the data and the final chapter will contain a discussion of the findings and conclusions.

CHAPTER IV: RESULTS

The purpose of this quantitative, ex post facto study was to determine if there is a relationship between the wealth of the locality in which each student's school division is located and the rate of dual enrollment participation in community colleges serving Virginia school divisions. Utilizing the composite index of local ability-to-pay, calculated every biennium by the Virginia Department of Education as a measure of local wealth to determine the state and local shares of mandated expenditures for K-12 public education, research questions were designed to measure whether local wealth influenced participation in dual enrollment. The relationships between local wealth and dual enrollment rate in urban, suburban, and rural school divisions respectively were examined. Finally, local wealth was analyzed to determine if it was a statistically significant predictor of the rate of dually enrolled students who subsequently enrolled in a community college or in a four-year institution.

The results of the research are presented in this chapter. The findings include tables providing descriptive statistics and the results of the predictive models. The statistical procedures performed in the predictive analysis for this study include various linear regression analyses. Supplemental explanatory appendices are also provided.

Descriptive Statistics

Dual enrollment students ($N = 9062$) in the sample were predominantly female (57.1%), white (81.7%), and enrolled in four-year public or private colleges or universities in the fall of 2006 following their high school graduation in the spring of 2006 (60.3%). Descriptive statistics on the demographic information on these students

are provided in Table 1. A detailed demographic profile of these students separated by the college in which they are dually enrolled is found in Appendix F. A detailed listing of the gender distribution separated by the college in which they are dually enrolled is found in Appendix G. Descriptive statistics on the profile of the graduating high school students participating in dual enrollment in the spring of 2006 who pursued postsecondary education in the fall of 2006 are provided in Table 2 and detailed data are located in Appendix H.

Table 1

Descriptive Statistics for Dual Enrollment Students' Demographic Information

(*N* = 9062)

Variable	Categories	Frequency	Percent
Gender	Male	3886	42.9
	Female	5176	57.1
Ethnicity	African American	1187	13.1
	American Indian/Alaskan	31	.3
	Asian/Pacific Islander	199	2.2
	Hispanic	134	1.5
	Not Specified	105	1.2
	White	7406	81.7

Table 2

Descriptive Statistics for Postsecondary Enrollment Information of Spring 2006 Dual Enrollment Students (N = 9062)

Enrollment Status in Fall 2006	Frequency	Percent
Virginia Community College	283	3.1
Public or Private Institution	5466	60.3
Did Not Enroll	3316	36.6

For the purposes of this study, six jurisdictions encompassing three joint school divisions were removed because local wealth cannot be separated in those instances. A summary count of the 130 remaining school divisions and their classification codes as urban, rural, or suburban is found in Table 3.

Table 3

Summary Count of School Divisions by Locale Classification (N=130)

Classification	Frequency	Percentage
Urban	16	12.30%
Suburban	16	12.30%
Rural	98	75.40%

For the independent variable, local wealth as measured by the composite index, descriptive statistics were computed for urban, suburban, and rural school divisions and are listed in Table 4.

Table 4

Mean Composite Index Scores for Classifications of School Divisions

Classification	<i>M</i>	<i>SD</i>	N	Range
Urban	.4216	.1896	16	.2100 to .8000
Suburban	.4903	.1920	16	.2343 to .8000
Rural	.3656	.1272	98	.1845 to .8000

For the dependent variable, dual enrollment participation rates, descriptive statistics were computed for urban, suburban, and rural school divisions and are listed in Table 5.

Table 5

Mean Dual Enrollment Participation Rates for Classifications of School Divisions

Classification	<i>M</i>	<i>SD</i>	N	Range
Urban	.8026	.7221	16	.0057 to 2.186
Suburban	.6512	1.025	16	.0000 to 2.797
Rural	1.627	1.001	98	.0654 to 6.227

Predictive Models

The purpose of this quantitative, ex post facto study was to determine the relationship between the wealth of the locality in which each student's school division is located and the rate of dual enrollment participation in community colleges serving Virginia school divisions. The relationship between local wealth and dual enrollment rate in urban, suburban, and rural school divisions was examined, and local wealth was analyzed to determine if it was a statistically significant predictor of the rate of these students who subsequently enrolled in a community college or in a four-year institution.

To answer these questions, a series of linear regression analyses was performed to determine to what extent local wealth predicted the participation rates of dual enrollment students from Virginia high schools at Virginia's community colleges in general and by urban, suburban, and rural distinctions as well as whether local wealth predicted the rate of postsecondary enrollment in the fall following the students' graduation from high school.

Research Question 1: Predictive Relationship between Local Wealth and Dual Enrollment Rate

To answer research question 1, a linear regression was performed with local wealth as the predictor variable and dual enrollment rate as the criterion variable. The results are shown in Table 6.

Table 6

Linear Regression Results for Relationship between Local Wealth and Dual Enrollment Participation Rate

<i>F</i>	<i>Df 1</i>	<i>Df 2</i>	<i>p</i>	<i>R²</i>
2.882	1	123	.092	.023

* $p < .05$

The results of the linear regression failed to support the predictive relationship between local wealth and dual enrollment rate, $F(1, 123) = 2.88$, $p > .05$, $R^2 = .02$.

Research Question 2: Predictive Relationship between Local Wealth and Dual Enrollment Rate in School Divisions by Jurisdiction

Research question 2 measured the relationship between local wealth and the rate of student participation in dual enrollment programs at school divisions in Virginia by jurisdiction, categorizing school divisions as either urban, suburban, or rural utilizing the locale code system developed by the National Center for Education Statistics (NCES). Eleven school divisions were classified in a “town” category and these school divisions’ locale codes had to be converted to either an urban, suburban, or rural classification for the purposes of this study. The school divisions originally classified as “town” in the NCES system which were converted to another classification are listed in Appendix D.

To answer research question 2(a), a linear regression was performed with local wealth in urban school divisions as the predictor variable and dual enrollment rate in urban school divisions as the criterion variable. The results of the linear regression for question 2(a) are displayed in Table 7.

Table 7

Linear Regression Results for Relationship between Local Wealth and Dual Enrollment Participation Rate for Urban Jurisdictions

<i>F</i>	<i>Df 1</i>	<i>Df 2</i>	<i>p</i>	<i>R²</i>
.095	1	13	.763	.007

* $p < .05$

The results of the linear regression failed to support the predictive relationship between local wealth and the dual enrollment rate in urban school divisions, $F(1, 13) = .095$, $p > .05$, $R^2 = .007$.

To answer research question 2(b), a linear regression was performed with local wealth in suburban school divisions as the predictor variable and dual enrollment rate in suburban school divisions as the criterion variable. The results of the linear regression for question 2(b) are displayed in Table 8.

Table 8

Linear Regression Results for Relationship between Local Wealth and Dual Enrollment Participation Rate for Suburban Jurisdictions

<i>F</i>	<i>Df 1</i>	<i>Df 2</i>	<i>p</i>	<i>R²</i>
.774	1	10	.400	.072

* $p < .05$

The results of the linear regression failed to support the predictive relationship between local wealth and the dual enrollment rate in suburban school divisions, $F(1, 10) = .77$, $p > .05$, $R^2 = .07$.

To answer research question 2(c), a linear regression was performed with local wealth in rural school divisions as the predictor variable and dual enrollment rate in rural school divisions as the criterion variable. The results of the linear regression for question 2(c) are displayed in Table 9.

Table 9

Linear Regression Results for Relationship between Local Wealth and Dual Enrollment Participation Rate for Rural Jurisdictions

<i>F</i>	<i>Df 1</i>	<i>Df 2</i>	<i>p</i>	<i>R²</i>
.463	1	96	.498	.005

* $p < .05$

The results failed to support the predictive relationship between local wealth and the dual enrollment rate in rural school divisions, $F(1, 96) = .46$, $p > .05$, $R^2 = .01$. For all classifications of school divisions utilized in this question for this study (urban, suburban, and rural), the results for all linear regression analyses did not support a predictive relationship.

Research Question 3: Predictive Relationship between Local Wealth and Subsequent Rate of Enrollment in a Virginia Community College among Dual Enrollment Students

To answer research question 3, a linear regression was performed with local wealth as the predictor variable and the rate of enrollment in a Virginia community college among dual enrollment students in the fall of 2006 as the criterion variable. The results are displayed in Table 10.

Table 10

Linear Regression Results for Relationship between Local Wealth and Subsequent Virginia Community College Enrollment in Fall after High School Graduation

<i>F</i>	<i>Df 1</i>	<i>Df 2</i>	<i>p</i>	<i>R</i> ²
.027	1	73	.869	<.001

* $p < .05$

The results failed to support the predictive relationship between local wealth and enrollment in a Virginia community college in the fall of 2006, $F(1, 73) = .03$, $p > .05$, $R^2 < .001$.

Research Question 4: Predictive Relationship between Local Wealth and Subsequent Rate of Enrollment in Four-Year Institutions among Dual Enrollment Students

To answer research question 4, a linear regression was performed with local wealth as the predictor variable and the rate of enrollment in a public or private four-year institution of higher education among dual enrollment students in the fall of 2006 as the criterion variable. The results are displayed in Table 11.

Table 11

Linear Regression Results for Relationship between Local Wealth and Subsequent Four-Year College Enrollment in Fall after High School Graduation

<i>F</i>	<i>Df 1</i>	<i>Df 2</i>	<i>p</i>	<i>R</i> ²
7.931*	1	119	.006	.062

* $p < .05$

The results lent support to the predictive utility of local wealth for the rate of enrollment in a four-year college or university among dual enrollment students in the fall of 2006, $F(1, 119) = 7.93, p < .05, R^2 = .06$. The size of R^2 suggested a moderate relationship between the predictor and the criterion variable. In specific, around 6% of variance in the rate of enrollment in a four-year postsecondary institution was predictable by local wealth.

Summary

This chapter has introduced the findings of the study. Descriptive statistics were cited along with the results of the predictive models used to answer the research questions. The findings presented in this chapter identified one variable with a predictive relationship. The next chapter will provide a summary of these results and will provide ideas on the implications of these findings.

CHAPTER V: SUMMARY

The final chapter of this study will contain an overview of the problem, the methodology and research questions which guided the study, major findings, and suggestions for future research. The major sections of this chapter will briefly review the background of the study, the problem which was examined, the research questions which guided the study, the significance of the study, a review of the methodology, and the findings. The findings will be discussed and include implications for action for researchers and practitioners. Finally, the chapter will contain suggestions for future research based upon the results of this study.

Overview of the Problem

Other countries are now educating a higher percentage of their citizens to more advanced levels than is occurring in the United States (U. S. Department of Education, 2006). The ranking of the United States has dropped from first in the world thirty years ago to fifteenth in 2009, the last year that the internationally renowned Organization for Economic Cooperation and Development studied the topic (Wessell & Banchemo, 2012). Both the current Governor of Virginia, Robert McDonnell, and President Barack Obama have promised to change the trend. Governor McDonnell's Executive Order No. 9 issued in 2010 called for 100,000 additional associate and bachelor's degrees by 2025; President Obama has vowed that the United States will once again have the highest proportion of college graduates in the world by 2020 (Greene, 2009).

One of the problems cited which has contributed to the decline in postsecondary education on a national scale in the United States is that the link between many public school systems and higher education should be strengthened (Kirst & Venezia, 2004);

public school systems need to view that preparation of students for life after high school is their responsibility. A potential solution to this problem is dual enrollment. Also known as dual credit, concurrent enrollment, college in the high school, and joint enrollment (Hoffman, Vargas, & Santos, 2008), dual enrollment enables a broad range of students not only to complete high school on time but to also receive credit toward a postsecondary credential. Initiatives to expand dual enrollment have continued in recent years (Cohen & Brawer, 2008), as the national call for more affordable higher education continues unabated, driven by diminishing public appropriations and support which have precipitated rising student debt levels and less affordable tuition.

In Virginia, the availability of dual enrollment classes for high school students has historically varied, depending on the interest of the local school division and the community college's president in whose service region the school division is located. The 2012 session of the Virginia General Assembly brought about the passage of HB 1184, which stipulates that the opportunity must be available for all high school students throughout the Commonwealth to be able to participate in dual enrollment and either receive a Uniform Certificate of General Instruction or an associate degree, with agreements signed between every school division and every community college by April 15, 2013 (Legislative Information System, 2012). Research conducted by the Virginia Community College System and the Virginia Department of Planning and Budget as background documentation for the legislation revealed that dual enrollment was more established and available in school jurisdictions in rural and economically disadvantaged parts of Virginia than in school divisions with a more affluent population (Legislative Information System, 2012; VCCS, February 2012).

The funding of dual enrollment programs between students, school divisions, and community colleges is not uniform. The costs are shared between school divisions, the community college sponsoring dual enrollment, and the parents; every community college president and every school superintendent negotiate dual enrollment agreements independently and there is no systematic approach to the pricing of dual enrollment. Although these funding arrangements vary around the state, this is not unusual compared to a review of policies in other states (Karp, Bailey, Hughes & Fermin, 2005). Since school divisions in Virginia are not fiscally autonomous, the local governing body in which the school division is located annually appropriates a local match as required by a formula of “local ability-to-pay” known as the composite index and often provides additional funding beyond the minimum requirement. For the year of this study (2006), local funding for Virginia’s public schools was \$5,804,255,290 compared to state funding of \$3,858,274,469 (VDOE, 2012c). Therefore, the funding to support dual enrollment historically in Virginia can be reliant on the local government’s tax base and local wealth.

Both the high school and their community college partner currently receive funding from the Commonwealth of Virginia for dual enrollment students through average daily membership (ADM) formulas and full-time equivalents (FTE) (Westcott, 2009). The underlying framework for local funding of school divisions in Virginia is based upon a computation known as the composite index. This measure takes into account the true value of real property, adjusted gross income, taxable retail sales, average daily membership of the school division measured on March 31, and total population of the local jurisdiction.

As dual enrollment must now be available to every high school student under HB 1184, it is important to examine the relationship of local wealth to dual enrollment participation in Virginia's community colleges and to analyze whether this local wealth predicts the rate of participation in urban, suburban, and rural jurisdictions. Since it is a public policy priority on both the state and national stage to increase a higher percentage of citizens to more advanced levels, the local wealth factor must also be examined to determine if it influenced the subsequent enrollment of these students in either a Virginia community college or a four-year institution following the students' graduation from high school.

Purpose Statement and Research Questions

The purpose of this quantitative, ex post facto study was to determine the relationship between the wealth of the locality in which each student's school division is located and the rate of dual enrollment participation in community colleges serving Virginia school divisions. The relationship between local wealth and dual enrollment rate in urban, suburban, and rural school divisions was examined, and local wealth was analyzed to determine if it was a statistically significant predictor of the rate of these students who subsequently enrolled in a community college or in a four-year institution.

The study was guided by the following research questions:

1. Is there a predictive relationship between local wealth and the rate of student participation in dual enrollment programs at school divisions in Virginia?
2. Is there a predictive relationship between local wealth and the rate of student participation in dual enrollment programs at school divisions in Virginia by jurisdiction?

2(a) Is there a predictive relationship between local wealth and the rate of student participation in dual enrollment programs at urban school divisions?

2(b) Is there a predictive relationship between local wealth and the rate of student participation in dual enrollment programs at suburban school divisions?

2(c) Is there a predictive relationship between local wealth and the rate of student participation in dual enrollment programs at rural school divisions?

3. Is there a predictive relationship between local wealth and the rate of enrollment in community colleges for dual enrollment participants at school divisions in Virginia?

4. Is there a predictive relationship between local wealth and the rate of enrollment in four-year institutions for dual enrollment participants at school divisions in Virginia?

To answer these questions, a series of linear regression analyses were performed to determine to what extent local wealth predicted the participation rates of dual enrollment students from Virginia high schools at Virginia's community colleges in general and by urban, suburban, and rural distinctions. In addition, linear regression analyses were performed to determine whether local wealth predicted the rate of postsecondary enrollment in the fall following the students' graduation from high school.

Review of the Methodology

Ex post facto data were gathered from the website of the Virginia Department of Education for local wealth, as measured by the composite index of local ability-to-pay, for the 2004-2006 biennium. These data were used to create the independent variable. Data were also collected from the Virginia Department of Education's website for average daily membership (ADM) in 2006. Data for Virginia high school students who were participating in dual enrollment at a Virginia community college in the spring of

2006 were obtained from the Department of Academic Services and Research at the Virginia Community College System and this data, divided by the students in average daily membership in each school division, yielded the dependent variable in research questions one and two. Data forming the dependent variable in research questions three and four for postsecondary enrollment status for the fall of 2006 were obtained from the Department of Academic Services and Research at the Virginia Community College System; this postsecondary enrollment status data originated from the National Student Clearinghouse.

Descriptive statistics were then provided to describe the sample used for this study. A series of linear regression analyses were conducted to answer the research questions.

Summary of Major Findings

For the predictive models calculated, a linear relationship was not established between local wealth and dual enrollment participation in research questions 1, 2, 2(a), 2(b), and 2(c). In addition, local wealth did not predict enrollment in a Virginia community college in the fall after the student's spring graduation from high school (research question 3). Research question 4 revealed that there was a moderate relationship between local wealth and subsequent enrollment of dual enrollment students in a public or private four-year institution in the fall following spring graduation. The results of this linear regression lent support to the predictive utility of local wealth for the rate of enrollment in a four-year college or university among dual enrollment students in the fall of 2006 using a 95% confidence interval. The size of the R^2 suggested a moderate relationship between the predictor and the criterion variable; specifically,

approximately 6% of variance in the rate of enrollment in a four-year postsecondary institution was predictable by local wealth. Descriptive statistics revealed that there were more females (57.1%) than males (42.9%) participating in dual enrollment in the spring of 2006. Of these participants, 81.7% were white; African Americans comprised the next largest ethnic group at 13.1% of the total students participating (Table 1). The largest concentration of high school students receiving dual enrollment instruction in the spring of 2006 were enrolled as students at Virginia Western Community College (Appendix F); the school division with the highest participation rate of dual enrollment students was in the town of West Point (Appendix E) with 6.227% of all students in Average Daily Membership in 2006 participating.

Composite index scores in this study ranged from a low of .1845 in Lee County to the capped highest rate of .8000 in Arlington, Bath, Goochland, and Surry Counties and the Cities of Alexandria, Falls Church, and Fairfax City (Appendix E). This group of school divisions with a composite index of .8000 represented urban (Arlington, Alexandria), suburban (Falls Church, Fairfax City) and rural (Bath, Goochland, Surry) school divisions.

Findings Related to the Professional Literature

Prior research has been incomplete on the effect of local wealth on dual enrollment participation in community colleges. Although local wealth in this study encompasses a measure which includes the wealth of the locality which provides local funding to the school division, wealth in other studies on dual enrollment participation and subsequent enrollment in postsecondary education has focused on income of the dually enrolled student or their family. Struhl and Vargas (2012) concluded that dual

enrollees from low-income families in Texas were more likely to attend a four-year college after high school than students from low-income families who did not participate in dual enrollment. The current study concluded that there was a predictive utility of local wealth for the rate of subsequent enrollment in a four-year college or university in the fall after spring graduation. The study by Struhl and Vargas (2012) also found that Texas high school students who completed college courses through dual enrollment were nearly 50 percent more likely to earn a college degree from a Texas college within six years than students who had not participated in dual enrollment.

Callan et al (2009) concluded that state finance is underutilized to promote cooperation among secondary and postsecondary institutions in the P-16 continuum. States have not used financial incentives to promote P-16 alignment, and state funding for dual enrollment is used in only half of the states (Callan et al., 2009). The current study found that state funding is provided for dual enrollment through both the K-12 funding formula and through the public higher education funding formula.

A total of 27 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 (Boswell, 2001 in Hunt, 2007). Consistent with research conducted by Westcott in 2009, the current study confirms that Virginia is one of the states in which dual enrollment students are counted toward full-time equivalent (FTE) by the community colleges and average daily membership by the public school divisions.

Research conducted by the Virginia Community College System in 2012 indicated that dual enrollment was more established at community colleges in rural and economically disadvantaged parts of Virginia. The current study's findings concluded

that the rural category's predominance was also consistent at the school division level with 75.40% of school divisions being classified as rural according to the locale code classification system established by the National Center for Education Statistics.

Westcott (2009) found that dual enrollment participation has many positive benefits for Virginia students and that students with prior dual enrollment coursework had higher rates of degree attainment and took less time to complete a bachelor's degree than students who did not participate in dual enrollment. Struhl and Vargas (2012) concluded that Texas high school students who completed college courses through dual enrollment were nearly 50 percent more likely to earn a college degree from a Texas college within six years than were students who had not participated in dual enrollment. Ward and Vargas (2012) found that 93% of high school graduates who attempted dual enrollment later earned college credit and 24% of the students earned an Associate's degree or college certificate.

The recommended dual enrollment contract template in Virginia between community colleges and school divisions which was developed in 2012 encourages school divisions and colleges to provide high school students with the opportunity for dual enrollment at no cost to them or their families (VCCS, September 2012). SCHEV (2009) and Callan, Ewell, Finney & Jones (2007) encourage lowering the cost for students as a public policy goal in order for more students in the United States to become educated to more advanced levels as is occurring in other countries. Although a linear relationship was not established as a result of this study between local wealth and dual enrollment participation, consistent pricing which takes into account both state and local

funding sources for the school division, is a policy goal which should be explored and is a finding of the current study.

Unexpected Findings

Gender distribution.

The distribution of male and female dual students in Virginia high schools who were participating in dual enrollment in the spring of 2006 and who graduated is found in Table 1. The percentage of female students (57.1%) to male students (42.9%) was an unexpected finding of this study. Appendix G displays the distribution of male and female students by the community college in which these students participated in dual enrollment. Only four of the twenty-three Virginia community colleges (Eastern Shore, New River, Piedmont Virginia, and Virginia Highlands Community College; Appendix G) had a higher percentage of male students than female students. The preponderance of female dual enrollment students compared to male dual enrollment students is consistent with the national landscape and literature for male and female student enrollment in higher education, however. There have been more females than males enrolled in higher education since the 1970s (Borzelleca, 2012) and females have steadily increased their numerical participation ever since; in 2008, the national average for enrollment in public universities was 43.62% male to 56.38% female. A study released by the National Center for Education Statistics in 2012 (Ross et al., 2006) found that the percentage of high school seniors with postsecondary aspirations who consulted college websites, publications, or search guides for information on college entrance requirements was higher for females (80%) than males (60%) and that a higher percentage of females (83%) than males (76%) who had graduated from high school in 2004 had ever attended

a postsecondary institution by 2006. This study (Ross et al., 2006) also concluded that a higher percentage of females also enrolled immediately in a postsecondary institution than did males (74% and 67%, respectively). In addition, a study of Tennessee high school graduates participating in dual enrollment through a Tennessee community college (McCormick) concluded that females were more likely to continue in postsecondary education after graduation from high school than their male counterparts.

Postsecondary enrollment status.

This study found that 36.6% of the high school seniors who were participating in dual enrollment classes in the spring of 2006 in Virginia's community colleges did not enroll in either a Virginia community college or a four-year public or private college or university in the fall of 2006. This is an unexpected finding of the study. It was also unexpected that more students chose to enroll in a four-year institution than in a community college since Speroni (2011) found that dual enrollment students were less likely to enroll in a four-year college after high school than Advanced Placement students.

The current study concluded that most dual enrollment students went directly to four-year institutions (60.3%) instead of beginning at a Virginia community college (3.1%) in the fall of 2006 (Table 2). A possible explanation for the variation in postsecondary enrollment status is that transfer between a Virginia community college and a four-year institution in 2006 was not guaranteed and students could have been concerned that community college credits would not necessarily transfer to the four-year institution. Although guaranteed admission agreements between Virginia's community colleges and public and private four-year institutions are now prevalent, legislation

requiring four-year institutions to develop articulation agreements between themselves and Virginia community colleges did not occur until July 1, 2005. Implementation of HB 2866, the Virginia Restructured Higher Education Financial and Administrative Operations Act, outlined that four-year public institutions of higher education should develop articulation agreements that have “application to all Virginia community colleges and meet appropriate general education and program requirements at the four-year institution, provide additional opportunities for associate degree graduates to be admitted and enrolled, and offer dual enrollment programs in cooperation with high schools” (Legislative Information Systems, Chapter 4.10, Section 23.38.88, 11-12). Once HB 2866 took effect, time was needed for the four-year institutions to work with the Virginia community college system to prepare the agreements and for momentum to accelerate for the concept. There are now 31 guaranteed admissions agreements between Virginia community colleges and four-year institutions: 12 agreements between Virginia community colleges and public four-year institutions, 13 agreements between Virginia community colleges and private four-year institutions, and 6 agreements between Virginia community colleges and other four-year institutions (VCCS, 2013).

Ethnic representation.

One of the unexpected findings of this study was the extremely low percentage of Hispanic students participating in dual enrollment. The Hispanic student definition by the National Student Clearinghouse that identifies the race/ethnicity of students in this study is the same as the definition utilized by the Integrated Postsecondary Education Data System (IPEDS), that “Hispanic or Latino” refers to a person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin regardless of race.

There is a notable discrepancy between the number of Hispanic dual enrollment participants and the number of Hispanic or Latino Virginians, both in the general population and in K-12 education. In the current study, only 1.5% of Hispanic students participated in dual enrollment. The 2010 Census reported that 8% of the Virginia population was Latino and that 9% of the K-12 students were Latino (Excelencia in Education, 2010).

A study of Latino degree attainment in Virginia (Excelencia in Education, 2010) highlighted the importance of Latino degree attainment in order for the U. S. to regain the top ranking in the world for college degree attainment by 2020. In 2007-2008, an equity gap between white and Latino students was cited in college graduation rates, completions per 100 FTE students, and total undergraduate degrees and certificates awarded per 1,000 adults aged 18 to 44 relative to the adult population with no college degree (Excelencia in Education, 2012). The Lumina Foundation (2012) identified that 28% of Latino adults had earned an associate degree or higher, compared to 44% of all adults. Although the current study did not include a focus on local wealth of school divisions which screened for ethnic group, further research could be pursued to examine the role of local wealth in dual enrollment participation by ethnic group.

Conclusions

The findings of this study and the literature review which supports this study reveal a number of implications for practitioners and for further research.

Implications for action and recommendations for practitioners.

Pursuant to HB 1184 from the 2012 General Assembly which outlines that all school divisions must offer dual enrollment opportunities for high school students, agreements

between all 23 Virginia community colleges and every school division were signed by April 15, 2013. Previous research indicates that public policy should minimize or eliminate the cost of dual enrollment to students and their families while there is a national need for more students to go to college. Although local wealth, as measured by the composite index of local ability-to-pay, was not a predictor of dual enrollment participation nor enrollment in a two-year institution after high school graduation, its moderate relationship to enrollment in a four-year institution after high school graduation indicates that a uniform model of cost-sharing between community colleges and local school divisions, and the state and local funding streams which support them, should be considered. These results also lead to the conclusion that the range for local wealth as measured by the composite index of ability-to-pay is compressed and narrow (ranging from .1845 to .8000) and that a study using another indicator of local wealth may prove a stronger relationship. The results also led to the determination that the Commonwealth of Virginia should examine whether or not the composite index of local ability-to-pay continues to be the best measure for measuring local wealth for K-12 funding.

This study did not measure Advanced Placement participation rates by jurisdiction; the low rate of dual enrollment participation in certain jurisdictions indicates that these school divisions may be offering Advancement Placement classes to students instead of dual enrollment as a means to provide high school and college credit.

Advanced Placement offers advanced high school students with the opportunity to experience college-level academic coursework along with an end-of-course examination which measures mastery of the content (Chajewski, Mattern & Shaw, 2011). Advanced Placement classes may be offered at no cost to students and the \$89 examination fee is

the only cost that is usually associated with them. In contrast, parents may share in all or some of the cost of community college tuition for a dual enrollment class. In high schools in which both dual enrollment and Advanced Placement classes are offered, this price differential may drive students away from dual enrollment and toward Advanced Placement. For low-income parents, paying for dual enrollment classes could be prohibitive while Advanced Placement classes for their children are much more affordable.

The public policy goal of offering dual enrollment at no cost to students and their families combined with the more affordable option of Advanced Placement leads to the conclusion that the varying pricing of dual enrollment around the state is no longer defensible. Offering financial aid to high school students who are participating in dual enrollment may be a policy that should be considered in order to increase dual enrollment participation. Alternatively, a uniform pricing model should be developed, considered, and implemented in the 2013-2014 fiscal year. Because of the declining public funding base, the pricing of dual enrollment needs to cover the costs to offer the program. A task force to study the issue and make recommendations should be appointed to include representatives from the Virginia Community College System as well as other stakeholder groups including the Virginia PTA, the Virginia Association of School Boards, the Virginia Association of School Superintendents, the Virginia Association of Counties and the Virginia Municipal League.

The low participation rate of Latino students in dual enrollment should be expanded in order to increase the number of college degree recipients throughout Virginia. Northern Virginia Community College developed the Pathway to the

Baccalaureate Program to increase access to and success in higher education for students identified as at-risk in Northern Virginia who are academically capable. Of the total student participants, 35% are Latino. Latino students in this program have an 86% transition rate from high school into higher education. Although the Pathway program is not currently a dual enrollment program, the implementation of HB 1184 will likely mean that dual enrollment will need to be incorporated into the Pathway program. Moreover, elements of the Pathway program which encourage Latino student success could be scaled up and integrated into dual enrollment program efforts in other parts of Virginia.

With the emphasis on the attractive value of community colleges compared to four-year institutions, more dual enrollment students should take advantage of a two-year associate degree that is transferable under the vast number of guaranteed admissions agreements to four-year institutions. The low frequency of dual enrollment students who subsequently enrolled in a Virginia Community College in the fall after graduating from high school as detected in this study is alarming and could be explained by the inconsistent dual enrollment pricing model. The Virginia Community College System and individual college presidents must make it a priority to enhance marketing efforts of dual enrollment and guaranteed transfer to public school superintendents, guidance counselors, and parents. A statewide marketing campaign which outlines that students can achieve their dream of attending a top choice four-year institution by first starting at a local community college and completing the guaranteed transfer path should be developed. Benefits to be emphasized include an accurate quantification of the cost savings of community college tuition compared to four-year tuition, the lower out-of-

pocket expenses for the student who lives at home while attending community college compared to room and board at a four-year institution, the resulting lower amount of student debt resulting from savings in both tuition and room and board, and the certainty of ultimately achieving a bachelor's degree at a prominent four-year institution.

Individual colleges could adopt elements of this statewide marketing campaign to develop customized marketing plans for their own institutions which are directed to students in their service regions. Outreach efforts by community colleges to high school guidance counselors, including workshops and marketing materials which fully explain the benefits of guaranteed transfer agreements, would encourage them to steer dual enrollment students to this path.

Community college career coaches, who are part-time community college employees located in public high schools, should also receive training as advocates for educating students about dual enrollment and the transfer opportunities that exist between Virginia's community colleges and four-year institutions. Another measure that could ultimately be developed would trigger an alert by four-year admissions personnel to career coaches and high school guidance counselors when students rejected for admission by the four-year institution still have qualifications which could make successful as a community college associate degree recipient who transfers under a guaranteed transfer agreement.

Recommendations for further research.

This study has illuminated a number of areas that can be pursued for further research. The base year for this study was chosen because the data from that year was available when the research began; a replication of this study using later years could be

undertaken, particularly in 2008 and beyond once guaranteed transfer agreements between community college students and four-year institutions were initiated and underway.

A number of research avenues could be pursued to measure why dual enrollment students did not pursue postsecondary enrollment in the fall after high school graduation. A longitudinal study which followed the same group of students would reveal if any of these students went directly to work or enrolled in military service, and if they eventually enrolled in a Virginia community college or a four-year institution. A study examining the academic performance of the dual enrollment graduates could provide an explanation of the decision not to pursue postsecondary education. A qualitative study of these students utilizing personal interviews could uncover reasons why they did not attend college in the fall following high school graduation.

Different indicators for local wealth other than the composite index could be utilized including some of the data which form the composite index calculation such as the true value of property or adjusted gross income in each jurisdiction. Per capita income could also be used as a measure of local wealth. Comparing dual enrollment participation and Advanced Placement participation with local wealth as measured by the composite index of ability-to-pay or some other wealth measure would be a noteworthy research endeavor. A study of Virginia community colleges for dual enrollment participation which compares urban, suburban, and rural community colleges using the Carnegie System of Classification could be initiated.

Dual enrollment is an answer to college and career readiness. Policymakers should support the needs of students who are interested in dual enrollment in technical as

well as academic courses (Karp, Bailey, Hughes & Fermin, 2005). Analyzing the type and number of classes that the students in the current study took and separating them into career-technical or academic classifications could yield interesting results and provide an explanation of why some students went to college or did not enroll in postsecondary education after graduation.

Following a cohort of dual enrolled students from a particular school division through postsecondary enrollment status and conducting a mixed-methods approach using focus groups or other qualitative interviews would establish findings that could be utilized to enhance dual enrollment programs. A group that has not received a focus at all in this study is the population of home-schooled students who are increasingly participating in dual enrollment in Virginia; an analysis of their participation patterns throughout the state and the resulting enrollment metrics with school divisions and community colleges could be meaningful.

Summary and Final Remarks

Dual enrollment opportunities for Virginia students will increase in the foreseeable future. A range of students will not only be able to complete high school, but will have the chance to obtain either a Uniform Certificate of General Studies or an associate degree through any Virginia community college, regardless of the school division in which they are attending high school. The current practice of different pricing structures between parents, students, school divisions, and community colleges will need to change and become more uniform as dual enrollment expands on a statewide basis. As more demands are placed on state and local budgets, the current practice of funding a dual enrollment student as both a full-time equivalent (FTE) in the community college

funding formula and as a student in Average Daily Membership (ADM) in the school division's funding formula is likely to be challenged as public finance becomes more transparent and the public demand for efficiency and cost effectiveness increases. The involved stakeholders should discuss and research a number of equitable options through which dual enrollment can be continued and expanded with the public policy goal of reducing or eliminating the direct cost to the student or their families while balancing the state and local funding obligations; reasonable recommendations for approval and implementation can be formed. Without such involvement and leadership, other groups including legislators and taxpayers' organizations could impose a pricing structure that is unsuitable, inequitable or that somehow shortchanges the students and makes them less likely to pursue postsecondary education. The good news is that achieving higher levels of postsecondary education for students to enhance their competitiveness in the global economy is a state and national goal and community college leaders should seize the opportunity to make dual enrollment more affordable for students and their families.

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2004-2006 COMPOSITE INDEX OF LOCAL ABILITY-TO-PAY

COMPOSITE INDEX VALUES AND COMPOSITE INDEX, 2004-2006

APPENDIX A

DivNum	DIVISION	INDICATORS OF ABILITY-TO-PAY (BASE YEAR: 2001)					2004-2006 COMPOSITE INDEX
		TRUE VALUE OF PROPERTY	ADJUSTED GROSS INCOME	TAXABLE RETAIL SALES	MARCH 31, 2002 ADM	TOTAL POPULATION	
001	ACCOMACK	\$1,989,787,842	\$384,892,181	\$212,844,891	5,174	38,700	2884
002	ALBEMARLE	\$8,945,548,172	\$2,107,018,203	\$919,852,987	11,995	85,800	6054
003	ALLEGHANY	\$850,410,104	\$244,211,410	\$83,226,413	2,948	16,800	2683
004	AMELIA	\$780,977,477	\$170,844,083	\$41,881,287	1,708	11,500	3518
005	AMHERST	\$1,538,987,069	\$408,581,464	\$189,351,843	4,589	31,800	2940
006	APPOMATTOX	\$759,859,143	\$183,115,521	\$83,090,549	2,332	13,700	2797
007	ARLINGTON	\$32,349,417,881	\$8,965,468,168	\$2,283,125,622	18,450	192,100	8000
008	AUGUSTA	\$4,276,347,158	\$1,088,383,878	\$328,787,810	10,685	65,800	3434
009	BATH	\$2,228,770,818	\$78,048,140	\$89,728,243	795	5,000	8000
010	BEDFORD COUNTY	\$4,355,528,406	\$1,095,441,896	\$185,211,371	9,619	61,000	3714
011	BLAND	\$331,234,189	\$81,005,681	\$13,562,950	892	8,900	2827
012	BOTETOURT	\$2,306,171,874	\$574,989,298	\$148,248,858	4,897	30,500	4061
013	BRUNSWICK	\$814,197,998	\$179,191,294	\$52,580,989	2,368	18,300	2568
014	BUCHANAN	\$1,538,793,823	\$241,790,548	\$114,597,950	3,882	26,300	2788
015	BUCKINGHAM	\$786,537,865	\$154,409,248	\$40,081,804	2,233	15,600	2527
016	CAMPBELL	\$2,540,249,878	\$723,863,283	\$274,767,421	8,609	50,700	2768
017	CAROLINE	\$1,367,382,672	\$335,162,514	\$87,598,570	3,713	22,200	3109
018	CARROLL	\$1,694,858,297	\$296,805,805	\$113,938,509	3,947	29,400	3001
019	CHARLES CITY	\$517,588,607	\$122,305,753	\$15,044,382	919	7,000	4199
020	CHARLOTTE	\$846,343,370	\$131,382,748	\$38,049,330	2,204	12,600	2331
021	CHESTERFIELD	\$18,092,293,556	\$6,057,151,194	\$2,823,908,808	52,337	264,600	3785
022	CLARKE	\$1,424,655,969	\$317,088,518	\$65,609,346	1,995	13,000	5548
023	CRAIG	\$332,236,470	\$67,301,868	\$9,484,075	706	5,100	3356
024	CULPEPER	\$2,412,739,339	\$643,903,474	\$376,135,572	5,777	35,200	3919
025	CUMBERLAND	\$550,495,873	\$99,597,961	\$19,018,714	1,309	9,000	2943
026	DICKENSON	\$936,793,205	\$142,843,550	\$47,977,617	2,642	16,000	2492
027	DINWIDDIE	\$1,485,445,568	\$354,506,460	\$66,631,327	4,333	24,800	2844
028	ESSEX	\$819,662,462	\$142,701,895	\$140,120,075	1,800	10,000	4175
029	FAIRFAX COUNTY	\$133,045,291,218	\$38,174,037,587	\$11,005,561,945	155,835	980,500	7489

2004-2008 COMPOSITE INDEX OF LOCAL ABILITY-TO-PAY

DivNum	DIVISION	INDICATORS OF ABILITY-TO-PAY (BASE YEAR: 2001)					2004-2008 COMPOSITE INDEX
		TRUE VALUE OF PROPERTY	ADJUSTED GROSS INCOME	TAXABLE RETAIL SALES	MARCH 31, 2002 ADM	TOTAL POPULATION	
030	FAUQUIER	\$6,878,488,411	\$1,787,309,142	\$465,848,713	9,652	57,400	6193
031	FLOYD	\$927,907,434	\$171,011,553	\$40,212,360	2,018	14,100	3251
032	FLUVANNA	\$1,471,518,184	\$338,902,832	\$47,795,058	3,122	21,400	3595
033	FRANKLIN COUNTY	\$3,805,927,433	\$718,750,933	\$280,137,967	7,031	48,100	3882
034	FREDERICK	\$4,271,402,135	\$1,214,571,270	\$485,557,554	10,711	61,200	3794
035	GILES	\$862,772,071	\$214,092,812	\$102,605,595	2,534	18,500	2948
036	GLOUCESTER	\$2,133,466,111	\$568,475,015	\$223,887,704	6,350	34,900	3132
037	GOOCHLAND	\$2,402,629,329	\$673,632,475	\$102,848,725	2,017	17,200	8000
038	GRAYSON	\$963,290,382	\$177,079,208	\$40,069,440	2,274	16,900	2932
039	GREENE	\$1,004,046,099	\$253,550,508	\$62,425,133	2,643	15,800	3241
040	GREENSVILLE	\$449,933,595	\$134,500,260	\$19,482,535	1,660	11,700	2319
041	*HALIFAX	\$2,857,635,750	\$422,126,777	\$230,766,322	5,965	37,000	3416
042	HANOVER	\$8,229,998,882	\$2,097,483,845	\$1,005,512,673	17,233	89,200	4539
043	HENRICO	\$20,311,999,509	\$6,220,171,902	\$3,902,579,679	42,333	267,400	4834
044	HENRY	\$2,494,809,145	\$717,502,044	\$371,735,139	8,573	57,100	2717
045	HIGHLAND	\$348,361,613	\$34,931,344	\$8,340,587	307	2,500	6274
046	ISLE OF WIGHT	\$2,030,404,149	\$582,543,689	\$152,047,518	4,945	30,100	3743
047	JAMES CITY	\$5,324,982,577	\$1,331,671,381	\$638,692,335	7,732	50,200	5988
048	KING GEORGE	\$1,279,415,097	\$331,563,105	\$73,637,291	3,041	17,000	3700
049	KING AND QUEEN	\$438,405,372	\$86,999,927	\$18,262,943	927	6,700	3376
050	KING WILLIAM	\$716,969,708	\$186,561,590	\$49,240,723	1,797	10,598	3482
051	LANCASTER	\$1,426,440,421	\$210,012,435	\$107,016,818	1,442	11,400	6498
052	LEE	\$814,931,708	\$186,408,968	\$81,400,476	3,781	23,400	1845
053	LOUDOUN	\$27,372,032,361	\$6,881,166,077	\$2,648,165,567	34,082	190,500	7220
054	LOUISA	\$3,839,203,580	\$411,644,810	\$100,458,476	4,216	28,500	5591
055	LUNENBURG	\$607,334,555	\$145,538,930	\$30,335,577	1,790	13,100	2626
056	MADISON	\$1,064,831,585	\$201,015,167	\$63,053,573	1,850	12,700	4194
057	MATHEWS	\$864,819,437	\$148,463,841	\$27,389,099	1,313	9,300	4474

2004-2006 COMPOSITE INDEX OF LOCAL ABILITY-TO-PAY

DivNum	DIVISION	INDICATORS OF ABILITY-TO-PAY (BASE YEAR: 2001)					2004-2006 COMPOSITE INDEX
		TRUE VALUE OF PROPERTY	ADJUSTED GROSS INCOME	TAXABLE RETAIL SALES	MARCH 31, 2002 ADM	TOTAL POPULATION	
058	MECKLENBURG	\$1,914,568,896	\$380,078,298	\$247,072,823	4,927	32,400	3122
059	MIDDLESEX	\$1,119,815,488	\$159,798,518	\$63,780,798	1,307	10,000	5522
060	MONTGOMERY	\$4,165,395,242	\$1,130,032,024	\$711,534,071	9,062	84,300	3877
062	NELSON	\$1,417,473,954	\$223,780,869	\$64,537,671	2,043	14,400	4664
063	NEW KENT	\$1,192,313,730	\$284,301,200	\$55,337,091	2,385	13,800	4177
065	NORTHAMPTON	\$1,044,843,108	\$150,984,362	\$93,045,484	2,112	12,900	3555
066	NORTHUMBERLAND	\$1,483,387,640	\$196,004,382	\$48,648,382	1,490	12,500	5955
067	NOTTOWAY	\$688,890,212	\$183,854,485	\$99,403,191	2,432	15,700	2431
068	ORANGE	\$1,949,277,091	\$500,191,213	\$150,171,517	3,950	26,800	4127
069	PAGE	\$1,297,012,750	\$305,027,256	\$124,133,215	3,512	23,300	3049
070	PATRICK	\$1,031,923,687	\$211,853,980	\$52,612,068	2,634	19,300	2859
071	PITTSYLVANIA	\$2,767,322,469	\$837,535,070	\$145,923,745	8,964	62,000	2694
072	POWhatan	\$1,589,345,017	\$456,248,871	\$74,818,517	3,659	23,200	3787
073	PRINCE EDWARD	\$886,415,687	\$192,028,205	\$211,804,650	2,659	20,000	2906
074	PRINCE GEORGE	\$1,530,854,502	\$491,082,140	\$87,217,837	5,847	33,500	2507
075	PRINCE WILLIAM	\$22,627,358,882	\$6,829,563,371	\$3,068,588,812	58,629	298,300	4086
077	PULASKI	\$1,783,312,719	\$449,181,237	\$225,896,612	4,951	35,000	3074
078	RAPPAHANNOCK	\$1,109,236,110	\$159,719,436	\$27,369,683	1,042	7,000	6905
079	RICHMOND COUNTY	\$557,830,176	\$122,802,712	\$62,423,540	1,248	9,000	3559
080	ROANOKE COUNTY	\$5,508,396,891	\$1,828,881,874	\$652,637,686	13,915	86,800	3926
081	ROCKBRIDGE	\$1,788,741,821	\$307,141,328	\$164,932,503	2,833	20,800	4518
082	ROCKINGHAM	\$4,265,134,683	\$1,192,226,796	\$358,706,460	10,720	68,700	3526
083	RUSSELL	\$1,302,097,770	\$309,744,895	\$101,878,423	4,167	29,600	2496
084	SCOTT	\$832,488,334	\$248,757,785	\$104,758,937	3,831	23,200	2157
085	SHENANDOAH	\$2,499,877,801	\$552,468,685	\$244,367,486	5,517	36,100	3678
086	SMYTH	\$1,291,416,852	\$369,329,891	\$173,280,787	5,080	33,200	2355
087	SOUTHAMPTON	\$994,849,605	\$228,596,094	\$31,797,672	2,786	17,800	2802
088	SPOTSYLVANIA	\$6,996,479,128	\$1,991,697,452	\$922,074,503	20,119	97,500	3573

2004-2006 COMPOSITE INDEX OF LOCAL ABILITY-TO-PAY

DivNum	DIVISION	INDICATORS OF ABILITY-TO-PAY (BASE YEAR: 2001)					2004-2006 COMPOSITE INDEX
		TRUE VALUE OF PROPERTY	ADJUSTED GROSS INCOME	TAXABLE RETAIL SALES	MARCH 31, 2002 ADM	TOTAL POPULATION	
089	STAFFORD	\$7,000,713,178	\$2,072,939,880	\$572,505,190	22,332	98,000	3274
090	SURRY	\$1,953,430,384	\$84,705,510	\$14,196,818	1,165	8,800	8000
091	SUSSEX	\$571,472,303	\$122,683,990	\$46,929,341	1,402	12,300	2961
092	TAZEWELL	\$1,682,001,973	\$558,649,957	\$414,883,974	6,962	43,600	2626
093	WARREN	\$2,178,137,139	\$560,209,820	\$192,383,429	5,062	32,200	3704
094	WASHINGTON	\$2,884,809,786	\$750,038,609	\$439,277,206	7,139	51,100	3553
095	WESTMORELAND	\$1,087,628,517	\$178,811,062	\$47,943,881	1,958	13,511	3801
096	WISE	\$1,423,344,738	\$419,516,015	\$247,460,742	6,842	41,600	2062
097	WYTHE	\$1,482,403,035	\$338,178,552	\$246,937,332	4,311	27,700	3017
098	YORK	\$4,507,305,042	\$1,099,749,756	\$461,360,068	12,010	57,700	3548
101	ALEXANDRIA	\$18,245,866,487	\$4,549,681,558	\$1,755,423,006	10,945	133,400	8000
102	BRISTOL	\$780,609,202	\$349,989,332	\$297,652,087	2,341	17,500	4245
103	BUENA VISTA	\$271,699,503	\$77,295,202	\$28,058,848	1,105	6,300	2322
104	CHARLOTTESVILLE	\$2,851,872,924	\$772,062,811	\$709,893,383	4,143	39,800	6111
106	COLONIAL HEIGHTS	\$1,103,910,257	\$290,362,171	\$542,648,444	2,778	16,900	4721
107	COVINGTON	\$273,803,034	\$75,202,500	\$109,738,343	932	6,300	3221
108	DANVILLE	\$1,819,399,487	\$617,787,376	\$625,668,362	7,412	47,600	2848
109	FALLS CHURCH	\$1,731,860,784	\$499,384,721	\$257,741,494	1,759	10,900	8000
110	FREDERICKSBURG	\$1,507,339,907	\$403,503,612	\$710,913,895	2,278	19,800	7005
111	GALAX	\$340,807,391	\$88,205,862	\$161,097,099	1,278	8,800	3266
112	HAMPTON	\$5,922,596,718	\$1,728,267,485	\$1,062,564,856	22,957	145,600	2521
113	HARRISONBURG	\$2,062,670,700	\$475,813,278	\$771,718,422	3,882	41,300	4804
114	HOPEWELL	\$972,157,607	\$259,109,725	\$143,150,751	3,969	22,400	2343
115	LYNCHBURG	\$3,400,922,534	\$959,797,889	\$1,026,752,377	8,989	65,400	3830
116	MARTINSVILLE	\$596,230,947	\$232,351,337	\$163,456,765	2,655	15,300	2740
117	NEWPORT NEWS	\$7,938,045,840	\$2,298,419,942	\$1,618,081,212	31,440	179,500	2598
118	NORFOLK	\$9,884,465,044	\$2,528,619,448	\$2,325,009,538	34,702	234,000	2681
119	NORTON	\$173,536,511	\$54,180,919	\$113,574,510	725	3,900	3449

2004-2006 COMPOSITE INDEX OF LOCAL ABILITY-TO-PAY

Division	DIVISION	INDICATORS OF ABILITY-TO-PAY (BASE YEAR: 2001)					2004-2006 COMPOSITE INDEX
		TRUE VALUE OF PROPERTY	ADJUSTED GROSS INCOME	TAXABLE RETAIL SALES	MARCH 31, 2002 ADM	TOTAL POPULATION	
120	PETERSBURG	\$1,149,449,198	\$382,451,888	\$286,833,550	5,884	32,700	2197
121	PORTSMOUTH	\$3,568,490,437	\$1,085,338,631	\$392,618,832	16,221	98,900	2100
122	RADFORD	\$595,887,372	\$182,384,178	\$87,252,080	1,555	15,900	3019
123	RICHMOND CITY	\$11,943,878,261	\$3,833,451,281	\$1,897,370,045	25,389	195,800	4334
124	ROANOKE CITY	\$4,850,538,446	\$1,324,943,213	\$1,578,043,491	13,101	95,000	3785
126	STAUNTON	\$1,119,334,123	\$319,805,481	\$329,855,239	2,898	23,500	3683
127	SUFFOLK	\$3,786,832,641	\$1,074,214,402	\$419,863,185	12,003	67,300	3012
128	VIRGINIA BEACH	\$25,902,347,420	\$7,388,888,943	\$3,883,752,990	75,518	428,800	3353
130	WAYNESBORO	\$1,036,989,892	\$280,514,138	\$215,438,576	2,967	19,500	3349
131	WILLIAMSBURG	\$1,085,265,384	\$253,947,291	\$335,092,593	890	12,400	8000
132	WINCHESTER	\$1,783,690,115	\$448,649,633	\$732,720,779	3,466	24,100	5473
134	FAIRFAX CITY	\$3,039,840,936	\$875,495,979	\$705,877,265	2,702	22,300	8000
135	FRANKLIN CITY	\$375,880,840	\$117,942,531	\$113,790,359	1,353	8,200	3101
136	CHESAPEAKE	\$11,783,480,129	\$3,370,116,488	\$2,240,123,785	38,129	202,500	3215
137	LEXINGTON	\$349,333,474	\$90,979,102	\$54,783,855	827	7,000	4380
138	EMPORIA	\$260,785,206	\$68,749,543	\$113,481,410	981	5,600	3115
139	SALEM	\$1,471,443,910	\$417,992,630	\$441,194,034	4,010	24,900	3905
140	BEDFORD CITY	\$300,005,103	\$77,094,738	\$81,514,372	943	8,300	3125
142	POQUOSON	\$785,348,544	\$262,863,708	\$34,631,956	2,488	11,500	3313
143	MANASSAS	\$2,894,984,871	\$793,056,244	\$333,839,753	6,391	36,400	4254
144	MANASSAS PARK	\$771,101,207	\$209,986,762	\$132,262,750	2,124	11,200	3681
202	COLONIAL BEACH	\$184,286,096	\$42,204,757	\$11,318,185	576	3,189	2696
207	WEST POINT	\$203,231,775	\$51,085,274	\$13,483,353	820	2,902	2822
	STATE TOTALS	\$573,954,932,642	\$151,235,799,099	\$68,641,730,340	1,143,018	7,197,200	

APPENDIX B
COMPOSITE INDEX FORMULA

COMPOSITE INDEX OF LOCAL ABILITY-TO-PAY FORMULA			
<p>Average Daily Membership (ADM) Component =</p> $ \begin{aligned} & .5 \left[\frac{\text{Local True Values}}{\text{Local ADM}} \right] + .4 \left[\frac{\text{Local Adjusted Gross Income}}{\text{Local ADM}} \right] + .1 \left[\frac{\text{Local Taxable Retail Sales}}{\text{Local ADM}} \right] \\ & \quad \quad \quad \frac{\text{State True Values}}{\text{State ADM}} \quad \quad \quad \frac{\text{State Adjusted Gross Income}}{\text{State ADM}} \quad \quad \quad \frac{\text{State Taxable Retail Sales}}{\text{State ADM}} \end{aligned} $			
<p>Population Component =</p> $ \begin{aligned} & .5 \left[\frac{\text{Local True Values}}{\text{Local Population}} \right] + .4 \left[\frac{\text{Local Adjusted Gross Income}}{\text{Local Population}} \right] + .1 \left[\frac{\text{Local Taxable Retail Sales}}{\text{Local Population}} \right] \\ & \quad \quad \quad \frac{\text{State True Values}}{\text{State Population}} \quad \quad \quad \frac{\text{State Adjusted Gross Income}}{\text{State Population}} \quad \quad \quad \frac{\text{State Taxable Retail Sales}}{\text{State Population}} \end{aligned} $			
<p>Final Composite Index =</p> $ ((.6667 \times \text{ADM Component}) + (.3333 \times \text{Population Component})) \times 0.45 $			

APPENDIX C: COMPOSITE INDEX CALCULATION FOR ARLINGTON

007 - ARLINGTON

Division Number:

Calculation of the 2004-2006 Composite Index for ARLINGTON

007

Step 1 - Calculation of the 2004-2006 Average Daily Membership Composite Index

.5	$\frac{\text{Local True Values}}{\text{Local ADM}}$ $\frac{\text{Total Local True Values}}{\text{Total State ADM}}$	+	.4	$\frac{\text{Local Adjusted Gross Income}}{\text{Local ADM}}$ $\frac{\text{Total State Adjusted Gross Income}}{\text{Total State ADM}}$	+	.1	$\frac{\text{Local Taxable Retail Sales}}{\text{Local ADM}}$ $\frac{\text{Total Taxable Retail Sales}}{\text{Total State ADM}}$	= ADM Composite Index
.5	$\frac{\$32,349,417,681}{18,450}$ $\frac{\$573,954,932,642}{1,143,018}$	+	.4	$\frac{\$6,965,466,168}{18,450}$ $\frac{\$151,235,799,099}{1,143,018}$	+	.1	$\frac{\$2,283,125,622}{18,450}$ $\frac{\$68,641,730,340}{1,143,018}$	= ADM Composite Index
.5	$\frac{\$1,753,356}{\$502,140}$	+	.4	$\frac{\$377,532}{\$132,313}$	+	.1	$\frac{\$123,747}{\$60,053}$	= ADM Composite Index
.5	3.4918	+	.4	2.8533	+	.1	2.0606	= ADM Composite Index
	1.7459	+		1.1413	+		.2061	= 3.0933

Step 2 - Calculation of the 2004-2006 Per Capita Composite Index

.5	$\frac{\text{Local True Values}}{\text{Local Population}}$ $\frac{\text{Total Local True Values}}{\text{State Population}}$	+	.4	$\frac{\text{Local Adjusted Gross Income}}{\text{Local Population}}$ $\frac{\text{Total State Adjusted Gross Income}}{\text{State Population}}$	+	.1	$\frac{\text{Local Taxable Retail Sales}}{\text{Local Population}}$ $\frac{\text{Total Taxable Retail Sales}}{\text{State Population}}$	= Per Capita Composite Index
.5	$\frac{\$32,349,417,681}{192,100}$ $\frac{\$573,954,932,642}{7,197,200}$	+	.4	$\frac{\$6,965,466,168}{192,100}$ $\frac{\$151,235,799,099}{7,197,200}$	+	.1	$\frac{\$2,283,125,622}{192,100}$ $\frac{\$68,641,730,340}{7,197,200}$	= Per Capita Composite Index
.5	$\frac{\$168,399}{\$79,747}$	+	.4	$\frac{\$36,260}{\$21,013}$	+	.1	$\frac{\$11,885}{\$9,537}$	= Per Capita Composite Index
.5	2.1117	+	.4	1.7256	+	.1	1.2462	= Per Capita Composite Index
	1.0559	+		.6902	+		.1246	= 1.8707

Step 3 - Combining of the Two 2004-2006 Indices of Ability to Pay:			
(.6667 X ADM Composite Index) + (.3333 X Per Capita Composite Index)			Local = Composite Index
(.6667 X 3.0933) + (.3333 X 1.8707)			Local = Composite Index
2.0623 + .6235			Local = Composite Index
Step 4 - Final Composite Index (adjusted for nominal state/local shares):			
(2.6858) X 0.45 =			.8000
Input Data:			
Source Data Used in the Calculation:			
School Division:	ARLINGTON		
Local True Value of Property	\$32,349,417,681		
Local AGI	\$6,965,466,168		
Local Taxable Sales	\$2,283,125,622		
Local ADM	\$18,450		
Local Population	182,100		
State True Value of Property	\$573,954,932,642		
State AGI	\$151,235,799,099		
State Taxable Sales	\$68,641,730,340		
State ADM	1,143,018		
State Population	7,197,200		

*Please note the following exceptions to the standard composite index calculation as specified in the appropriation act (see actual language under tab labeled "Appropriation Act Language"): 1) For those divisions in which three percent or more of their adjusted gross income is derived from individuals who are not residents of Virginia, those divisions have the option to have that portion of the adjusted gross income excluded from the composite index calculation; 2) Any division with a calculated composite index that exceeds .8000 is considered as having an index of .8000; 3) Under a hold harmless provision addressing the consolidation of school divisions contained in the appropriation act and Section 15.2-1302, Code of Virginia, the actual composite index to be used for Halifax Co. in 2004-2006 is .2390, which was the index calculated for the 1996-1998 biennium; however, the 2004-2006 composite index for Halifax County calculated based on data elements from base-year 2001 is shown here.

APPENDIX D**CONVERSION OF LOCALE CODES FROM TOWN TO URBAN, RURAL, AND
SUBURBAN**

School Division	Adjacent School Division	Locale Code Name	Locale Code
Buena Vista	Rockbridge	Rural	3
Colonial Beach	King George	Rural	3
Covington	Alleghany	Rural	3
Galax	Carroll	Rural	3
Lexington	Rockbridge	Rural	3
Martinsville	Henry	Rural	3
Norton	Wise	Rural	3
Radford	Montgomery	Rural	3
Waynesboro	Augusta	Rural	3
West Point	King and Queen	Rural	3

APPENDIX E

LISTING OF VIRGINIA SCHOOL DIVISIONS UTILIZED IN STUDY WITH
COMPOSITE INDEX VALUES, DUAL ENROLLMENT PARTICIPATION RATES,
AND URBAN, SUBURBAN, AND RURAL CLASSIFICATION CODES

School Division	Composite Index	Participation Rate	Code	Classification
Accomack County	0.2884	0.9943	3	Rural
Albemarle County	0.6054	1.5300	3	Rural
Alexandria City	0.8000	0.0000	1	Urban
Alleghany County	0.2683	1.1267	3	Rural
Amelia County	0.3516	1.2450	3	Rural
Amherst County	0.2940	1.3374	3	Rural
Appomattox County	0.2797	1.5018	3	Rural
Arlington County	0.8000	0.0057	1	Urban
Augusta County	0.3434	0.4829	3	Rural
Bath County	0.8000	1.1568	3	Rural
Bland County	0.2827	2.8249	3	Rural
Botetourt County	0.4061	2.5535	3	Rural
Bristol City	0.4245	1.4335	3	Rural
Brunswick County	0.2568	2.0576	3	Rural
Buchanan County	0.2788	1.5191	3	Rural
Buckingham County	0.2527	2.5142	3	Rural
Buena Vista City	0.2322	1.6799	3	Rural
Campbell County	0.2768	1.9766	3	Rural
Caroline County	0.3109	0.6904	3	Rural
Carroll County	0.3001	2.4863	3	Rural
Charles City County	0.4199	0.2323	3	Rural
Charlotte County	0.2331	2.0298	3	Rural
Charlottesville City	0.6111	0.8532	1	Urban
Chesapeake City	0.3215	0.3407	2	Suburban
Chesterfield County	0.3785	0.8486	2	Suburban
Clarke County	0.5546	3.6500	3	Rural
Colonial Beach	0.2696	1.2300	3	Rural
Colonial Heights City	0.4721	0.0000	2	Suburban
Covington City	0.3221	0.6083	3	Rural
Craig County	0.3356	3.6415	3	Rural
Culpeper County	0.3919	0.2471	3	Rural
Cumberland County	0.2943	0.9299	3	Rural
Danville City	0.2848	1.6618	1	Urban
Dickenson County	0.2492	0.4819	3	Rural
Dinwiddie County	0.2844	0.3519	3	Rural

APPENDIX E (CONTINUED)

LISTING OF VIRGINIA SCHOOL DIVISIONS UTILIZED IN STUDY WITH
COMPOSITE INDEX VALUES, DUAL ENROLLMENT PARTICIPATION RATES,
AND URBAN, SUBURBAN, AND RURAL CLASSIFICATION CODES

School Division	Composite Index	Participation Rate	Code	Classification
Essex County	0.4175	1.4075	3	Rural
Fairfax City	0.8000	0.0000	2	Suburban
Fairfax County	0.7489	0.0000	2	Suburban
Falls Church City	0.8000	0.0006	2	Suburban
Fauquier County	0.6193	0.8942	3	Rural
Floyd County	0.3251	1.4918	3	Rural
Fluvanna County	0.3595	2.6158	3	Rural
Franklin City	0.3101	0.9946	3	Rural
Franklin County	0.3882	1.2232	3	Rural
Frederick County	0.3794	1.3396	3	Rural
Fredericksburg City	0.7005	0.1635	2	Suburban
Galax City	0.3266	3.6419	3	Rural
Giles County	0.2946	3.1935	3	Rural
Gloucester County	0.3132	2.4833	3	Rural
Goochland County	0.8000	2.2153	3	Rural
Grayson County	0.2932	2.6475	3	Rural
Greene County	0.3241	0.7011	3	Rural
Halifax County	0.3416	3.1255	3	Rural
Hampton City	0.2521	0.1564	1	Urban
Hanover County	0.4539	1.5972	3	Rural
Harrisonburg City	0.4804	0.1173	1	Urban
Henrico County	0.4834	0.3901	1	Urban
Henry County	0.2717	2.6508	3	Rural
Highland County	0.6274	2.7027	3	Rural
Hopewell City	0.2343	0.1808	2	Suburban
Isle of Wight County	0.3743	0.3114	3	Rural
King George County	0.3700	1.9204	3	Rural
King William County	0.3482	2.3751	3	Rural
King and Queen County	0.3376	0.7519	3	Rural
Lancaster County	0.6496	0.7519	3	Rural
Lee County	0.1845	2.3460	3	Rural
Lexington City	0.4380	1.2914	3	Rural
Loudoun County	0.7220	0.0728	2	Suburban
Louisa County	0.5591	1.7198	3	Rural

APPENDIX E (CONTINUED)

LISTING OF VIRGINIA SCHOOL DIVISIONS UTILIZED IN STUDY WITH COMPOSITE INDEX VALUES, DUAL ENROLLMENT PARTICIPATION RATES, AND URBAN, SUBURBAN, AND RURAL CLASSIFICATION CODES

School Division	Composite Index	Participation Rate	Codes	Classification
Lunenburg County	0.2626	2.4706	3	Rural
Lynchburg City	0.3830	2.1859	1	Urban
Madison County	0.4194	1.5143	3	Rural
Manassas Park	0.3661	0.0000	2	Suburban
Martinsville City	0.2740	1.5061	3	Rural
Mathews County	0.4474	2.9576	3	Rural
Mecklenburg County	0.3122	1.8212	3	Rural
Middlesex County	0.5522	2.2709	3	Rural
Montgomery County	0.3877	0.4571	3	Rural
Nelson County	0.4664	1.7776	3	Rural
New Kent County	0.4177	1.5879	3	Rural
Newport News City	0.2598	0.3460	1	Urban
Norfolk City	0.2681	0.2330	1	Urban
Northampton County	0.3555	1.1640	3	Rural
Northumberland County	0.5955	2.3595	3	Rural
Norton City	0.3449	0.6993	3	Rural
Nottoway County	0.2431	3.5511	3	Rural
Orange County	0.4127	0.2167	3	Rural
Page County	0.3049	0.7295	3	Rural
Patrick County	0.2859	1.3261	3	Rural
Petersburg City	0.2197	1.1331	1	Urban
Pittsylvania County	0.2694	1.7503	3	Rural
Poquoson City	0.3313	0.4294	2	Suburban
Portsmouth City	0.2100	0.6036	1	Urban
Powhatan County	0.3787	1.0546	3	Rural
Prince Edward County	0.2905	3.5040	3	Rural
Prince George County	0.2507	1.1044	3	Rural
Prince William County	0.4066	0.0165	2	Suburban
Pulaski County	0.3074	1.3218	3	Rural
Radford City	0.3019	0.0654	3	Rural
Rappahannock County	0.6905	2.4851	3	Rural
Richmond City	0.4334	0.4298	1	Urban
Richmond County	0.3559	1.3180	3	Rural

APPENDIX E (CONTINUED)

LISTING OF VIRGINIA SCHOOL DIVISIONS UTILIZED IN STUDY WITH
COMPOSITE INDEX VALUES, DUAL ENROLLMENT PARTICIPATION RATES,
AND URBAN, SUBURBAN, AND RURAL CLASSIFICATION CODES

School Division	Composite Index	Participation Rate	Code	Classification
Roanoke City	0.3765	1.6086	1	Urban
Roanoke County	0.3926	2.7972	2	Suburban
Rockbridge County	0.4516	1.4213	3	Rural
Rockingham County	0.3526	0.7981	3	Rural
Russell County	0.2496	1.2488	3	Rural
Salem City	0.3905	2.7763	2	Suburban
Scott County	0.2157	2.3511	3	Rural
Shenandoah County	0.3678	1.7776	3	Rural
Smyth County	0.2355	0.9220	3	Rural
Southampton County	0.2802	1.4669	3	Rural
Spotsylvania County	0.3573	0.6850	3	Rural
Stafford County	0.3274	0.8465	3	Rural
Staunton City	0.3983	0.8779	3	Rural
Suffolk City	0.3012	0.6319	3	Rural
Surry County	0.8000	0.0973	3	Rural
Sussex County	0.2961	0.7818	3	Rural
Tazewell County	0.2626	0.8946	3	Rural
Virginia Beach City	0.3353	0.3728	1	Urban
Warren County	0.3704	1.2334	3	Rural
Washington County	0.3553	1.9880	3	Rural
Waynesboro City	0.3349	0.6696	3	Rural
West Point	0.2622	6.2267	3	Rural
Westmoreland County	0.3801	2.1146	3	Rural
Winchester City	0.5473	1.9423	1	Urban
Wise County	0.2062	2.0226	3	Rural
Wythe County	0.3017	2.5537	3	Rural
York County	0.3548	0.1875	2	Suburban

APPENDIX F

DEMOGRAPHIC PROFILE OF DUAL ENROLLMENT STUDENTS BY VIRGINIA COMMUNITY COLLEGE, SPRING 2006

College	Demographic Information	Counts	College Total
Blue Ridge	African American	2	111
	Asian/Pacific Islander	1	
	Hispanic	2	
	Not Specified	5	
	White	101	
Central Virginia	African American	71	733
	American Indian/Alaskan	2	
	Asian/Pacific Islander	15	
	Hispanic	5	
	Not Specified	8	
	White	632	
Dabney S. Lancaster	African American	1	189
	Not Specified	6	
	White	182	
Danville	African American	230	360
	American Indian/Alaskan	230	
	Asian/Pacific Islander	230	
	Hispanic	230	
	Not Specified	230	
Eastern Shore	African American	10	71
	Asian/Pacific Islander	1	
	Hispanic	2	
	White	58	
Germanna	African American	45	459
	American Indian/Alaskan	4	
	Asian/Pacific Islander	18	
	Hispanic	20	
	Not Specified	14	
	White	358	

APPENDIX F (CONTINUED)

**DEMOGRAPHIC PROFILE OF DUAL ENROLLMENT STUDENTS
BY VIRGINIA COMMUNITY COLLEGE, SPRING 2006**

College	Demographic Information	Counts	College Total
J. Sargeant Reynolds	African American	153	710
	American Indian/Alaskan	2	
	Asian/Pacific Islander	24	
	Hispanic	9	
	Not Specified	11	
	White	511	
John Tyler	African American	131	694
	American Indian/Alaskan	3	
	Asian/Pacific Islander	22	
	Hispanic	11	
	Not Specified	3	
	White	524	
Lord Fairfax	African American	13	753
	American Indian/Alaskan	2	
	Asian/Pacific Islander	13	
	Hispanic	17	
	Not Specified	10	
	White	698	
Mountain Empire	African American	1	270
	White	269	
New River	African American	5	243
	Asian/Pacific Islander	1	
	Hispanic	2	
	White	235	
Patrick Henry	African American	47	296
	Asian/Pacific Islander	1	
	Hispanic	2	
	White	244	

APPENDIX F (CONTINUED)

**DEMOGRAPHIC PROFILE OF DUAL ENROLLMENT STUDENTS
BY VIRGINIA COMMUNITY COLLEGE, SPRING 2006**

College	Demographic Information	Counts	College Total
Paul D. Camp	African American	35	160
	Asian/Pacific Islander	2	
	Hispanic	3	
	Not Specified	1	
Piedmont Virginia	African American	33	414
	American Indian/Alaskan	1	
	Asian/Pacific Islander	14	
	Hispanic	13	
	Not Specified	12	
	White	341	
Rappahannock	African American	76	582
	American Indian/Alaskan	3	
	Asian/Pacific Islander	9	
	Hispanic	4	
	Not Specified	7	
	White	483	
Southside Virginia	African American	173	585
	American Indian/Alaskan	2	
	Asian/Pacific Islander	4	
	Hispanic	6	
	Not Specified	5	
	White	395	
Southwest Virginia	African American	3	175
	American Indian/Alaskan	1	
	Asian/Pacific Islander	2	
	Not Specified	1	
	White	168	
	African American	3	

APPENDIX F (CONTINUED)**DEMOGRAPHIC PROFILE OF DUAL ENROLLMENT STUDENTS BY
VIRGINIA COMMUNITY COLLEGE, SPRING 2006**

College	Demographic Information	Counts	College Total
Thomas Nelson	African American	61	305
	American Indian/Alaskan	1	
	Asian/Pacific Islander	12	
	Hispanic	11	
	Not Specified	4	
	White	216	
Tidewater	African American	162	578
	American Indian/Alaskan	5	
	Asian/Pacific Islander	34	
	Hispanic	16	
	Not Specified	8	
	White	353	
	African American	162	
Virginia Highlands	Asian/Pacific Islander	2	194
	Hispanic	1	
	Not Specified	2	
	White	189	
	Asian/Pacific Islander	2	
Virginia Western	African American	41	848
	American Indian/Alaskan	3	
	Asian/Pacific Islander	19	
	Hispanic	1	
	Not Specified	3	
	White	781	
Wytheville	African American	3	332
	American Indian/Alaskan	1	
	Asian/Pacific Islander	3	
	Hispanic	6	
	White	319	

APPENDIX G**DUAL ENROLLMENT STUDENTS' GENDER DISTRIBUTION BY COLLEGE
SPRING 2006**

College	Female	% Female	Male	% Male	Total
Blue Ridge	70	63.06%	41	36.94%	111
Central Virginia	410	55.93%	323	44.07%	733
Dabney S. Lancaster	106	56.08%	83	43.92%	189
Danville	191	53.06%	169	46.94%	360
Eastern Shore	35	49.30%	36	50.70%	71
Germanna	283	61.66%	176	38.34%	459
J. Sargeant Reynolds	378	53.24%	332	46.76%	710
John Tyler	371	53.46%	323	46.54%	694
Lord Fairfax	447	59.36%	306	40.64%	753
Mountain Empire	170	62.96%	100	37.04%	270
New River	119	48.97%	124	51.03%	243
Patrick Henry	181	61.15%	115	38.85%	296
Paul D. Camp	100	62.50%	60	37.50%	160
Piedmont Virginia	207	50.00%	207	50.00%	414
Rappahannock	367	63.06%	215	36.94%	582
Southside Virginia	344	58.80%	241	41.20%	585
Southwest Virginia	102	58.29%	73	41.71%	175
Thomas Nelson	158	51.80%	147	48.20%	305
Tidewater	352	60.90%	226	39.10%	578
Virginia Highlands	91	46.91%	103	53.09%	194
Virginia Western	496	58.49%	352	41.51%	848
Wytheville	198	59.64%	134	40.36%	332

APPENDIX H
LISTING OF VIRGINIA SCHOOL DIVISIONS UTILIZED IN STUDY WITH
FALL 2006 VCCS AND FOUR-YEAR ENROLLMENT COUNTS FOLLOWING
SPRING 2006 DUAL ENROLLMENT PARTICIPATION

School Division	VCCS Enrollment	Four-Year Enrollment
Accomack County	0	24
Albemarle County	3	128
Alexandria City	0	0
Alleghany County	0	22
Amelia County	2	17
Amherst County	0	47
Appomattox County	0	26
Arlington County	0	0
Augusta County	0	39
Bath County	0	4
Bland County	0	13
Botetourt County	4	75
Bristol City	2	20
Brunswick County	2	25
Buchanan County	16	24
Buckingham County	0	27
Buena Vista City	0	10
Campbell County	3	91
Caroline County	2	16
Carroll County	8	26
Charles City County	0	1
Charlotte County	1	27
Charlottesville City	1	23
Chesapeake City	9	115
Chesterfield County	7	378
Clarke County	2	54
Colonial Beach	0	5
Colonial Heights City	0	0
Covington City	0	3
Craig County	0	12
Culpeper County	3	3
Cumberland County	0	6
Danville City	0	41
Dickenson County	3	9
Dinwiddie County	0	8
Essex County	4	16
Falls Church	0	0

APPENDIX H (CONTINUED)
LISTING OF VIRGINIA SCHOOL DIVISIONS UTILIZED IN STUDY WITH
FALL 2006 VCCS AND FOUR-YEAR ENROLLMENT COUNTS FOLLOWING
SPRING 2006 DUAL ENROLLMENT PARTICIPATION

School Division	VCCS Enrollment	Four-Year Enrollment
Fairfax City	0	0
Fairfax County	0	1
Fauquier County	6	63
Floyd County	2	17
Fluvanna County	2	53
Franklin City	0	8
Franklin County	2	62
Frederick County	4	117
Fredericksburg City	1	2
Galax City	2	26
Giles County	2	29
Gloucester County	4	74
Goochland County	2	36
Grayson County	10	30
Greene County	2	9
Halifax County	7	55
Hampton City	0	1
Hanover County	3	219
Harrisonburg City	1	1
Henrico County	2	84
Henry County	13	104
Highland County	0	5
Hopewell City	0	1
Isle of Wight County	1	11
King George County	3	25
King William County	0	28
King and Queen County	0	5
Lancaster County	0	21
Lee County	6	28
Lexington City	0	0
Loudoun County	1	28
Louisa County	1	37
Lunenburg County	1	12
Lynchburg City	0	133
Madison County	2	13
Manassas	0	0
Manassas Park	0	0

APPENDIX H (CONTINUED)
LISTING OF VIRGINIA SCHOOL DIVISIONS UTILIZED IN STUDY WITH
FALL 2006 VCCS AND FOUR-YEAR ENROLLMENT COUNTS FOLLOWING
SPRING 2006 DUAL ENROLLMENT PARTICIPATION

School Division	VCCS Enrollment	Four-Year Enrollment
Martinsville City	0	30
Mathews County	0	21
Mecklenburg County	3	55
Middlesex County	0	16
Montgomery County	2	27
Nelson County	0	24
New Kent County	1	36
Newport News City	2	38
Norfolk City	0	24
Northampton County	0	14
Northumberland County	1	19
Norton City	0	4
Nottoway County	3	45
Orange County	1	4
Page County	2	11
Patrick County	4	22
Petersburg City	0	43
Pittsylvania County	1	67
Poquoson City	1	7
Portsmouth City	2	52
Powhatan County	2	24
Prince Edward County	1	40
Prince George County	1	35
Prince William County	1	5
Pulaski County	1	39
Radford City	0	1
Rappahannock County	0	19
Richmond City	1	71
Richmond County	0	11
Roanoke City	2	117
Roanoke County	4	308
Rockbridge County	1	31
Rockingham County	4	67
Russell County	12	19
Salem City	3	72
Scott County	18	36

APPENDIX H (CONTINUED)
LISTING OF VIRGINIA SCHOOL DIVISIONS UTILIZED IN STUDY WITH
FALL 2006 VCCS AND FOUR-YEAR ENROLLMENT COUNTS FOLLOWING
SPRING 2006 DUAL ENROLLMENT PARTICIPATION

School Division	VCCS Enrollment	Four-Year Enrollment
Shenandoah County	2	54
Smyth County	1	19
Southampton County	0	22
Spotsylvania County	9	108
Stafford County	3	171
Staunton City	1	13
Suffolk City	1	46
Surry County	0	0
Sussex County	0	8
Tazewell County	3	36
Virginia Beach City	0	201
Warren County	4	30
Washington County	7	83
Waynesboro City	0	17
West Point	0	25
Westmoreland County	4	22
Winchester City	0	58
Wise County	12	91
Wythe County	5	43
York County	0	4

VITA

Ellen Richardson Davenport holds a Bachelor of Arts in Criminal Justice from Old Dominion University and a Master of Planning in Urban and Environmental Planning from the University of Virginia. Dr. Davenport earned a Ph.D. in Community College Leadership from the Darden College of Education at Old Dominion University. Dr. Davenport currently works as Assistant Vice Chancellor of Governmental Relations for the Virginia Community College System and has over thirty years of experience in public budgeting and finance, state and national governmental relations, and the intersection of the public finance and governmental relations. Prior to joining the VCCS, she worked as Director of Public Finance for the Virginia Association of Counties and as a local government budget analyst and budget officer. She has made numerous presentations to the Virginia Municipal League, the Virginia Association of Counties, the Virginia Government Finance Officers Association, the Virginia School Superintendents Association, and to the Academic Services Advisory Committee, Institutional Advancement Officers Committee, and Advisory Council of Presidents of the Virginia Community College System. Dr. Davenport is a native of Portsmouth, Virginia and currently resides with her family in Chesterfield County, Virginia.