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Creating Pathways for Low-Skill Adults: Lessons for Community and Technical Colleges from a Statewide Longitudinal Study

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CREATING PATHWAYS FOR LOW-SKILL ADULTS: LESSONS FOR COMMUNITY AND TECHNICAL COLLEGES FROM A STATEWIDE LONGITUDINAL STUDY

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by
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DEDICATION

This dissertation is dedicated to my loving family who has provided the encouragement and support to complete this task: my patient and understanding husband Jim, daughter Ryan, and son Jimmy. Without you I would not have made it. I also dedicate this accomplishment to my father who passed away before its completion but who always told me "education is something no one can take away from you."

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ABSTRACT

The purpose of this study was to examine the educational experiences and outcomes of low-skill adults in West Virginia's community and technical colleges, providing a more detailed profile of these students. Data for the variables were obtained from archival databases through a cooperative agreement between state agencies. Descriptive statistics were utilized to examine momentum point attainment, milestone achievement, persistence, and pre- and post-educational mean wages of first-time students age 25+ who enrolled in a West Virginia community and technical college over a five year period beginning with the 2004-2005 academic year. Chi-square tests for independence were used as well as frequencies and conditional probability analysis. Students were grouped by their initial enrollment, developmental or college-ready, and their academic goals, vocational or transfer. The most significant momentum point attainment that indicated successful achievement of any milestone was completion of a college-level math course. This was true for all groups. Completion of a college-level math course was also the best indicator of persistence.

CHAPTER ONE: INTRODUCTION

> Educators have cultural and political missions to ensure there is an educated citizenry to continue to defend and promote America's democratic ideals. Nevertheless, the inescapable reality is that ours is a society based on individual economic autonomy. Those who are not equipped with the knowledge and skills necessary to get, and keep, good jobs are denied full social inclusion and tend to drop out of the mainstream culture, polity, and economy. Hence, if the standards reform movement cannot fulfill its economic mission to help youth and adults become successful workers, it also will fail in its cultural and political missions to create good neighbors and good citizens. (Carnevale & Desrochers, 2003, p. viii)

In 2003, nearly two-thirds of jobs in the United States that paid wages to support a family above the poverty line required some postsecondary education (Carnevale & Desrochers, 2003; U.S. Department of Education, College completion tool kit, 2011). By 2006, when the Commission on the Future of Education report was released, Secretary of Education Margaret Spellings stated that "eighty percent of our fastest-growing jobs will require some higher education" (Miller et al., September 2006, p. 33). Knowledge has become the catalyst for growth among nations as well as individuals, which means that workers require a solid academic foundation to meet the skills required for employment (Kirsch, Braun, & Yamamoto, 2007).

With this information in mind, the issue becomes the low educational attainment of adults in the United States and in West Virginia specifically. In 2009, the U.S. Census Bureau's American Community Survey reported that approximately 43% of adults 25 years old and over have at most a high school education. In other words, only 57% of adults 25 years old and older have had at least some college. West Virginia ranks below the national average; 58% of adult West Virginians have at most a high school education, which means that only 42% of adults have had at least some college (U.S. Department of

Commerce, 2009). Education levels are closely related to employment levels. That same year, the U.S. Census Bureau reported national unemployment rates of 15.2% for working-age adults with less than a high school diploma and 10.6% for those with a high school diploma but no college, compared with 8.3% with some college or an associate degree and 4.5% with a bachelor's degree. The rates for West Virginia are similar to national rates. In West Virginia the unemployment rates are 13.7% for adults with less than a high school diploma and 6.3% for those with a high school diploma but no college, compared with 6.0% with some college or an associate's degree and 3.2% with a bachelor's degree (U.S. Department of Commerce, 2009). Research has shown that high unemployment and low income are associated with low educational attainment (Prince & Jenkins, 2005), but it is becoming an increasingly critical relationship as the United States has dropped to tenth among developed countries in the percentage of college graduates age 25 to 34 with an associate degree or higher (Kelly, 2010).

Statement of the Problem

Relatively little is known about what happens to adults with limited education who enter community colleges and how their educational attainment and labor market outcomes differ from those of traditional college-age students (Prince & Jenkins, 2005). Research has shown that community colleges play a large role in the education of adults but that role is not well understood (Morest, 2004). The *Persistence and Attainment of 2003-04 Beginning Postsecondary Students: After 6 Years* report by the U.S. Department of Education surveyed a nationally representative sample of first-time college students who enrolled in college-credit courses at a community college in 2003-04. According to this report, adult students who start college later, 25 years old and older, are more likely

to earn a certificate, a one year credential, compared to students who enter college soon after high school, 18-24 years of age. However, these non-traditional students are much less likely to earn an associate or bachelor's degree or transfer to a four-year institution. Only 40% of first-time non-traditional students earned any credential, certificate or associate degree, or transferred after six years, compared with 60% of traditional-age students (U. S. Department of Education, 2010). These statistics raise the question of how the educational experiences of adult students in West Virginia community and technical colleges differ from those of traditional-age students. What does this difference in the level of educational attainment mean for the economic outcomes of these low-skill adults?

Research Questions

The answers to the research questions in this study are based on a cohort of low-skill adult (25 years old and older) students enrolled for the first time in one of West Virginia's ten community and technical colleges over the five year period 2004-2005 to 2008-2009. The following research questions were formulated for this study.

1. What is the relationship, if any, between momentum point attainment and milestone achievement?
2. What is the relationship, if any, between momentum point achievement and persistence in postsecondary education for low-skill adults?
3. What is the relationship, if any, between the level of educational attainment of low-skill adults and their annual earnings six years after initial enrollment in higher education?

4. What is the relationship, if any, between the completion of an academic credential/milestone by low-skill adults and annual earnings six years after initial enrollment in higher education?

Significance of the Study

In 2010, President Obama's challenge to America to produce eight million more college graduates by 2020 (Obama, 2010) has turned attention to community colleges as the ideal entry point for adult students to help achieve this initiative. To accomplish this goal, the National Center for Higher Education Management Systems released a report by Patrick Kelly that projects what each state's contribution should be. For West Virginia, it was projected that an additional 851 degrees, both associate and baccalaureate, would be needed to meet that goal, which is equivalent to a 4.3% increase annually for ten years (Kelly, 2010). In 2009, the Lumina Foundation for Education recognized that the United States was falling behind globally in college degrees earned and issued a challenge to increase the proportion of the population of the United States that have earned a college degree to 60% by the year 2025. To meet this challenge, it is projected that the United States would have to increase the number of degrees awarded per year by 276,781, and West Virginia would need to increase the number of degrees awarded by 2,244 per year. This number would be a substantial increase for the state. In 2010, only 6.8% of West Virginians held an associate degree and only 25.5% of the population had any type of college degree (Lumina Foundation for Education, 2010). West Virginia's community and technical colleges will need to play a significant role in achieving these goals of increased numbers of college graduates. With the current fiscal realities that exist for states, decisions for implementing initiatives must be data-driven. This study provides

data for West Virginia community and technical college educators to use in developing initiatives that can help low-skill adults achieve credentials that will impact their economic outcomes. It also provides data that can be used in the development of state policies and in determining how financial resources can be allocated for the most effective support of student success.

Operational Definitions

ACCUPLACER: A suite of tests provided by the College Board that assess reading, writing, and math skills of students.

Adult student: A community and technical college student 25 years of age or older.

Annual earnings: The annual earning information provided by WorkForce West Virginia.

College-ready: A student who did not require any developmental course work.

Compass: A suite of computer-adaptive tests by The American College Testing Program, Inc. (ACT) that assesses students' skills in reading, writing, math, and English as a Second Language (ESL).

Credential: A one-year certificate, at least 30 credit hours, or two-year associate degree, at least 60 credit hours, awarded by a West Virginia community and technical college.

Developmental/pre-college group: A student who placed or enrolled in a developmental course.

Developmental course: "Developmental courses are 'pre-college' courses and do not count toward a baccalaureate degree, an associate of arts (AA) degree, an associate of science (AS) degree, or an associate of applied science (AAS) degree" (Title 135 Procedural Rule West Virginia Council for Community and Technical College Education, Series 21, p. 1).

Educational attainment: The highest level of successful education completed, the number of college-level credits earned, a certificate or associate degree, or a certification/licensure.

Gatekeeper course: A course that appears to be a roadblock or point at which an adult student drops out or fails to advance to the next level. In this study, gatekeeper courses are the initial college-level math and English courses offered at West Virginia community and technical colleges.

HEPC: West Virginia Higher Education Policy Commission is the organization that is responsible for the oversight of the four-year public institutions in West Virginia.

Low-skill adult: Community college student 25 years of age or older who is placed in a developmental English, math, or reading course when enrolling in a West Virginia community and technical college.

Milestones: "Measurable educational achievements that include both conventional terminal completions, such as earning a credential or transferring to a

baccalaureate program, and intermediate outcomes, such as completing developmental education" (Leinbach & Jenkins, 2008, p. 2). For this study, milestones were defined for each of the four groups. For the developmental/pre-college group, the milestones were completion of all required developmental courses or completion of a gatekeeper course in the area of remediation. For the college-ready group, the milestones were identified as transfer to a baccalaureate institution, an associate degree earned, or a certificate earned. Two milestones were identified for the transfer group: an associate degree completed or transfer to a baccalaureate institution. The vocational/workforce group milestones were defined as a certificate or an associate degree earned.

Momentum points: "Measurable educational attainments, such as completing a college-level math course, that are empirically correlated with the completion of a milestone" (Leinbach & Jenkins, 2008, p. 2). For this study, the momentum points were completion of any developmental course or completion of a college-level math or English course for students in the developmental/pre-college group. For students in the college-ready, vocational/workforce, or transfer groups, the momentum points were completion of a college-level math or English course, 15 credits, 30 credits, or 30 credits in one year.

Persistence: Enrolled during the last year of the research period, earned a credential, or transferred during the time the research covered.

Transfer group: A student whose academic goal is to transfer to a baccalaureate institution that is determined by the program in which the student initially enrolled.

Tipping points: "Measurable educational attainments that include both conventional terminal completions, such as earning a credential or transferring to a

baccalaureate program, and intermediate outcomes, such as completing developmental education" (Leinbach & Jenkins, 2008, p. 2; Jenkins, 2008). For this study, milestones and tipping points are synonymous.

Vocational/workforce group: A student whose educational goal is to earn a certificate or associate degree as determined by the initial program in which the student enrolled.

Working-age adults: Adults between the ages of 25 and 64.

WVCTCS: The Community and Technical System of West Virginia that is the organization that is responsible for the oversight of the public community and technical colleges in West Virginia.

Purpose of the Study

The purpose of this study was to examine the educational experiences and outcomes of low-skill adults in West Virginia's community and technical colleges, providing a more detailed profile of these students. The process also identifies roadblocks that cause these adults to drop out or fail, momentum or tipping points, and the impact that the level of postsecondary education attainment has on an individual's income. This research seeks to fill gaps in the literature of the educational experience of low-skill adult community and technical college students in West Virginia and what this means for their relative economic outcomes. This study examined a cohort of students 25 years of age or older with, at most, a high school education, who initially entered one of West Virginia's public community and technical colleges in 2004-2005. The cohort included adults who enrolled in developmental education courses as well as directly into

college-level courses. The educational attainment of the cohort was reviewed to identify momentum points, gatekeeper courses, milestones, and the impact on the students' economic outcomes.

Limitations

This study can be useful in identifying achievement gaps for different groups of students and potential opportunities for improving student outcomes. However, it does not diagnose the cause of the achievement gaps or propose strategies to help reduce them. The limitations of this study are as follows:

- The cohorts of students included in the study were only West Virginia community and technical college students; therefore, the results may not be generalized beyond the state of West Virginia.
- This study was also limited to adult community and technical college students and does not include traditional age college students, 18-24 years old.
- This study used only data from West Virginia public two-year community and technical colleges, and, therefore, results probably could not be applied to four-year institutions or private institutions.
- The workforce data that were used did not include individuals who work in other states.
- The workforce data that were used did not include independent contractors or sole proprietors who do not pay unemployment taxes.

- Data provided by WorkForce West Virginia did not distinguish if a salary average is low due to an individual taking six weeks of unpaid leave or similar situations.
- With respect to demographics, the Higher Education Policy Commission/Community and Technical College System of West Virginia (HEPC/WVCTCS) collects data on disadvantaged students which is a proxy for socioeconomic status and welfare recipients.
- The educational background data for the students in this study were SAT or ACT test scores for placement in a developmental class. For the time period of this study, HEPC/WVCTCS did not collect test scores for other instruments that were used for academic placement such as ACCUPLACER or Compass.
- An Associate of Science (AS) degree is defined as a transfer degree (Title 135 Procedural rule West Virginia community and technical education , 2011). In West Virginia the intent of AS degrees has not always been to transfer. For this study, however, programs were classified as transfer or vocational/workforce based strictly on degree designation with Associate of Arts (AA) and AS degrees classified as transfer degrees and Associate of Applied Science (AAS) classified as vocational/workforce degrees. The degree designations were obtained from the HEPC/WVCTCS program inventory.

Methods

This study was a longitudinal study using student unit record (SUR) data over five years for students who were first-time freshmen for the 2004-2005 academic year and were 25 years of age or older. The students then were grouped by their initial course enrollment, college-level or developmental. The same students also were identified by their expected program outcome or enrollment objective, vocational or transfer, for analysis. This information was self-reported and may be unreliable or change over time (Bailey, Jenkins, & Leinbach, 2006).

The study was an analysis of this data using descriptive statistics and cross tabulation with a chi-square test for independence between momentum points and milestones. The momentum points that were examined were completion of developmental courses, gatekeeper courses (college-level math and English) and completing various amounts of college-level credits. The milestones that were analyzed were transferring to a baccalaureate institution and earning specific credentials, a certificate or associate degree (Jenkins, 2008).

Summary

Low educational attainment in adults is associated with high unemployment rates and poverty. The majority of jobs that pay a wage above the poverty level require at least some postsecondary education. It is becoming increasingly important that low-skill

adults succeed in postsecondary education. To meet the needs of these low-skill adults, West Virginia community and technical college educators must understand the progression through postsecondary education and the achievement or lack thereof that these adults experience. In the current economic conditions, decisions on how to assist low-skill adults to succeed in postsecondary education must be data-driven. This study provides information to help community and technical college educators in developing programs to address the needs of these students.

CHAPTER TWO: REVIEW OF THE LITERATURE

Community colleges were established in the early twentieth century to provide a way for more individuals to access higher education. As industries in the United States expanded, there became a greater need for skilled workers, which was one of the main contributing factors to the increase in community colleges (Cohen & Brawer, 2003). As the enrollment of community colleges has increased over time, the mission has changed. From the beginning there was a move by educators who wanted the four-year institutions to discontinue the first two years of postsecondary education and allow community colleges to deliver this level of education (Cohen & Brawer, 2003). With the increasing demands being placed on all levels of education, community colleges embraced their mission of providing access to higher education for individuals at all economic levels (Cohen & Brawer, 2003; Phillippe & Patton, 2000). During the twentieth century, as the nation became more industrialized and as technology continued to emerge, industry looked for a source of skilled labor. Since World War II, the skill requirements for employment have increased markedly (Carnevale & Desrochers, 2003; Garza & Eller, 1998). The passage of the GI Bill in1944 and the suggestion to create a network of public, community-based colleges by the Truman Commission in 1948 provided the impetus for a 282% increase in the number of community colleges between 1940 and 1970 (Cohen & Brawer, 2003; Phillippe & Patton, 2000; American Association of Community Colleges, 2012).

As baby boomers reached college age in the 1960s, the growth of community colleges continued and became a national network with the opening of 457 public

community colleges between 1940 and 1970 (American Association of Community Colleges, 2012; Phillippe & Patton, 2000). Steady growth continued through the twentieth century and beyond. There are currently 1,166 community colleges in the United States (American Association of Community Colleges, 2012).

As the number of community colleges grew, their role changed. From being the first two years of four-year institutions, community colleges went on to add non-credit continuing education in the 1940s, developmental education in the 1960s, a parity between vocational and collegiate programs in the 1970s, and community service in the 1980s. Over the last century, role evolved to what is now considered a comprehensive community college (American Association of Community Colleges, 2012; Cohen & Brawer, 2003; Phillippe & Patton, 2000; U.S. Department of Education, 2008). During the 1960s through the 1980s, funding has also changed from total community funding to state and federal funding, with some community colleges still receiving local resources (Cohen & Brawer, 2003).

Across the nation at the end of the twentieth century, community colleges were emerging as learning colleges and being challenged to play new roles as part of local and regional economic development. The economic environment of the twenty-first century calls for greater use of technology, lifelong learning, and educational flexibility (Garza & Eller, 1998; Levin, 2000). To support this effort in 1994, the Ford Foundation and MDC, Inc. funded the formation of the Rural Community College Initiative (RCCI) to bring together access to higher education and economic development (Garza & Eller, 1998; Rivard, 2002). Nine community colleges were awarded grants to develop and implement projects to respond to this idea. In 1997, another 15 sites were added, and in 2003, an

additional eight community colleges were included (Rivard, 2002). A result of these programs was a reexamination of the assumptions that access to postsecondary education leads to economic prosperity. Instead, it was found that access does not always guarantee community economic prosperity (Garza & Eller, 1998). Levin's study in 2000 supported the shift of the mission of the community college from serving as the first two years of a baccalaureate degree to one that is oriented toward economic concerns and the requirements of the private sector. His study supported the "high skill/high wages" concept relating education and employment (Levin, 2000).

The federal government recognized the importance of education to the economy of the nation, and in 1980, Congress established the U.S. Department of Education (DOE) with the following mission:

- Strengthen the Federal commitment to assuring access to equal educational opportunity for every individual;
- Supplement and complement the efforts of states, the local school systems and other instrumentalities of the states, the private sector, public and private nonprofit educational research institutions, community-based organizations, parents, and students to improve the quality of education;
- Encourage the increased involvement of the public, parents, and students in Federal education programs;
- Promote improvements in the quality and usefulness of education through Federally supported research, evaluation, and sharing of information;
- Improve the coordination of Federal education programs;
- Improve the management of Federal education activities; and

- Increase the accountability of Federal education programs to the President, the Congress, and the public (Overview, 2011)

To further the support of adult education to meet the increasing demand for high-skill workers, the Office of Vocational and Adult Education (OVAE) was created by DOE with three divisions: Adult Education and Literacy, Career and Technical Education, and Community College (Office of Vocational and Adult Education, 2011). While the Division of Adult Education and Literacy (DAEL) is responsible for support of programs that provide basic skills training, processes for completion of secondary school, job training and retraining, the Division of Community Colleges provides leadership to strengthen access to postsecondary education through community college for both youth and adults (Office of Vocational and Adult Education, 2011). In some states, these services are provided by distinctly separate groups while in other states the lines are blurred as to who provides the services to adults. Both of these services are important in providing high-skill workers. Two states contiguous to West Virginia, Virginia and Kentucky, provide significant support for their respective community college systems. In the 1990s and early 2000s, Kentucky was experiencing economic decline which was identified as being related to a low-skill/uneducated population. The Kentucky legislature recognized this issue and re-chartered the community and technical colleges in 1997, and issued a new charter to adult education in 2000. Although the two systems are managed by separate agencies, the legislature mandated that there be collaboration and linkages between the two systems. According to Chisman (2004), Kentucky is the national model that presents two issues for national policy consideration: 1) Kentucky gets significant results through short-duration adult education services, but these are not

well captured by the federal reporting system and 2) explicit policy or funding has not been established to support transitioning from adult education to postsecondary or workforce education. The Virginia Community College System (VCCS) was created more than 40 years ago, is made up of 23 community colleges and is member of the Achieving the Dream (ATD) initiative (About Achieving the Dream, 2011). Recognizing the importance of community colleges in meeting the needs for higher education and workforce training, the VCCS developed a six-year strategic plan, *Achieve 2015*, focusing on meeting the needs of the communities they serve (Achieve 2015, 2012). The goals of this strategic plan are success, affordability, student success, workforce, and resources which sets a target of raising at least $550 million to support the mission of their community colleges (Achieve 2015, 2012). The system has worked with the Community College Research (CCRC) at Columbia University to develop initiatives to achieve these goals (Jenkins, Jaggars, & Roksa, 2009).

During the 1990s, two legislative acts were passed by Congress, the School-to-Work Opportunities Act of 1994 and the Workforce Investment Act of 1998. These pieces of legislation were enacted to support community colleges' expanded participation in workforce/career programs. The goal of these expanded program offerings was to provide access to postsecondary education for students working towards technical careers and also provide a skilled workforce for employers (Cohen & Brawer, 2003).

Although access is a critical issue, especially with community and technical colleges, degree or credential completion is the goal for college administrators, state legislators, and students (Adelman, 1999). Achieving degree completion is a challenge for community and technical colleges since only 4% of students enroll in certificate

programs with intent to obtain the credential. Many students enroll only to achieve skills to obtain, maintain, or advance in a job. The colleges must also deal with the challenges posed by under-prepared students with low academic skills and the continually changing characteristics of community college students (Lohman & Dingerson, 2005; Miller, Pope, & Steinmann, 2005). Over the past 20 years, much research has been done to address this issue with the majority of it being case studies. In 1999, Beder's *The Outcomes and Impacts of Adult Literacy Education in the United States,* published by the National Center for the Study of Adult Learning and Literacy (NCSALL), found that 11 of 14 studies on adult literacy programs reported gains in employment after completion of the program. Two studies were inconclusive and one reported no gain. However, these were case studies and the results were based on self-reporting by the participants and not on statistical data (Beder, 1999).

Over the past two decades, several reports have been published that focus on the links between educational attainment, literacy skills, and the U.S. economy. One of the earliest reports was *A Nation at Risk: The Imperative for Educational Reform,* written by then Secretary of Education Terrell H. Bell's National Commission on Excellence in Education and published in April 1983. This report was one of the first to discuss the failing of American public schools and higher education (Gardner et al., 1983). *Education and the Economy: An Indicator's Report* (published in 1997 by the Office of Educational Research and Improvement of the U.S. Department of Education) and *Reach Higher, America: Overcoming Crisis in the U.S. Workforce* (published in 2008 by the National Commission on Adult Literacy), among others, also investigated the relationship between educational attainment and the economy. These reports indicate that

the economy of the nation as well as the economic well-being of individuals continues to rely on educational attainment. In 2003, the National Center for Public Policy and Higher Education warned that unless states made significant efforts to improve educational attainment, personal income would decline over the next 15 years (Kirsch et al., 2007). The Educational Testing Service published a report in February 2007 describing the condition of higher education and issuing a "storm warning" for the future. This report, "*America's Perfect Storm: Three Forces Changing Our Nation's Future*," identifies the three forces which have contributed to the decline of educational attainment as divergent skill distribution, changing economy, and demographic trends (Kirsch et al., 2007). According to the report, there are large numbers of the adult population that lack sufficient literacy and numeracy skills to participate in the increasingly competitive workforce. The second force, changing economy, has resulted from changes in the sources of wealth, patterns of international trade, and a shift between the balance of capital and labor due to globalization and technological innovation. The third force, demographic trends, indicates that the population of the United States will become increasingly older over the next 20-25 years. It is critical that more American adults increase their academic attainment.

Community colleges provide an ideal entry point into higher education for adults with no previous college experience and/or low academic skills. Table 1 compares adult enrollment for public community colleges and public four-year institutions.

Table 1
Enrollment Comparison between Public Community Colleges and Public Four-Year Institutions

	Community Colleges	Four-Year Institutions
Full-time-equivalent (FTE) working age adults	33%	15%
2004-2005		
24-29 year old adults	18%	16%
30+ year old adults	35%	13%

Adapted from U. S. Department of Education, (2001), *Fall Enrollment Survey:2001-Integrated Postsecondary Education Data System,* Washington, DC: National Center for Educational Statistics. Adapted from U. S. Department of Education, (2008), *Community Colleges: Special Supplement to the Condition of Education 2008,* Washington, DC: National Center for Education.

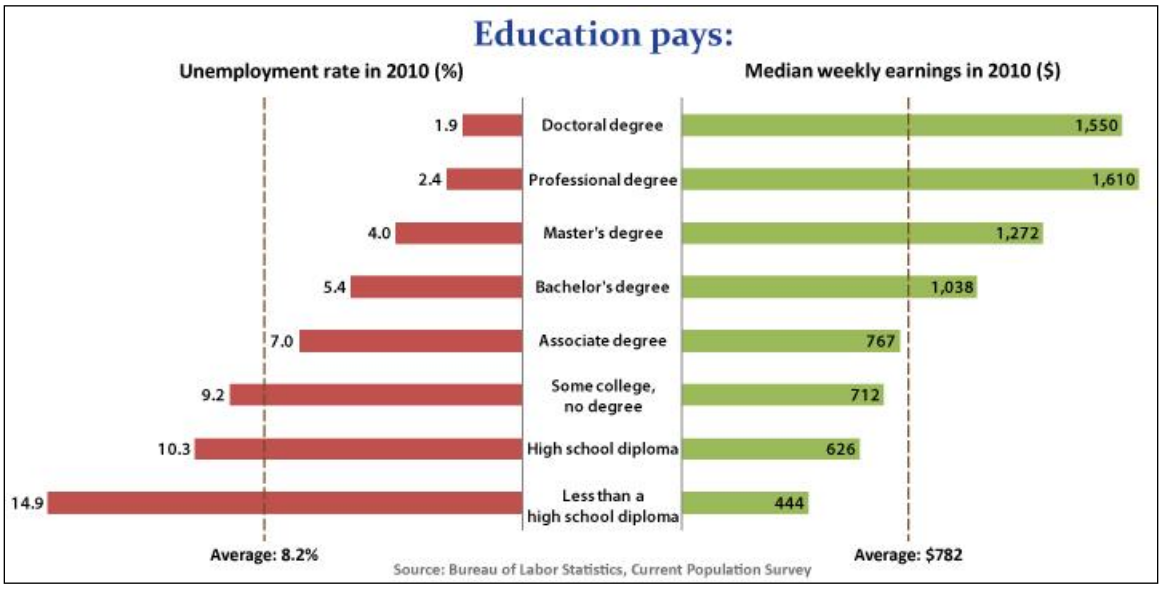
According to the American Association of Community Colleges (AACC), in fall 2008, 44% of all undergraduate students were enrolled in community colleges, signifying approximately 12.4 million students nationally (Community College Fast Facts , n.d.). It is anticipated that the number of students enrolling in community colleges will increase for the next several years. The potential of community colleges to serve as career pathways for adults with low academic skills has been recognized and funded by several initiatives over the past few years. Of these initiatives, the more well-known are the Ford Foundation's *Bridges to Opportunity for Underprepared Adults;* the Lumina Foundation for Education's *Achieving the Dream: Community Colleges Count,* the National Governors Association's *Pathways to Advancement,* and the Washington State Board of Community and Technical Colleges' *Integrated Basic Education and Skills Training (I-*

BEST). The *Bridges to Opportunity for Underprepared Adults* initiative provided funding for six states, including Colorado, Kentucky, Louisiana, New Mexico, Ohio, and Washington. The purpose was to develop programs to better align remedial, occupational, and academic programs through incentives to the community colleges in these states (Jenkins, et al., 2008). *Achieving the Dream (ATD)* is an initiative that was founded in 2004 by eight partner organizations which included the Lumina Foundation for Education, The American Association of Community Colleges, The Community College Leadership Program, The Community College Research Center, Jobs for the Future, MDC (formerly Manpower Development Corporation of Chapel Hill, NC), MDRC (formerly Manpower Demonstration Research Corporation), and Public Agenda. At this time, 130 community colleges have participated in the *Achieving the Dream* initiative, which is dedicated to student-centered initiatives that are based on data-driven decisions and target low-income students. Twenty to thirty new colleges are added to the *ATD's* initiative each year (About Achieving the Dream, 2011). Although colleges continue to join the *Achieving the Dream* initiative, recent reports indicate that on average the initial member colleges have seen only modest improvements in the percentage of students completing gatekeeper courses, college-level English or math (Rutschow et al., 2011). What does this say about the level of educational attainment and the economic well-being of individuals? What is needed is a study that will identify the variables that lead to increased success for adult students in post-secondary education.

According to the 2002 U.S. Census Bureau's report entitled *The Big Payoff: Educational Attainment and Synthetic Estimates of Work-Life Earnings* (Day & Newburger, 2002), the difference in earnings for workers with different levels of

educational attainment grew over the preceding 25 years. In 1975, the average earnings of workers with a bachelor's degree were 50% greater than those of workers with only a high school diploma. By 1999, the bachelor's degree holders were earning an average of 80% more, an increase of 30%. Meanwhile, the relative earnings of the least educated fell (Day & Newburger, 2002). Figure 1 shows the average annual earnings of workers 25 to 64 years old by educational attainment for 2010 and the related unemployment rates. As can be seen, the 2010 median weekly earnings increased by 22.5% for adults with an associate degree compared to only a high school diploma while the unemployment rate dropped by 3.3 % for the same group.

Figure 1



Note: Data are 2010 annual averages for persons age 25 and over. Earnings are for full-time wage and salary workers.
Source: Bureau of Labor Statistics, 2010 Current Population Survey (U.S. Department of Labor, 2011).

This information reinforces the need to increase the educational attainment of individuals. If the economy of the United States is to improve and stay competitive, the educational attainment of adults, especially those with low academic skills, must be increased. Once a leader among developed nations in post-secondary attainment for adults age 25 to 64, the United States is now twelfth out of 36 (Lee & Rawls, 2010).

A recent study conducted by David Prince of the Washington State Board for Community and Technical Colleges (WSBCTC) and Davis Jenkins of the Community College Research Center (CCRC) at Columbia University tracked the educational attainment and economic outcome of low-skill adult students over five years. This study looked at measurable educational attainments such as completing a college-level English or math course, a momentum point, and educational attainments such as achieving a credential. A milestone or, as referred to in their study, a "tipping point" of at least one year of college-level course work and a credential was found to have a substantial effect on a student's annual income (Prince & Jenkins, 2005).

A number of other reports also discuss initiatives to assist adults in transitioning from basic skills to college-level courses in occupational programs: *Adult Education & Literacy and Community Colleges in Kentucky* sponsored by the Council for Advancement of Adult Literacy; *The Potential of Community Colleges as Bridges to Opportunity: Can it be Achieved at Scale?* published by the Community College Research Center; *Breaking Through: Helping Low-Skilled Adults Enter and Succeed in College and Careers,* an initiative sponsored by the Charles Stewart Mott Foundation and the Bill and Melinda Gates Foundation; and *The Role of Community Colleges in State Adult Education Systems* (Chisman, 2004; Jenkins, March 2003; Liebowitz & Taylor,

2004; Morest, 2004). Although these reports provide information on initiatives to assist adults in transition, for the most part they rely on case studies and provide little statistical evidence of outcomes. The initiatives addressed by these reports do not research a cohort over time to identify what happens to low-skill adult students in community college. Most research has focused on enrollment and students in four-year institutions, with less research being done on community colleges.

Community colleges and states continually collect student unit record (SUR) data, but often these data are underutilized in researching longitudinal patterns of student progression and achievement. In organizing data by term, patterns may emerge that help identify milestone and momentum points (Leinbach & Jenkins, 2008). Leinbach and Jenkins (2008, p. 2) define milestones as "measurable educational achievements that include both conventional terminal completions, such as earning a credential or transferring to a baccalaureate program, and intermediate outcomes, such as completing developmental education or adult basic skills requirements." Momentum points are defined as "measurable educational attainments, such as completing a college-level math or English course" (Leinbach & Jenkins, 2008, p. 2).

The majority of research by economists on community college outcomes has focused on the effects of enrolling and receiving a degree from a two-year program, not on student and institutional characteristics that affect completion (Bailey, Calcagno, Jenkins, Kienzl, & Leinbach, 2005). According to Bailey et al. (2005), the most used frameworks of persistence and completion are based on Marvin Tinto's *Student Integration Model* and Bean's *Student Attrition Model.* Using research that is based on these models, Titus developed a list of institutional characteristics that might influence

student persistence that include institutional control, residential or not, size, sources of revenue, and patterns of expenditure (Titus, 2004; Titus, 2006). Most of the research that has been conducted on persistence as a production function has involved four-year colleges. Bailey et al. have conducted the only such study involving community colleges and concluded that institutions with large enrollments and higher percentage of minority students, part-time students, and women have lower graduation rates (Bailey, Alfonso, Scott, & Leinbach, 2004).

Another measure of community college performance is the Student Right-to-Know (SRK) graduation rates that are required by law. The SRK rates are reported as part of the Integrated Postsecondary Education Data System (IPEDS) by each institution that receives federal financial aid. According to Bailey, Crosta, and Jenkins, SRK rates give a biased and misleading picture of individual community college student outcomes (2006). The IPEDS SRK rates do not include part-time or transfer students. In public two-year institutions, part-time students represent 61% of the students (Reyna, 2010). In 1993, the National Student Clearinghouse was founded by the higher education community as the only Family Educational Rights and Privacy Act (FERPA) compliant access to national enrollment and degree records for college students (National Student Clearinghouse Facts, 2012). Although SRK rates do not give a completely accurate picture for community college student outcomes, they do provide valuable information and with the use of the National Student Clearinghouse data there is the potential for a more accurate picture of individual community college student outcomes (Bailey, Crosta, & Jenkins, 2006).

History of West Virginia Community and Technical Colleges

In West Virginia, two-year associate degrees have been offered since the 1930s by four-year institutions. Prior to 1969, all education, including higher education, was under the control of the State Board of Education. In 1969, the legislature created the West Virginia Board of Regents and gave it the authority for governing all institutions of higher education. However, the formal development of community colleges in West Virginia did not begin until the legislature mandated it in the 1970s (Miller & Dziagwa, 1997). Three free-standing community and technical colleges (Parkersburg, Northern, and Southern) were established in 1971, and six "discrete elements" (community and technical college components) of Shepherd College, Glenville College, Fairmont State College, Bluefield College, West Virginia State College, Marshall University, and Potomac State College were converted to comprehensive community colleges. This created a system of ten comprehensive community college service regions under the Board of Regents. Over the next 30 years, legislation was passed to structure and focus the mission of community colleges in West Virginia. In 1989, Senate Bill 377 (1989) created the Joint Commission for Vocational-Technical-Occupational Education to bridge the gap between secondary and post-secondary vocational, technical, and occupational education. Through Senate Bill 420 (1990) in 1990, the Board of Regents was dissolved and two separate governing boards were created: the University System Board of Trustees governed Marshall University and West Virginia University and the State College System Board of Directors governed all other four-year and two-year colleges. In 1995, Senate Bill 547 (1995) established the mission of West Virginia's community colleges which included career-technical education and workforce training by requiring

all governing boards to establish "community and technical college education with the administrative, programmatic and budgetary control necessary to respond to local needs." Discrete divisions with a provost were established for all administratively linked community and technical college components of four-year institutions. To further delineate the role of community colleges, Senate Bill 653 (1999) required all component community colleges to obtain independent accreditation from the four-year institutions to which they were administratively linked. This legislation eliminated the two board system and created the Higher Education Policy Commission (HEPC) as the "policy-making" entity for higher education and also included the creation of a state-level interim governing board to oversee the transition from institutional boards of advisors to local boards of governors for all free-standing institutions. In 2001, Senate Bill 703 (2001) authorized the creation of a "statewide" community and technical college system to provide a mechanism to aid in achieving independent accreditation and enhance and focus attention on achieving established state goals for community and technical college education. New River Community and Technical College was separated from Bluefield State College and created as a free-standing, independently accredited community and technical college by House Bill 2224 (2003) in 2003. Continuing the efforts to support community and technical colleges, Senate Bill 448 (2004) created the West Virginia Council for Community and Technical College Education as a separate coordinating agency with authority over state community and technical colleges, branches, centers, and other delivery sites with a community college mission. In 2004, Senate Bill 792 (2004) re-merged Pierpont Community and Technical College with Fairmont State University. To further establish a community and technical college system, House Bill

3215 (2008)declared independence for all community and technical college components, divisions, and regional campuses (except Potomac State College). Local advisory boards were dissolved and local boards of governors were formed for all newly independent community and technical colleges. In 2011, two bills were enacted that affected community and technical colleges. Senate Bill 200 (2011) placed in West Virginia legislative code name changes for three of the former component community and technical colleges, Bridgemont Community and Technical College, Kanawha Valley Community and Technical College, and Mountwest Community and Technical College, and Senate Bill 375 (2011) gave the West Virginia Community and Technical College Council authority to make rules for accreditation and determining minimum standards for conferring degrees. Being a state that is among the lowest in the nation in college graduates, West Virginia continues to focus on meeting the need for a skilled workforce for the twenty-first century through legislative support of higher education and community colleges in particular (Miller & Dziagwa, 1997; Lumina Foundation for Education, 2010).

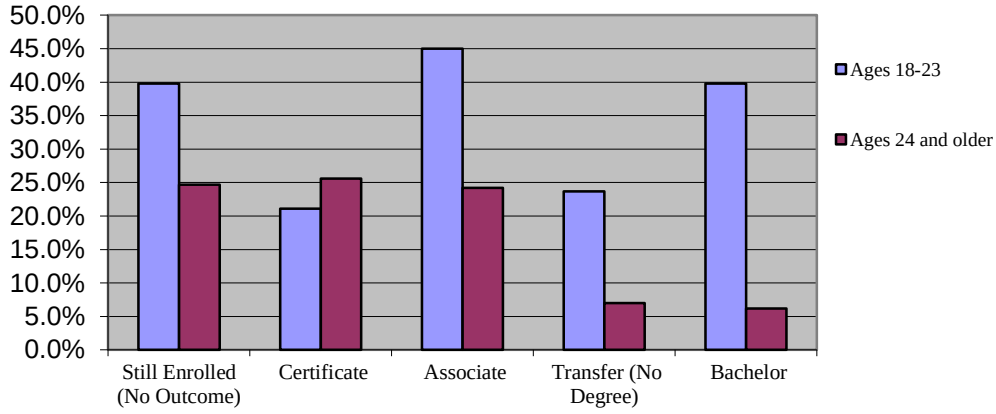
Conclusion

The *Persistence and Attainment of 2003-04 Beginning Postsecondary Students: After 6 Years* report by the U.S. Department of Education surveyed a nationally representative sample of first-time college students who enrolled in college-credit courses at community college in 2003-04. According to this report, adult students (age 25-64) were more likely to earn a certificate than traditional age students (18-24) but less likely to earn an associate degree or transfer to a four-year institution. The report further states that nearly 60% of the adult first-time students did not earn any credential or transfer

after six years compared to only about 40% of the younger students (U.S. Department of Education, 2010). Figure 2 shows, of the students who did obtain a credential, the highest level of educational attainment after six years for students who started in 2003-04.

Figure 2

Highest Outcome After Six Years



Source: Beginning Postsecondary Student (BPS:04-09) (U.S. Department of Education, 2010). Researcher's calculations.

With all of the emphasis on student persistence and completion, only one study has looked at the tipping points and milestones for community college students. Prince and Jenkins (2005) tracked for five years the progress of two cohorts of adult students with at most a high school education who entered one of Washington State's community and technical colleges in 1996-97 or 1997-98. Unemployment insurance wage records were used to review the annual earnings of the students. The results of the study identified a tipping point where educational attainment has an impact on an individual's

earnings. According to this report, at least one year of postsecondary education and earning a credential were required to have a positive impact on an individual's earnings (Prince & Jenkins, 2005). This research is intended to duplicate the Washington State study to fill gaps in the literature of the educational experiences of low-skill adult community and technical college students in West Virginia.

CHAPTER THREE: RESEARCH METHODS

This chapter discusses the methods used to analyze existing data to quantify the impact of postsecondary education on the income of West Virginia community and technical college students. Data for the study were collected from two public agencies, the West Virginia Higher Education Policy Commission/Community and Technical College System of West Virginia (HEPC/WVCTCS) and WorkForce West Virginia (WFWV) to describe the educational attainment and earning status of community and technical college students.

Research Design

The research design is longitudinal, non-experimental, quantitative, and descriptive. In non-experimental research, the independent variables are not manipulated by the researcher and there is no random assignment to groups (Johnson & Christensen, 2008). Instead, the researcher makes observations and interpretations on collected data (Gay & Airasian, 2000). According to Johnson and Christensen, a longitudinal panel study analyzes the same individuals over time (2008). This study is longitudinal research using existing student unit record (SUR) data for all variables, which were analyzed using various descriptive statistics (Gay & Airasian, 2000; Jenkins, 2008). The SUR data created a cohort that was analyzed over a five year period for momentum/tipping point achievement, milestone achievement, and annual income. A causal-comparative design was used to analyze the relationship between attainment of momentum points and achievement of educational milestones and economic impacts of West Virginia community and technical college students.

Population

Purposive sampling was used to obtain the participation data needed for the study. The "participants" for this study included adults 25 years of age and older, first-time, both full-time and part-time West Virginia community and technical college students who initially enrolled during the academic year 2004-2005. Using these criteria, a population of 1,512 students was identified. The whole population was analyzed, and a cohort of 1,390 degree-seeking students, including AA, AS, and AAS, was identified. This cohort was tracked over a five year period.

Data Collection

Data for the variables were secured from the West Virginia Higher Education Policy Commission (HEPC), Community and Technical College System of West Virginia (WVCTCS) and in cooperation with WorkForce West Virginia (WFWV), a division of the West Virginia Department of Commerce databases. The data were provided through a Supplemental Cooperative Agreement (SCA) between WFWV, HEPC/WVCTCS, and the researcher. See Appendix A for a copy of the agreement. The additional SCA was formulated by WFWV to ensure confidentiality in all aspects of the research.

The data collected by the WFWV are not self-reported but are submitted by employers in West Virginia. All employers, with a few exceptions such as independent contractors or sole proprietors, must submit quarterly contribution and wage reports to the West Virginia Unemployment Compensation Division (Fry, 2010). The wage data

gathered by WFWV provided the wage variables that were used in the economic impact aspect of this study.

HEPC/WVCTCS pulled the student files that created the cohort of adults 25 years of age or older, first-time, both full-time and part-time West Virginia community and technical college students with at most a high school diploma and initially enrolled during the 2004-2005 academic year. These files were given to WFWV to cross-match with the data from their files.

The resulting files from WFWV include data fields which identify the students' earnings by quarter, year, match (employed) wages, employer, NAICS, county, and zip code. From these files the HEPC/WVCTCS built a wage table for 2002 and 2003, prior to enrolling in higher education, and 2009 and 2010, the two years following the end of the study, by merging with the data in the SUR file (S. Tucker, personal communication, September 21, 2011). Information contained in the student files from HEPC/WVCTCS included fields such as institution attended, social security number, gender, year of birth, enrollment in developmental course/s, and program of initial enrollment (Documents and Resources, 2011). The resulting merged data files were assigned a random identifying number and social security numbers were removed to maintain confidentiality. The merged data fields included students' earnings by quarter, institution, CIP code, year, gender, year of birth, etc. Not all fields were necessary for this study. Only data relevant to the research were queried to provide the data fields including student identifier, CIP code of the student's program of study, wages earned by quarter, NAICS of the employer, level of educational attainment, and gender of the student. The requested data from the file merge from HEPC/WVCTCS and WFWV were stripped of all individual

student identifiers. Because surveys were not sent to individuals and information was reported without personal information, privacy was not an issue.

Once accessed, the data files were transferred to SPSS data fields for statistical analysis. The data files were analyzed only for the purposes of this research. An executive summary of the study will be shared with the West Virginia Community and Technical College Chancellor and WorkForce West Virginia.

Data Analysis

The study used descriptive statistics to present the essential characteristics of the data and to answer research questions. Descriptive statistics "focus on describing, summarizing and explaining data," according to Johnson and Christensen (2008, p. 464). Frequency, conditional probabilities, and chi-square analyses were used. In this study the achievement of a milestone and the student annual income were dependent variables. The independent variables were those associated with achieving a momentum/tipping point: completing developmental coursework, completing a college-level math/English course, earning a certificate, earning an associate degree, and transferring to a baccalaureate institution.

Research Questions

1. What is the relationship, if any, between momentum point achievement and milestone achievement for low-skill adults? Percentage ratios were calculated for each initial cohort of students and their momentum and milestone achievements.

2. What is the relationship, if any, between momentum point achievement and the persistence of postsecondary education for low-skill adults? Descriptive statistics were used to analyze momentum point achievement and student persistence. A chi-square test for independence was applied to determine dependence of persistence on momentum point attainment.
3. What is the relationship, if any, between the level of educational attainment of low-skill adults and their annual earnings? The average annual earnings were cross-tabulated with the level of educational attainment.
4. What is the relationship, if any, between the completion of an academic credential/milestone by low-skill adults and annual earnings? The average annual earnings, two years prior to enrolling in a community and technical college and two years after the five year period covered by the study, were cross-tabulated with the academic credential/milestone achievement five years after enrolling.

The cohort of students used in this study represented all ten community and technical colleges in West Virginia. The data from HEPC/WVCTCS were cross-matched with the databases of WFWV to obtain income data. The identification of achievement gaps that the study presents can highlight potential opportunities for improving student outcomes. However, the diagnoses and development of strategies for improving student success should be left to the faculty, student services staff, and administrators of the West Virginia community and technical colleges (Jenkins, 2008; Leinbach & Jenkins, 2008).

Summary

This study of the momentum/tipping point attainment, milestone achievement, and the impact, if any, on the earnings of low-skill adults who have enrolled in West Virginia community and technical colleges analyzed the data using a non-experimental causal-comparative design. Data were collected from HEPC/WVCTCS and WFWV existing databases for all variables. Both descriptive statistics and regression analysis were utilized for analyzing the data using IBM SPSS Statistics 20.

CHAPTER FOUR: PRESENTATION AND ANALYSIS OF DATA

The purpose of this study was to examine the educational experiences and outcomes of low-skill adult students in West Virginia's community and technical colleges to provide a more detailed profile of these students. The process also identified roadblocks that cause these students to drop out or fail, momentum or tipping points that increase the likelihood of student success, and the impact the level of postsecondary education attainment has on an individual's income. The research attempts to fill gaps in the literature of the postsecondary educational experience of low-skill adult community and technical college students in West Virginia and what this means for their relative economic outcomes.

Data Collection

Data for the variables were secured from the West Virginia Higher Education Policy Commission (HEPC) and the Community and Technical College System of West Virginia (WVCTCS) in cooperation with WorkForce West Virginia (WFWV), a division of the Department of Commerce archival databases. The data exchange was made available through an agreement between HEPC/WVCTCS, WFWV, and the researcher to ensure confidentiality of records. See Appendix A for a copy of the agreement.

The data parameters were provided by the researcher to the HEPC/WVCTCS for retrieval of the data files. The retrieved files were transferred to five Excel spreadsheets that contained from 388 rows of data to 21,709 rows of data providing the student unit record (SUR) data elements needed for the research analysis. From this raw data, the list of students 25 years of age and older, first-time, both full-time and part-time West

Virginia community and technical college students who initially enrolled during the 2004-2005 academic year was identified which consisted of a list of 1,512 students. This list of students was provided to WFWV who cross-matched with the data from their files which included information such as the students' earnings by quarter, year, and North American Industry Classification System (NAICS) code. HEPC/WVCTCS then merged this data with the student unit record (SUR) files and entered the data into SPSS for analysis.

Of the 1,512 students that were initially included for analysis, Classification of Instructional Programs (CIP) codes were used to identify those students that were degree seeking for inclusion in this research. This resulted in an N=1,390 students. In determining the appropriate momentum points and milestones to analyze, the students' academic starting point and finishing goal needed to be taken into consideration. Therefore, the data was first sorted into four student groups that were not mutually exclusive.

The first two groups were based on the students' initial enrollment status, developmental or college-ready. The second two groups were based on the students' expected finishing point, vocational or transfer. Although five different tests are accepted in West Virginia for use as placement in remedial or college-level course work in community and technical colleges, West Virginia did not collect placement test scores except ACT or SAT scores as part of the SUR data during the period that the data for this research was collected 2003-2008. Therefore, the determination to include a student in the developmental group or the college-level group was based on the students' enrollment

in a remedial course. There were 70.8% (N=984) students in the developmental group and 29.3% (N=407) students in the college-ready group.

Regardless of their starting point, students may have the same ultimate goals of either a certificate or an associate degree for workforce preparation, a vocational goal, or the goal of transferring to a baccalaureate institution. Two criteria were used to determine into which group a student was included for this analysis: the CIP code of the students' declared major, and whether the student transferred to a baccalaureate institution. Students who declared a major with a CIP code associated with a Certificate of Applied Science (CAS) or Associate of Applied Science (AAS) were included in the vocational or workforce-ready group. This group included 40.8% (N=567) students. Students who declared a major with a CIP code associated with an Associate of Arts (AA) or Associate of Science (AS) degree, transfer degrees, or who transferred to a baccalaureate program during the research period were included in the transfer group. This group included 59.2% (N=823) students.

Demographic Data

Demographic data provided by HEPC/WVCTCS included gender, race, and year of birth (age). Table 2 shows the demographic characteristics of the total cohort of students for the study. Reflecting a common pattern among community and technical college students, females comprise the majority of the student population, 61.4%. Approximately 90% of the cohort was white, which reflects the population of West Virginia. According to the U. S. Census Bureau, in 2010 93.9% of West Virginia's population was white (U.S. Census Bureau, 2012).

Table 2
Demographic Characteristics and Gender of West Virginia Community and Technical College First-Time Students Age 25+ Who Enrolled in the 2003-2004 Academic Year.

Student Characteristics	Females	Males	Total
Number of Students	61.4%	38.6%	1,390
Race			
White	92.4%	87.1%	90.4%
Black	5.6%	7.3%	6.3%
Hispanic	0.4%	2.8%	1.3%
American Indian or Alaskan Native	0.7%	0.2%	0.5%
Unknown	0.9%	2.6%	1.6%
Age			
25 - 34	54.9%	61.2%	57.3%
35 - 44	30.6%	24.4%	28.2%
45 - 55	13.9%	12.3%	11.9%
Over 55	0.6%	2.1%	1.2%

Tables below provide the demographics of the students in the study for each of the four groups, developmental, college-ready, vocational/workforce-focused, and transfer-focused.

Table 3
Demographic Characteristics and Gender of West Virginia Community and Technical College First-Time Students Age 25+ Who Started in Developmental Courses.

Student Characteristics	Females	Males	Total
Number of Students	65.4%	34.6%	984
Race			
White	92.5%	89.1%	91.40%
Black	6.1%	7.6%	6.60%
Hispanic	0.3%	2.1%	0.90%
American Indian or Alaskan Native	0.3%	0.0%	0.20%
Unknown	0.8%	1.2%	0.90%
Age			
25 – 34	57.1%	64.7%	59.80%
35 – 44	30.7%	22.0%	27.70%
45 – 55	11.8%	11.8%	11.80%
Over 55	0.3%	1.5%	0.70%

Table 4

Demographic Characteristics and Gender of West Virginia Community and Technical College First-Time Students Age 25+ Who Started in College-Level Courses.

Student Characteristics	Females	Males	Total
Number of Students	51.6%	48.2%	407
Race			
White	91.9%	83.7%	87.9%
Black	4.3%	6.6%	5.4%
Hispanic	0.5%	4.1%	2.2%
American Indian or Alaskan Native	1.9%	0.5%	1.2%
Unknown	1.4%	5.1%	3.2%
Age			
25 – 34	48.1%	55.1%	51.5%
35 – 44	30.0%	28.6%	29.3%
45 – 55	20.5%	13.3%	17.0%
Over 55	1.4%	3.1%	2.2%

Table 5

Demographic Characteristics and Gender of West Virginia Community and Technical College First-Time Students Age 25+ Whose Goal is a Vocational Credential.

Student Characteristics	Females	Males	Total
Number of Students	58.4%	41.6%	567
Race			
White	92.1%	87.3%	90.1%
Black	5.1%	5.1%	5.1%
Hispanic	0.6%	4.2%	2.1%
American Indian or Alaskan Native	0.9%	0.0%	0.5%
Unknown	1.2%	3.4%	2.1%
Age			
25 – 34	52.9%	53.0%	52.9%
35 – 44	29.0%	28.0%	28.6%
45 – 55	17.5%	16.5%	17.1%
Over 55	0.6%	2.5%	1.4%

Table 6
Demographic Characteristics and Gender of West Virginia Community and Technical College First-Time Students Age 25+ Whose Goal is to Transfer to a Baccalaureate Program.

Student Characteristics	Females	Males	Total
Number of Students	63.5%	36.5%	823
Race			
White	92.5%	87.0%	90.5%
Black	5.9%	9.0%	7.0%
Hispanic	0.2%	1.7%	0.7%
American Indian or Alaskan Native	0.6%	0.3%	0.5%
Unknown	0.8%	2.0%	1.2%
Age			
25 – 34	56.2%	67.7%	60.4%
35 – 44	31.5%	21.7%	27.9%
45 – 55	11.7%	9.0%	10.7%
Over 55	0.6%	1.7%	1.0%

Research Questions

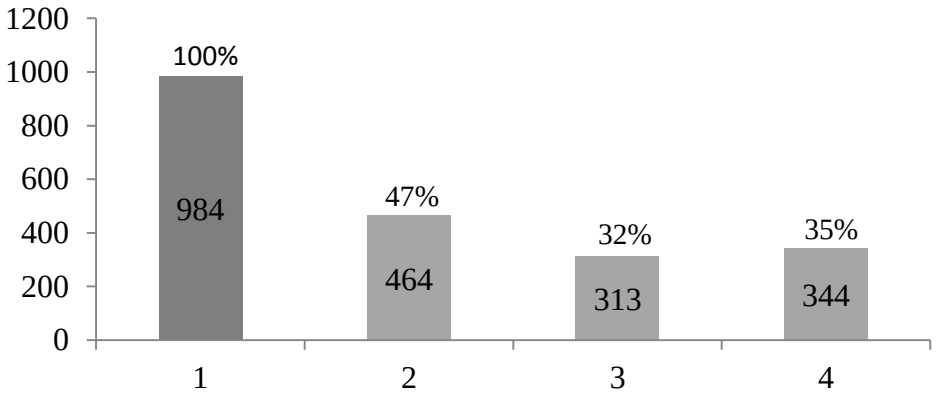
1. What is the relationship, if any, between momentum point attainment and milestone achievement?
2. What is the relationship, if any, between momentum point attainment and persistence in postsecondary education for low-skill adults?
3. What is the relationship, if any, between the level of educational attainment of low-skill adults and their annual earnings?
4. What is the relationship, if any, between the completion of an academic credential/milestone by low-skill adults and annual earnings?

Data Analysis

Descriptive statistics were utilized with information from existing databases from HEPC/WVCTCS and WFWV to answer the research questions. The statistical analysis utilized IBM SPSS Statistics 20 software. Frequency and percentage statistics were used to analyze momentum point attainment and milestone achievement for research question one for each of the four groups. Figures 3, 4, 5, and 6 show this achievement for the students grouped by initial enrollment. For students in the developmental group, college-ready indicates the student completed all developmental courses required or completed a gatekeeper course in an area of remediation. To answer research question one, the data were further analyzed utilizing cross-tabulation, followed by a 2 x 2 chi-square test for independence.

Figure 3

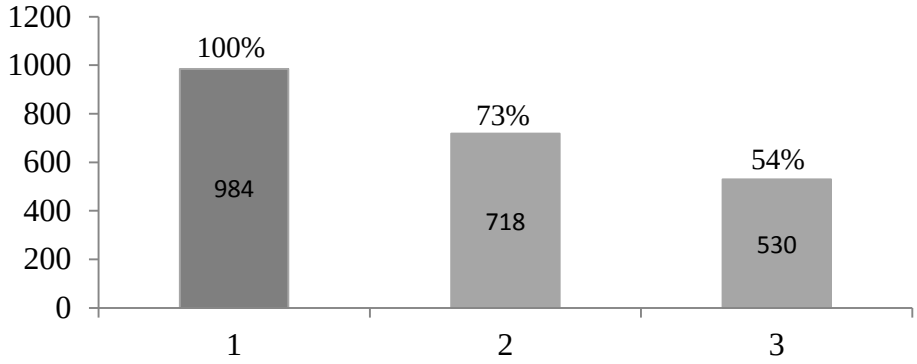
Developmental/Pre-College Students Five-Year Milestone Achievement Totals



1 - Total Developmental Students
2 - Achieved Any Milestone
3 - College Ready
4 - Transition to College

Figure 4

Developmental/Pre-College Students Five-Year Momentum Point Attainment Totals

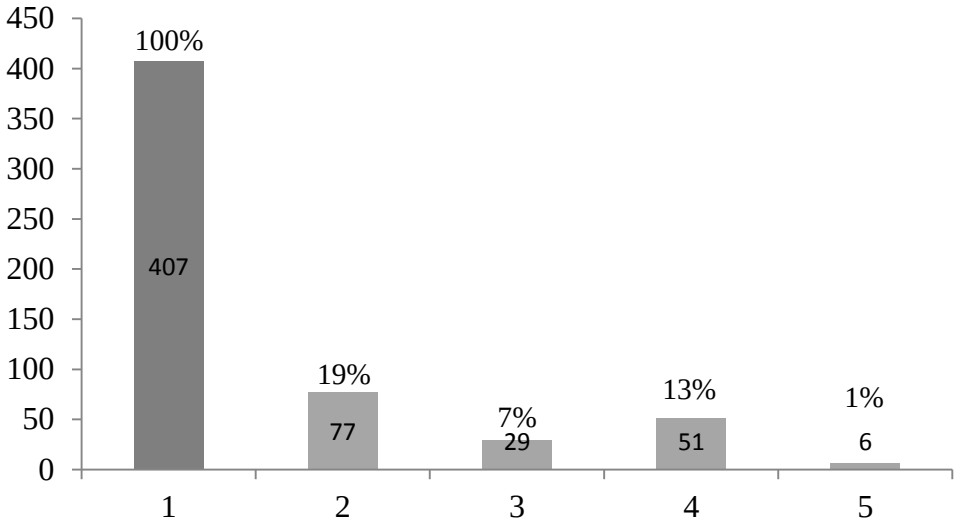


1 - Total Developmental Students
2 - Completed Any Developmental Course
3 - Completed Any Gatekeeper Course

Figure 3 shows that slightly more developmental students completed a gatekeeper course in a required remedial area milestone than completed the all developmental courses milestone. Figure 4 shows that more of the developmental students, 73%, completed any developmental course as opposed to completing any gatekeeper course, 54%.

Figure 5

College-Level Students Five-Year Milestone Achievement Totals

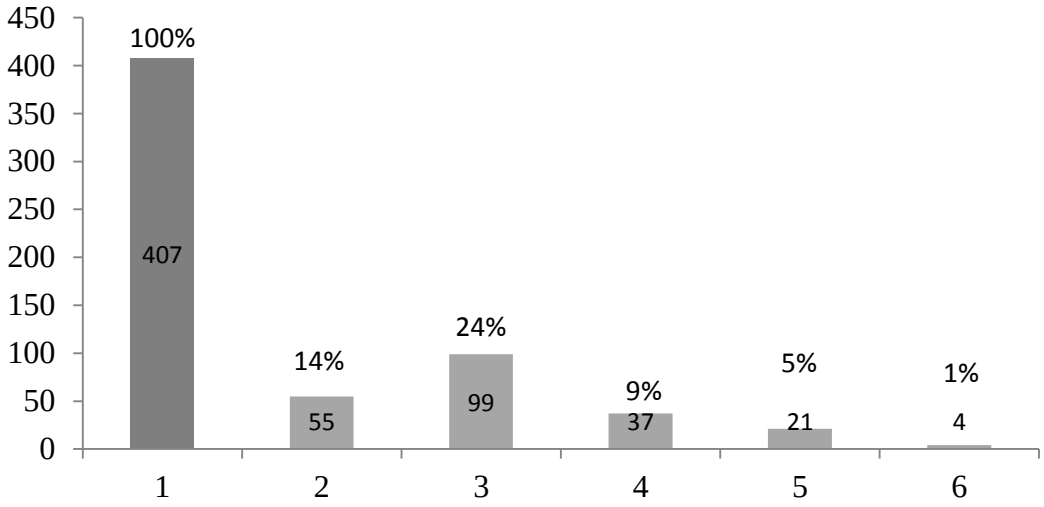


1 - Total College-Level Students
2 - Achieved Any Milestone
3 - Transferred to Four-Year
4 - Earned Associate Degree
5 - Earned Certificate

As can be seen in Figure 5 though, only 19% of the college-level/college-ready students completed any milestone.

Figure 6

College-Level Students Five-Year Momentum Point Attainment Totals



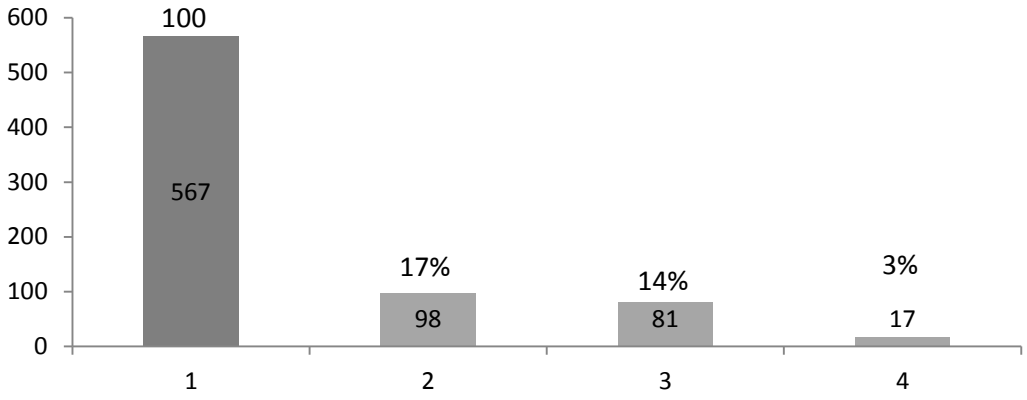
1 - Total College-Level Students
2 - Completed a College-level Math Course
3 - Completed a College-level English Course
4 - Completed 15 Credits
5 - Completed 30 Credits
6 - Completed 30 Credits in One Year

Figure 6 shows that of the college-level/college-ready students the momentum point with the highest attainment rate was completion of a college-level English course.

Figures 7, 8, 9, and 10 show the momentum point attainment and milestone achievement for the groups based on students' academic goals, vocational/workforce ready or transfer, using frequency and percentage statistics.

Figure 7

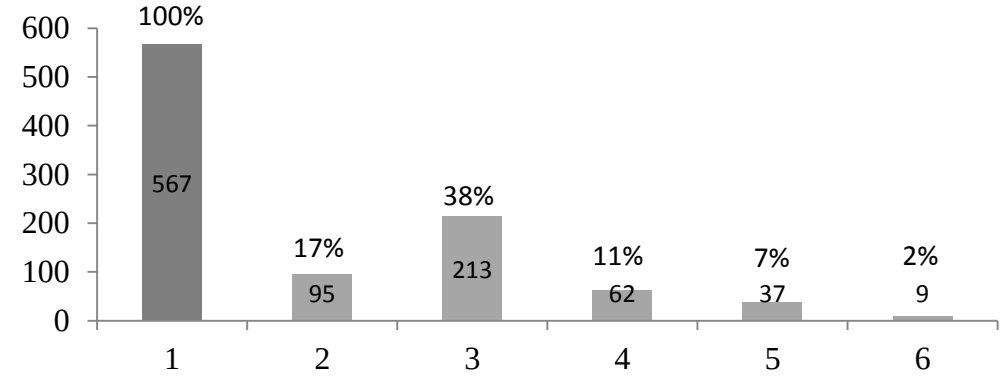
Vocational/Workforce Students Five-Year Milestone Achievement Totals



1 - Total Vocational Students
2 - Achieved Any Milestone
3 - Earned Associate Degree
4 - Earned Certificate

Figure 8

Vocational/Workforce Students Five-Year Momentum Point Attainment Totals

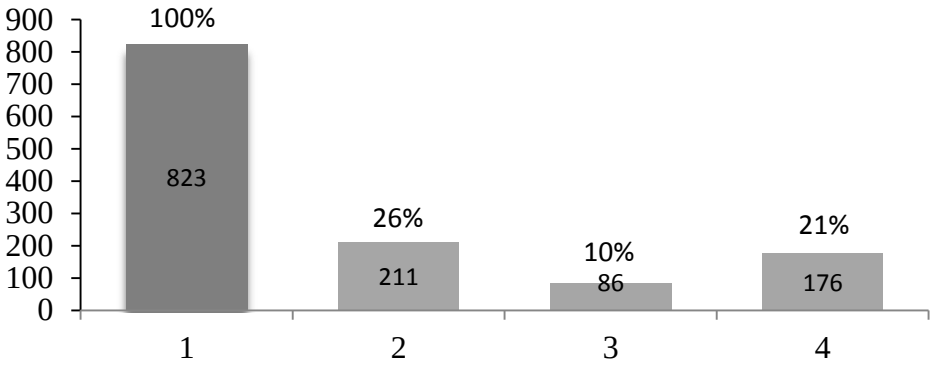


1 - Total Vocational Students
2 - Completed College-level Math Course
3 - Completed College-level English Course
4 - Completed 15 Credits
5 - Completed 30 Credits
6 - Completed 30 Credits in One Year

Of the vocational/workforce students, Figure 8 shows the momentum point, completion of a college-level English course, had the highest rate of attainment similar to the college-level/college-ready group. Figure 7 shows that achievement of any milestone was only 17%, and earning an associate degree was the milestone with the highest rate of achievement, 14%.

Figure 9

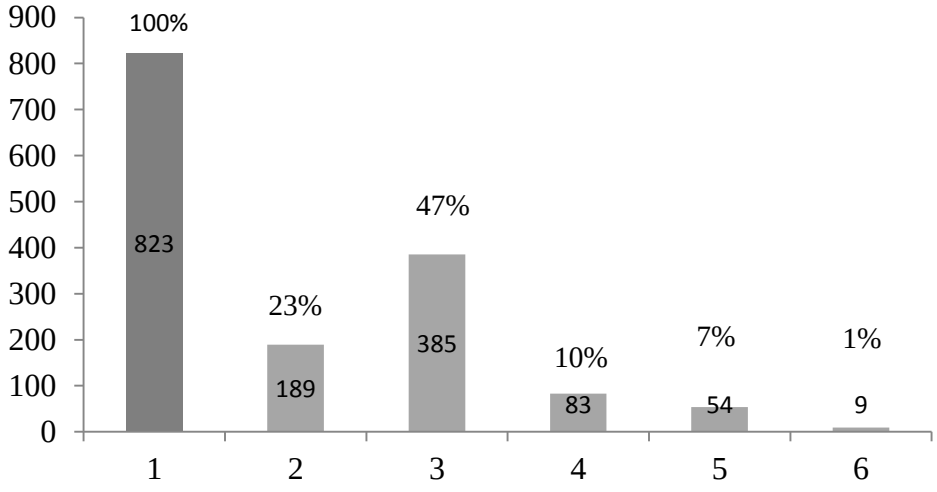
Transfer Students Five-Year Milestone Achievement Totals



1 - Total Transfer Students
2 - Achieved Any Milestone
3 - Transferred
4 - Earned Certificate, Associate, or Baccalaureate

Figure 10

Transfer Students Five-Year Momentum Point Attainment Totals



1 - Total Transfer Students
2 - Completed College-level Math Course
3 - Completed College-level English Course
4 - Completed 15 Credits
5 - Completed 30 Credits
6 - Completed 30 Credits in One Year

Attainment of the momentum point, completion of a college-level English course, again was highest for the transfer group (47%), see Figure 10. Milestone achievement was also low for the transfer group, only 21% for achievement of any milestone.

Cross-tabulation and 2 x 2 chi-square test for independence were also used on the milestone achievement and momentum point attainment data to answer research question one for the milestone achievements and momentum point attainments for each of the four groups, initial enrollment of developmental or college-ready and academic goals enrolled in vocational/workforce program or transfer program.

For research question two, frequency and percentage statistics were also used to analyze the relationship between momentum point attainment and persistence. Of the 1,390 degree-seeking students, only 365 (26.3%) persisted, that is, they either graduated, transferred or were still enrolled at the end of five years. A total of 20.8% (N=289) students graduated during the five years, 9.9% (N=138) transferred, and 5.5% (N=76) of the students were still enrolled. Figure 11 presents persistence of the four groups, developmental, college-ready, vocational/workforce, and transfer.

Table 7
Persistence of West Virginia Community and Technical College First-Time Students Age 25+ Based on Initial Enrollment and Academic Goals

Group Characteristics	Total	Persisted
Total	1,390	
Students who persisted	365	26.3%
Initially enrolled in developmental	301	21.7%
Initially enrolled in college-ready	80	5.8%
Enrolled in vocational/workforce program	150	10.8%
Enrolled in transfer program	231	16.6%

Table 8 presents the frequency and percentage of students who attained momentum points and persisted over the five year period. A 2 x 2 chi-square test for independence was also executed on the attainment of momentum points and the persistence over the research period to determine what, if any, relationship there is between momentum point attainment and persistence.

Table 8
Percentage of West Virginia Community and Technical College First-Time Students Ag 25+ Who Attained a Momentum Point and Persisted Over Five Years

Momentum Point Attained	Total	Persisted
Any momentum point	893	39.8%
Developmental momentum point	218	39.3%
Completed college-level English	607	49.3%
Completed college-level math	293	68.6%
Completed 15 credit hours	145	48.3%
Completed 30 credit hours	92	48.9%
Completed 30 credit hours in one year	19	57.9%

To analyze data for research question three, the levels of educational attainment included were: completing 15 credit-hours, completing 30 credit-hours, earning a certificate, and earning an associate degree. Cross-tabulation and a 2 x 2 chi-square test for independence were applied to the data to assess whether a relationship exists between educational attainment and annual earnings. For annual earnings, pre- and post-educational mean wages for each level of educational attainment were analyzed. Table 9 shows the number of students who attained a specific level of education and the mean wages before and after their educational achievement. Because of the low number of students, 2% in 2002 and 9% in 2003, with wage data prior to entering higher education, the comparison of pre- and post-educational mean wages appears skewed.

Table 9
*Educational Level Attainment of West Virginia Community and Technical College First-Time Students Age 25+ and Their Pre- and Post-Educational Mean Wages**

Education Level	Students	Pre-Education (# of Students)	Post-Education (# of Students)
15 Credit Hours	109	$55,660 (7)	$26,920 (75)
30 Credit Hours	91	$55,665 (2)	$22,501 (55)
Certificate	26	$74,068 (1)	$20,990 (14)
Associate	263	$64,409 (24)	$25,738 (180)

*Only students with existing wage data were included in the mean calculation.

Prior to entering higher education, only 2% of the 1,390 degree-seeking students in the study had wages in 2002 as reported by WFWV. The mean income was approximately $17,200. Only 5% of the students had wages reported in 2003 with a mean income calculated to be approximately $62,000 according to the information provided by WFWV and HEPC/WVCTCS. In analyzing the data, 60% (N=38) of the pre-educational reported wages were over $50,000. These data produced a skewed pre-educational attainment mean wage as seen in Table 9. Research for this study did not provide an explanation for the anomaly in the 2003 reported wages; however, in 2004 a couple of large businesses in West Virginia closed, which could account for the enrollment of students who previously had large salaries. In 2009, five years after entering higher education, 51% of the 1,390 degree-seeking students had reported wages with a mean income of $20,284. In 2010, 50% had reported wages with a mean income of $21,727. Cross-tabulation and chi-square analyses were conducted on credentials, certificates, associate degrees and baccalaureate degrees, and wage increases in 2009 and 2010 to answer research question four.

Research Findings

Research Question 1: What is the relationship, if any, between momentum point attainment and milestone achievement?

Conditional probabilities were calculated for momentum point attainment and milestone achievements for each of the four categories of students. The conditional probability denotes the likelihood that a milestone will be achieved, given the attainment of the momentum point. Table 10 shows the conditional probabilities for the first two categories based on initial enrollment.

Table 10
Conditional Probabilities for Milestone Achievement Based on Momentum Point Attainment for West Virginia Community and Technical College First-Time Students Age 25+ Identified by Their Initial Enrollment

Initial Enrollment	Momentum Point	Milestone	Conditional Probability
Developmental	Completed any developmental course	Completed all developmental courses or completed a gatekeeper course in area of remediation	63%
	Completed college-level math or English	Completed all developmental courses or completed a gatekeeper course in area of remediation	65%
	Completed college-level math	Transferred, earned an associate degree or earned a certificate degree	53%
	Completed college-level English	Transferred, earned an associate degree or earned a certificate degree	47%
College-Ready	Completed 15 credit hours	Transferred, earned an associate degree or earned a certificate degree	38%
	Completed 30 credit hours	Transferred, earned an associate degree or earned a certificate degree	(not valid)
	Completed 30 credit hours in one year	Transferred, earned an associate degree or earned a certificate degree	(not valid)

Chi-square tests for independence were also conducted on these data. Tables 10 and 11 present the results of these tests. For analysis of a 2 by 2 chi-square table, the Yates' Correction for Continuity which compensates for the overestimation of the chi-

square value should be used. In the following tables, the significance level associated with this value which is found in the column labeled Asymp. Sig. was used for analysis.

Table 11

Chi-Square Tests for Completing Any Developmental Course and Any Milestone Achievement for Developmental Initial Enrollment Group

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	275.488[a]	1	.000		
Continuity Correction[b]	273.106	1	.000		
Likelihood Ratio	331.211	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	275.208	1	.000		
N of Valid Cases	984				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 125.43.

b. Computed only for a 2x2 table

As seen in Table 11, the alpha is less than .05 indicating a significant relationship between completing any developmental course and any milestone achievement for the developmental group.

Table 12

Chi-Square Tests for Completing College-level math or English and Any Milestone Achievement for Developmental Initial Enrollment Group

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	152.942[a]	1	.000		
Continuity Correction[b]	151.362	1	.000		
Likelihood Ratio	157.774	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	152.787	1	.000		
N of Valid Cases	984				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 214.55.

b. Computed only for a 2x2 table

Table 12 shows an alpha value less than .05 also indicated a significant relationship between the momentum point, completing a college-level English course, and any milestone for the developmental group.

Conditional probabilities suggest a positive association between momentum point attainment and milestone achievement for students initially enrolled in developmental courses. The chi-square tests have alpha values less than .05, indicating that the results are significant. In other words, for the developmental group, students who completed a momentum point were significantly more likely to go on to achieve one or more milestones as well. Tables 13 through 17 show the results of the chi-square tests for the momentum point attainment and milestone achievement for the students initially enrolled as college-ready.

Table 13

Chi-Square Tests for Completing College-level Math and Any Milestone Achievement for College-Ready Initial Enrollment Group

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	52.619[a]	1	.000		
Continuity Correction[b]	49.968	1	.000		
Likelihood Ratio	42.343	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	52.490	1	.000		
N of Valid Cases	407				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 10.41.
b. Computed only for a 2x2 table

An alpha value of less than .05 in Table 13 indicated a significant relationship between completing college-level math and any milestone for the college-ready group.

Table 14

Chi-Square Tests for Completing College-level English and Any Milestone Achievement for College-Ready Initial Enrollment Group

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	64.710[a]	1	.000		
Continuity Correction[b]	62.359	1	.000		
Likelihood Ratio	56.950	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	64.551	1	.000		
N of Valid Cases	407				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 18.73.

b. Computed only for a 2x2 table

A significant relationship between completing college-level English and any milestone is indicated by an alpha value of less than .05 in Table 14.

Table 15

Chi-Square Tests for Completing 15 Credit Hours and Any Milestone Achievement for College-Ready Initial Enrollment Group

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	15.699[a]	1	.000		
Continuity Correction[b]	14.003	1	.000		
Likelihood Ratio	12.951	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	15.660	1	.000		
N of Valid Cases	407				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 7.00.

b. Computed only for a 2x2 table

An alpha value of less than .05 shown in Table 15 indicated a significant relationship between students in the college-ready group completing 15 credit hours and

any milestone achievement.

Table 16

Chi-Square Tests for Completing 30 Credit Hours and Any Milestone Achievement for College –Ready Initial Enrollment Group

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	2.999[a]	1	.083		
Continuity Correction[b]	2.090	1	.148		
Likelihood Ratio	2.605	1	.107		
Fisher's Exact Test				.091	.080
Linear-by-Linear Association	2.992	1	.084		
N of Valid Cases	407				

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 3.97.

b. Computed only for a 2x2 table

In Table 16 an alpha value greater than .05 which leads to the conclusion that the results are not significant.

Table 17

Chi-Square Tests for Completing 30 Credit Hours in One Year and Any Milestone Achievement for College-Ready Initial Enrollment Group

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	.097[a]	1	.755		
Continuity Correction[b]	.000	1	1.000		
Likelihood Ratio	.091	1	.763		
Fisher's Exact Test				.569	.569
Linear-by-Linear Association	.097	1	.755		
N of Valid Cases	407				

a. 2 cells (50.0%) have expected count less than 5. The minimum expected count is .76.

b. Computed only for a 2x2 table

The alpha value greater than .05, as seen in Table 17 $a = 1.000$, indicated no significant relationship between completing 30 credit hours in one year and achieving any milestone.

Conditional probabilities for the data in the college-ready group were not as strong as those in the developmental group. The chi-square tests for the momentum points of completing college-level math, English and 15 credit hours indicate the relationship is significant. The tests showed no relationship between completing 30 credit hours and completing 30 credit hours in one year and further milestone achievement. However, the chi-square tests for these relationships have one and two cells respectively with expected count less than five which violates chi-square test assumptions and thus the test results are not valid.

Table 18 presents the conditional probabilities for the data groups workforce/vocational and transfer. This analysis indicates a stronger relationship between the attainment of the college-level math and completion of 30 credit hours and milestone achievement for workforce/vocational students. For transfer students, those who attained the momentum points of completing college-level math, English, and 15 credit hours were the most likely to achieve a milestone.

Table 18

Conditional Probabilities for Milestone Achievement Based on Momentum Point Attainment for West Virginia Community and Technical College First-Time Students Age 25+ Identified by Their Academic Goals

Academic Goals	Momentum Point	Milestone	Conditional Probability
Workforce/Vocational	Completed college-level math	Earned associate degree or certificate	47%
	Completed college-level English	Earned associate degree or certificate	34%
	Completed 15 credit hours	Earned associate degree or certificate	38%
	Completed 30 credit hours	Earned associate degree or certificate	43%
	Completed 30 credit hours in one year	Earned associate degree or certificate	(not valid)
Transfer	Completed college-level math	Transferred or earned associate degree	57%
	Completed college-level English	Transferred or earned associate degree	40%
	Completed 15 credit hours	Transferred or earned associate degree	40%
	Completed 30 credit hours	Transferred or earned associate degree	29%
	Completed 30 credit hours in one year	Transferred or earned associate degree	(not valid)

Chi-square tests shown in Tables 19 through 23 indicate that there is a significant relationship between momentum point attainment and milestone achievement. It should be noted that the chi-square tests for completing 30 credit hours in one year and any milestone achievement has one cell, completing 30 credit hours in one year and achieving any milestone, with expected count less than 5 which violates assumptions, and therefore is not a valid result.

Table 19

Chi-Square Tests for Completing College-Level Math and Any Milestone Achievement for Workforce/Vocational Academic Goal

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	72.246[a]	1	.000		
Continuity Correction[b]	69.741	1	.000		
Likelihood Ratio	59.012	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	72.119	1	.000		
N of Valid Cases	567				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 16.42.
b. Computed only for a 2x2 table

As seen in Table 19, an alpha value less than .05, $a = .000$, indicated a significant relationship between completing a college-level math course and any milestone achievement for the workforce/vocational group.

Table 20

Chi-Square Tests for Completing College-Level English and Any Milestone Achievement for Workforce/Vocational Academic Goal

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	68.870[a]	1	.000		
Continuity Correction[b]	66.980	1	.000		
Likelihood Ratio	67.492	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	68.748	1	.000		
N of Valid Cases	567				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 36.81.
b. Computed only for a 2x2 table

An alpha value less than .05 ($a = .000$), as seen in Table 20, indicated a significant relationship between the attainment of the momentum point, completing college-level English,

and achievement of any milestone for the workforce/vocational group.

Table 21

Chi-Square Tests for Completing 15 Credit Hours and Any Milestone Achievement for Workforce/Vocational Academic Goal

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	23.268[a]	1	.000		
Continuity Correction[b]	21.571	1	.000		
Likelihood Ratio	19.143	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	23.227	1	.000		
N of Valid Cases	567				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 10.54.
b. Computed only for a 2x2 table

A significant relationship between completing 15 credit hours and any milestone is indicated in Table 21 which presented an alpha value less than .05, $a = .000$ for the workforce/vocational group.

Table 22

Chi-Square Tests for Completing 30 Credit Hours and Any Milestone Achievement for Workforce/Vocational Academic Goal

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	14.975[a]	1	.000		
Continuity Correction[b]	13.285	1	.000		
Likelihood Ratio	12.053	1	.001		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	14.949	1	.000		
N of Valid Cases	567				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.40.
b. Computed only for a 2x2 table

Table 22 also indicated a significant relationship between attainment of the momentum point, completing 30 credit hours, and achieving any milestone for the workforce/vocational group by an alpha value less than .05.

Table 23

Chi-Square Tests for Completing 30 Credit Hours in One Year and Any Milestone Achievement for Workforce/Vocational Academic Goal

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	1.648[a]	1	.199		
Continuity Correction[b]	.704	1	.401		
Likelihood Ratio	1.378	1	.240		
Fisher's Exact Test				.192	.192
Linear-by-Linear Association	1.645	1	.200		
N of Valid Cases	567				

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 1.56.
b. Computed only for a 2x2 table

Table 23 presents an alpha value greater than .05, $a = .401$, resulting in the conclusion there is no significant relationship between completing 30 credit hours in one year and achieving any milestone for the workforce/vocational group.

Chi-square tests shown in Tables 24 through 28 have alpha values less than .05, indicating there is a significant relationship between momentum point attainment and milestone achievement. It should be noted that, as with the workforce/vocational goal, the chi-square tests for completing 30 credit hours in one year and any milestone achievement has one cell, completed 30 credit hours in one year but did not achieve any

milestone, with expected count less than 5 which violates assumptions, and therefore is not a valid result.

Table 24

Chi-Square Tests for Completing College-Level Math and Any Milestone Achievement for Transfer Academic Goal

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	157.524[a]	1	.000		
Continuity Correction[b]	155.032	1	.000		
Likelihood Ratio	139.646	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	157.333	1	.000		
N of Valid Cases	823				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 42.03.
b. Computed only for a 2x2 table

For the group whose students' academic goal was transfer, Table 24 shows an alpha value less than .05 which indicated a significant relationship between completing a college-level math course and achievement of any milestone,

Table 25

Chi-Square Tests for Completing College-Level English and Any Milestone Achievement for Transfer Academic Goal

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	133.193[a]	1	.000		
Continuity Correction[b]	131.262	1	.000		
Likelihood Ratio	142.307	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	133.031	1	.000		
N of Valid Cases	823				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 86.27.
b. Computed only for a 2x2 table

Table 25 also shows an indicated significant relationship between completing college-level English and achievement of any milestone for this group with an alpha value less than .05, $a = .000$.

Table 26

Chi-Square Tests for Completing 15 Credit Hours and Any Milestone Achievement for Transfer Academic Goal

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	8.616[a]	1	.003		
Continuity Correction[b]	7.818	1	.005		
Likelihood Ratio	7.831	1	.005		
Fisher's Exact Test				.005	.004
Linear-by-Linear Association	8.605	1	.003		
N of Valid Cases	823				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 18.46.
b. Computed only for a 2x2 table

A significant relationship for the transfer group between completing 15 credit hours and any milestone achievement with an alpha value less than .05, $a = .005$, as seen in Table 26.

Table 27

Chi-Square Tests for Completing 30 Credit Hours and Any Milestone Achievement for Transfer Academic Goal

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	4.116[a]	1	.042		
Continuity Correction[b]	3.458	1	.063		
Likelihood Ratio	3.761	1	.052		
Fisher's Exact Test				.061	.035
Linear-by-Linear Association	4.111	1	.043		
N of Valid Cases	823				

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 12.01.
b. Computed only for a 2x2 table

An alpha value of .063, greater than .05, indicated there was no significant relationship between completing 30 credit hours and achieving any milestone for the transfer group, see Table 27.

Table 28
Chi-Square Tests for Completing 30 Credit Hours in One Year and Any Milestone Achievement for Transfer Academic Goal

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	10.389[a]	1	.001		
Continuity Correction[b]	7.953	1	.005		
Likelihood Ratio	8.208	1	.004		
Fisher's Exact Test				.005	.005
Linear-by-Linear Association	10.376	1	.001		
N of Valid Cases	823				

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 2.00.
b. Computed only for a 2x2 table

Unlike the workforce/vocational group, a significant relationship between completing 30 credit hours in one year and achieving any milestone was indicated by an alpha value less than .05, $a = .005$, for the transfer group.

Research Question 2: What is the relationship, if any, between momentum point attainment and persistence in postsecondary education for low-skill adults?

For this study, persistence was defined as one of three possibilities: continued enrollment at the end of the five-year research period, completion of a credential, or transfer. As seen in Table 7, only 26.3% (N=365) of the degree-seeking students in this study persisted over the five-year period. The group that had the highest percentage of

students who persisted was the group of students who initially started in developmental, with a 21.7% (N=301) persistence rate, see Table 7. Table 8 showed the percentages of persistence based on the completion of momentum points. Chi-square tests were conducted on these data and the results were alpha values of less than .05 for all momentum points and persistence, indicating a significant association. However, for the 30 credit hours in one year momentum point, a valid chi-square test could not be conducted due to the low number of data points.

Table 29
Phi Coefficient for Cross-tabulation of Momentum Point Attainment and Persistence for West Virginia Community and Technical College First-Time Students Age 25+

Momentum Point	**Phi Coefficient**
Completed any developmental course	0.306
Completed college-level English	0.460
Completed college-level math	0.497
Completed 15 credit hours	0.171
Completed 30 credit hours	0.137
Completed 30 credit hours in one year	(not valid)

Further analysis of the phi coefficient is shown in Table 29. Using Cohen's criteria, a phi coefficient of 0.10 is small effect, 0.30 is medium effect, and 0.50 is large effect. Based on this analysis, attainment of the momentum points of completion of college-level English (0.460) or math (0.497) had the greatest effect on persistence.

Research Question 3: What is the relationship, if any, between the level of educational attainment of low-skill adults and their annual earnings?

In 2002, only 2% of the students had reported income and in 2003, only 5%. The percentage of students in the different levels of educational attainment ranged from 0% of

the students completing 30 credit hours or earning a certificate to 6% of the students earning an associate degree who had reported income. These percentages (and, by inference, the students' employment levels) increased for all levels of educational attainment from 35% for earning 15 credit hours, to 54% for a certificate, 62% for earning an associate degree and 79% for earning 30 credit hours (see Table 30). The low numbers of students with reported income did not allow for a valid comparison of pre- and post-educational mean wages. For the 15 credit hours earned, 30 credit hours earned, and certificate educational levels, a valid chi-square test could not be conducted due to the low number of data points. The chi-square analysis for the associate degree returned an alpha value greater than.05, indicating that the relationship is not significant. However, the increase in the number of students reporting income does appear to be significant. The data that were collected did not provide an explanation for the anomaly of the high wages reported in 2003, but as stated previously the researcher found that at least a couple of large businesses in West Virginia closed in 2004 which could account for the enrollment of students who previously had larger incomes..

Table 30
Pre- and Post-Educational Mean Wages for West Virginia Community and Technical College First-Time Students Age 25+ Based on Educational Attainment

Educational Attainment	Total	Wages							
		2002		2003		2009		2010	
		%	Mean	%	Mean	%	Mean	%	Mean
15 Credit Hours	62	2%	$51,894	2%	$76,068	35%	$25,288	34%	$25,354
30 Credit Hours	63	0%	$0	3%	$55,655	79%	$20,999	78%	$21,201
Certificate	26	0%	$0	4%	$74,068	54%	$17,440	46%	$24,148
Associate	263	6%	$17,545	9%	$63,409	62%	$22,751	61%	$26,043

Research Question 4: What is the relationship, if any, between the completion of an academic credential/milestone by low-skill adults and annual earnings?

Of the 289 students who earned a credential, only 5% had reported wages in 2002 and 9% in 2003. This increased to 62% in 2009 and 60% in 2010. Chi-square analysis was conducted to determine the relationship between earned credentials and annual earnings. However, it was determined that one cell, earning a certificate and increased earnings, in the 2009 analysis and one cell, earning a certificate and increased earnings, in the 2010 analysis have expected counts less than five. Therefore, a valid chi-square test could not be conducted due to the low number of data points.

Summary

In this study the relationship of momentum point attainment and milestone achievement for West Virginia community and technical college first-time students age 25+ was analyzed. The relationship of momentum point attainment to persistence, educational attainment, and income was also analyzed.

Data from a total of 1,390 West Virginia community and technical college first-time, degree-seeking students age 25+ who were initially enrolled in the 2004-2005 academic year were analyzed. The majority of the students (71%) were initially enrolled in developmental courses. The remainder of the students (29%) was college-ready/enrolled in college-level courses. Analysis was also conducted based on the students' academic goals, workforce/vocational (41%) or transfer (59%).

Chi-square analysis on the relationship of momentum point attainment and milestone achievement indicated a significant relationship between the completion of any

developmental course or college-level math or English course and milestone achievement for students initially enrolled as developmental students and conditional probability analysis indicated that this relationship was positive. For college-ready, workforce/vocational, and transfer students, attainment of all of the defined momentum points except earning 30 credit hours in one year indicated a positive, significant relationship to milestone achievement. Completion of a college-level math course showed the strongest relationship.

Although persistence was low, with only 36% of the original enrollees completing their education, alpha values indicated a significant relationship between momentum point attainment and persistence. Only completion of the momentum point of earning 30 credit hours in one year could not be evaluated by a valid chi-square test due to the low number of data points.

Due to the low quantity of data points on wages for pre-college enrollment, analysis of the relationship between the level of educational attainment or the completion of an academic credential and the annual earnings of West Virginia community and technical college first-time, degree-seeking students age 25+ could not be validated. Observation of the increase in the number of students with reported income at the completion of the study compared to pre-college enrollment, however, indicates a possible relationship.

Conclusions of this study are presented in chapter five. Implications, limitations, recommendations, and suggestions for further research are also examined.

CHAPTER FIVE: CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

Summary of Purpose

The purpose of this study was to examine existing data to analyze the educational experiences of West Virginia community and technical college low-skill first-time adult students age 25+ to provide a more detailed profile of these students. Data for the study were obtained through an agreement between the researcher, West Virginia Higher Education Policy Commission (HEPC), Community and Technical College System of West Virginia (WVCTCS), and WorkForce West Virginia (WFWV). This research seeks to fill gaps in the literature of the educational experiences of these adult students and what this means for their relative economic outcomes. The educational attainment of the research cohort was reviewed to identify momentum points, gatekeeper courses, milestones and the impact of these attainments on the students' economic outcomes.

The following questions guided the research.

1. What is the relationship, if any, between momentum achievement and milestone achievement?
2. What is the relationship, if any, between momentum point achievement and persistence in postsecondary education for low-skill adults?
3. What is the relationship, if any, between the level of educational attainment of low-skill adults and their annual earnings?
4. What is the relationship, if any, between the completion of an academic credential/milestone by low-skill adults and annual earnings?

Summary of Procedures

The data obtained contained 1,512 rows of information representing West Virginia community and technical college first-time students age 25+ who enrolled during the 2004-2005 academic year. The researcher segmented the data by Classification of Instructional Programs (CIP) codes to identify degree seeking students. The variables included for analysis were enrollment in developmental courses, successful completion of developmental courses, enrollment in college-level courses, successful completion of college-level courses, continued enrollment at the end of the study period, attainment of a certificate or associate degree, transfer to baccalaureate institution, annual wages earned before enrollment, and wages earned after the research period. Based on initial enrollment and academic goals, the data were separated into four groups which were not exclusive. The research identified the academic variables for each of these groups as momentum points and milestones for further analysis.

Summary of Descriptive Data

The census population was sorted by the researcher to include only degree seeking students, which resulted in a final population of 1,390 students from the ten West Virginia community and technical colleges. The data from this population were separated into four groups, two based on initial enrollment and two based on academic goals, for analysis to answer four research questions. Descriptive statistics, including frequency and percentage statistics and a 2 x 2 chi-square test for independence, were used to answer the research questions. Conditional probability analysis was also used to answer research question one.

Summary of Findings

Students initially enrolled in developmental courses and completing any developmental course had a 63% probability of achieving a milestone, or if completing college-level mathematics or English course, a 65% probability of achieving a milestone. This indicated a positive relationship between momentum point attainment and milestone achievement for this group of students. For this group of students an alpha value of $p<.01$ indicates the results are significant. For the college-ready group, students who completed a college-level math course had the highest probability of completing a milestone (53%). The attainment of the momentum point of completing college-level math resulted in the highest probability of achieving a milestone for both the vocational/workforce group (47%) and the transfer group (57%). An alpha value of $p<.01$ indicates this is a significant positive relationship.

In this study, persistence was defined as one of three possibilities: continued enrollment at the end of the five-year research period, completion of a credential, or transfer to a baccalaureate institution. Of the 1,390 students in the cohort that was researched, only 26.3% of the students persisted. The strongest relationship of momentum point attainment to persistence appears to be completion of a college-level math course (68.6%). Using Cohen's criteria, a phi coefficient of .50 indicates a large effect. Completion of college-level math had a phi coefficient of .497, indicating a strong positive relationship of momentum point attainment to persistence. Attainment of the momentum points, completion of college-level English or completion of any developmental course, had a medium effect on persistence based on the phi coefficient, .460 and .306 respectively.

The low numbers of students with reported income prior to enrolling in a community and technical college did not allow for a valid comparison of pre- and post-educational mean wages. However, the percentages of reported income (and, by inference, the students' employment levels) increased for all levels of education attainment. The associate degree level of educational attainment reported the most students with reported income 18.9% (N=263). The percentage of students in this group who had reported income increased from only 9% prior to enrolling in postsecondary education to 62% in 2009 and 61% in 2010. Although all levels of educational attainment showed increase in the percentage of students reporting income, the number of students attaining each level was low (see Table 29). Again, the low number of students who earned a credential and had reported earnings did not provide data for valid analysis. Combining the two years prior to enrollment in higher education and the two years after the end of the research period still did not provide sufficient data for valid analysis. It can be noted by observation, however, that the percentage of students with reported income increased from the start of the study to the final reported income, 5% in 2002 and 9% in 2003 to 62% in 2009 and 60% in 2010, for the students who earned a credential.

Summary of Ancillary Findings

Ancillary findings indicate that the ratio of males to females is much closer in the vocational/workforce group (41.6% to 58.4%) than in the transfer group (36.5% to 63.5%). However, in the age group 25 – 34 years old, male enrollment exceeded female enrollment 55.1% to 48.1%. Of the 289 students who obtained a credential, females outnumber males three to one (74.4% to 25.6%).

Limitations

This study was limited by several factors. At the time the data were collected, West Virginia did not collect test scores for placement into developmental coursework except for ACT and SAT scores which many, if not most, community college students do not have. Therefore, the researcher placed students in the developmental group for initial enrollment based on course enrollment, which may or may not have been accurate. Students were also separated into the vocational/workforce group and transfer group based on the Classification of Instructional Programs (CIP) codes. The classification of the code does not ensure an accurate assessment of the students' academic goals or intentions. The wage data used in the study were obtained from WorkForce West Virginia (WFWV) and does not include individuals who work in other states, independent contractors, or sole proprietors who do not pay unemployment taxes. Also, the data provided by WFWV did not distinguish if a salary average is low due to an individual taking unpaid leave or similar situations. Wages were also only included for the two years prior to enrollment in higher education and two years after the end of the research period. Data for income during enrollment or beyond two years were not included. The researcher also only included students who identified themselves as degree-seeking. Non-degree seeking students could ultimately have had a goal of earning a credential or transferring, but that determination could not be made.

Recommendations

An analysis of the data and the findings of this study suggest the following recommendations.

- The HEPC/WVCTCS should collect placement test scores to determine if the placement in developmental courses is based on a test score or if the placement is the student's choice. This information could affect how developmental education is handled.
- Based on the results of this research, emphasis should be placed on programs to help students complete a college-level math course.
- The data that were analyzed in this study on a statewide basis should be studied from an institutional perspective. The information should be shared with the educational providers at each institution to develop programs for their respective institutions.
- Multiple years of wage information in the data should be included in the exchange between HEPC/WVCTCS and WFWV. This data would enable statewide and institution-level studies of the effects of educational attainment levels and credential attainment on wages.
- Ways should be investigated to collect wage information for independent contractors, sole proprietors, or individuals working outside the state of West Virginia.

Suggestions for Further Research

Much of the analysis in this study focused on students who entered West Virginia community and technical college enrolling in developmental education. The following are suggestions for further research.

- A qualitative aspect to this type of study should be conducted to try to determine reasons for the low persistence rate. Knowing what is a good indicator of persistence is not enough to prevent non-persistence.
- Research to include the experiences of adults before entering community and technical college such as arriving with a high school diploma, General Education Development (GED) certificate, or neither, or have taken Adult Basic Education (ABE) courses will help to identify barriers these students face in college.
- Research to examine the details of the various paths low-skill adults take after entering community and technical college to identify additional roadblocks.
- Research to try to estimate the cost and benefits to low-income communities based on the educational attainment of low-skill adults in these communities.

Conclusions and Implications

The data suggested that the best indicator of any milestone achievement or persistence was completion of a college-level math course. For students who initially enroll in developmental courses, completion of any developmental course is also a significant indicator of milestone achievement. For this study, the number of data points for the attainment of the momentum point, completing 30 credit hours in one year, were too small to be valid. The second most significant momentum point attainment was completion of a college-level English course. The research by Jenkins, Jaggars, and

Roksa supports these results (2009). Persistence for this study was one of three possibilities: earning a credential, transferring, or continued enrollment through the five year research period. Of the 1,390 students in this study, only 26.3% (N=365) persisted. Similar to the indicator for milestone achievement, completion of a college-level math course was the best indicator of persistence in this study. One of the primary sources for this research was the study of the Washington State Community and Technical System conducted by Prince and Jenkins (2005). One difference in the Washington State study and the West Virginia results was in the Washington study the momentum point, completion of 30 credit hours in one year, was one of the strongest indicators of milestone achievement (Prince & Jenkins, 2005).

The analysis of the relationship between educational attainment and income and earning a credential and income was less than what was expected. The lack of wage information did not allow for valid analysis. This study looked at several levels of educational attainment: earning 15 credit hours, earning 30 credit hours or completing a credential. Only 2% in 2002 and 5% in 2003 of the students who achieved one of these levels had reported income pre-enrollment. None had reported income in 2009 and only 6% in 2010. Although the number of students with reported income was too low for valid analysis, there was a substantial increase in the number of students with reported income at the end of the research period. This information would support research claiming that higher education does have an impact on income. Again a difference in this study and that of Washington State was significant relationship between earning a certificate and increased reported wages (Prince & Jenkins, 2005).

This study showed that students who achieve one of three identified momentum points are more likely to complete a milestone. The implication for West Virginia's community and technical colleges is that an increased focus on students' completion of those momentum points (college math, college English, or a developmental course) could increase milestone achievement, resulting in greater educational success for low-skill adults.

APPENDIX A

SUPPLEMENTAL COOPERATIVE AGREEMENT

SUPPLEMENTAL COOPERATIVE AGREEMENT

Between

WORKFORCE WEST VIRGINIA

And

WEST VIRGINIA HIGHER EDUCATION POLICY COMMISSION

The purpose of this Agreement is to supplement the current unemployment compensation (UC) information disclosure agreement between WORKFORCE West Virginia (WWV) and the West Virginia Higher Education Policy Commission (HEPC) by allowing for the disclosure of information to Carol Perry, Doctoral Candidate at Marshall University (MU). The purpose of this disclosure is to research the relationship between income levels and educational attainment level obtained through West Virginia Community and Technical College System institutions. The information to be released includes randomized ID number, gender, institution where the student attended, year/s attended, CIP of program of study, quarter, wages, and SIC of employer.

This Supplemental Agreement does not replace or in any way detract from the terms of the basic information disclosure agreement that currently exists between WWV and HEPC. The information furnished to Carol Perry by HEPC shall be strictly confidential. Carol Perry and HEPC will publish data only in aggregate form and will not disclose individual names or social security numbers. If additional programming time is required by WWV staff for on-going costs, WWV will bill HEPC through current billing procedures as established in the previous agreement.

This Supplement Agreement may be canceled by either of the parties upon a minimum of fifteen (15) working days' written notice to the party. However, in the event changes in either State or Federal laws or regulations occur rendering performance hereunder illegal or void, this Supplemental Agreement will terminate immediately.

This Supplemental Agreement shall become effective upon being signed by the appropriate officials of each party. It shall continue until either party provides a written notice to terminate.

WORKFORCE West Virginia

Russell L. Fry,
Acting Executive Director

9-28-11
Date

West Virginia Higher Education Policy Commission

9/08/2011

Rob Anderson,
Interim Executive Vice Chancellor for Administration

Date

Marshall University

9/20/11

Carol Perry,
Doctoral Candidate

Date

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CURRICULUM VITAE

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EDUCATION

Marshall University, Doctor of Education, Leadership Studies, 2012

Marshall University, Master of Business Administration, 1992

Marshall University, Bachelor of Science, 1973

PROFESSIONAL EXPERIENCE

2008-Present	Executive Dean/Dean of Liberal Arts and Human Services, Mountwest Community & Technical College
2005-2008	Associate Dean, General Studies Division, Marshall Community & Technical College
1999-2005	Director, General Studies Division, Marshall Community & Technical College
1994-1999	Program Coordinator, Math and Science Programs, Marshall Community & Technical College
1990-1994	Mathematics Faculty, Marshall Community & Technical College
1989-1990	Adjunct Faculty, Marshall Community & Technical College
1986-1989	Private Tutor
1982-1983	Computer Analyst, Ashland Exploration, Inc., Ashland, KY
1976-1982	Planning Engineer, Ashland Synthetic Fuels, Inc., Cattletsburg, KY

PRESENTATIONS

2011	Co-presented "EZ Start Your College Career", Council for Adult & Experiential Learning (CAEL), Chicago, IL
2007	Co-presented "EZ Start: Non-traditional Start to College", First Year Experience Conference, Hawaii
2006	Co-authored "Using the Web to Meet Rural Library Training and Development Needs, *Young Adult Services Association Journal*
2005	Co-presented "The Doc Student Portfolio: A Meaningful Alternative to Residency and Comps", 59th National Council of Professors of Educational Attainment (NCPEA), Washington, DC