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Economic Returns of the Occupational Education Experience Based on Two Missouri Community Colleges

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Electronic Dissertation

ECONOMIC RETURNS OF THE OCCUPATIONAL EDUCATION EXPERIENCE BASED ON TWO MISSOURI COMMUNITY COLLEGES

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DISSERTATION

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Abstract

A commonly held belief is that formal education has a strong positive association with earnings (Sanchez, 1998). The motivation for individuals to pursue and complete an education beyond high school is likely founded in the hopes of higher paying jobs or a higher position. The "economic benefits" of a community college education can be defined as the gain in personal earnings over time because of the skills and knowledge acquired, as reflected in credit hours completed, at the community college.

The purpose of this study was to determine how the skills, knowledge, and credentials obtained in community college occupational courses and the completion of occupational degrees affect employability and future earnings. As a result, a valid source of accountability was produced, providing evidence to stakeholders through the State, community, and institution that the investment in higher education provides a positive rate of return and further validates the important role of the community college.

The framework of this study is embedded within te theoretical construct of the human capital theories of education. According to Human Capital Theory, higher education is both, a consumption good and an investment good. As an investment good, individuals sacrifice time and money to receive an education for the purpose of earning a higher salary and having a better standard of living in the future. It is a consumption good because of the immediate benefit derived from the college experience: socialization and learning for the sake of learning (Becker, 1992).

For this project, student databases were obtained through the offices of Institutional Research at two Missouri community colleges. Unemployment wage data from the State of Missouri was accessed for each student through the Department of Economics at the University of

Missouri-Columbia. This wage data was adjusted using the Gross Domestic Product Implicit Price Deflator to normalize the data for inflation. Data was analyzed using regression analysis and paired samples t tests.

This study provides the first empirical evidence of the labor-market returns to the State of Missouri community college occupational education experience. The increase in earnings was significant for each sub-group of students researched. The methods used in this study cannot establish causality, however, the findings are compelling.

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Chapter 1

Introduction

Adam Smith, wrote in his first book published in 1759, *The Theory of Moral Sentiments:*

> The education of boys at distant great schools, of young men at distant colleges, of young ladies in distant nunneries and boarding-schools, seems in the higher ranks of life to have hurt most essentially the domestic morals, and consequently the domestic happiness, both of France and England. …Surely no acquirement which can possibly be derived from what is called a public education can make any sort of compensation for what is almost certainly and necessarily lost by it. (p. 363-364)

Over 200 years later economists Becker (1964), Mincer (1962), and Schultz (1971) ignored this rhetoric and labored to advance the concept that the benefit and value of the knowledge and skills students acquire from education greatly exceed its costs. According to the human capital theory of education presented by these economists, students base their decision to continue their education using a cost-benefit analysis--comparing the cost of education, including wages lost while pursuing their education, with subsequent increases in earnings (Becker, 1992). These students sacrifice foregone earnings which are an indirect cost of schooling, including lost opportunities of working either part-time or full-time, for the perceived benefits of making greater salaries as a result of the education obtained.

Sanchez (1998) maintained that formal education has a strong positive association with earnings and others such as Nobel Laureate, Paul Krugman (2009) have gone so far

as to declare that "If you had to explain America's economic success with one word, that word would be education" (p. 18). According to the economic model of student college decision making, the motivation for individuals to pursue and complete an education beyond high school is founded on the hopes of higher paying jobs or a higher position. Following this logic, the "economic benefits" of a community college education can be defined as the gain in personal earnings over time because of the skills and knowledge acquired, based on credit hours completed, at the community college. Among others, research by Belfield and Bailey (2011), Leslie, Johnson, and Carlson (1977), Romano (2011) and Tannen (1978) suggested that the primary reason for pursuing higher education is the expectation of higher lifetime earnings.

Background and Context

The framework of this study is embedded within the theoretical construct of the human capital theories of education. According to human capital theory, higher education is both a consumption good and an investment good. As an investment good, individuals sacrifice time and money to receive an education for the purpose of earning a higher salary and having a better standard of living in the future. Higher Education is a consumption good because of the immediate benefit personally derived from the college experience through socialization and learning for the sake of learning (Schultz, 1961).

The concept of human capital theory is in all respects analogous to the economist's traditional concept of physical capital. Physical capital includes all useful physical assets (e.g., currency, property, etc.). The term human capital, as it relates to education, means acquiring energy, motivation, skill, and knowledge that can be

harnessed over time for the task of producing goods and services. In essence, human capital theory measures the return on investment in oneself (Sanchez,1998).

Education as a form of human capital has been widely discussed in the literature. Proponents of human capital theory assert that schools were developed to prepare people for modern roles that are not enhanced by the more traditional agents of socialization, such as the family or the church (Baptiste, 2001). Education is assumed to provide students with skills they can bring to their jobs, while allowing them to be more productive and functional members of society. Education represents a major means through which individuals acquire the mental skills and capacities for self-direction necessary for successful future performance in the workplace (Hunter, 1988). It also encourages higher levels of competence and socializes students into modern tastes and values. Those with limited education enter the labor market destined to remain in lower level jobs or struggle to remain employed because they lack the skills required to be successful. Indeed, the relative advantages in the labor market of more highly educated workers is a major reason individuals continue to pursue advanced levels of education (Walters, 2004). Carnevale, Smith & Strohl (2010) believe the relationship between education and occupation is rapidly becoming the arbiter of economic opportunity. Providing support to the theory is the reality that during the recession of 2008-2009, employment data indicated that as 2010 closed, those with a high school diploma or less were experiencing unemployment rates above 11%, while those with a bachelors degree or above were below five percent (Almanac of Higher Education, 2010).

From the 1950s to the 1970s, human capital theory helped to shape the thinking of policymakers and, to a considerable extent, was responsible for the expansion of higher

education (Ashton & Lowe, 1991). Viewing education as a personal investment made the acquisition of knowledge more attractive than ever.

Although human capital theory also posits that informal education provides many of the same values and an investigation of other forms of human capital would be enlightening, the absence of readily available data on these forms makes it necessary to concentrate primarily on formal education. The economic value of formal education is of interest to multiple stakeholders including policymakers, students, educational administrators, parents, and taxpayers. Educators constantly seek strategies to improve the educational process and to promote accountability and validation. As a result, quantitative evidence on the economic effects of education add an important dimension to the discussions of the overall benefits and positive impacts of the educational experience and provides a vital piece to the accountability puzzle (Becker, 1992).

Policymakers seek reliable data to use as the basis for making decisions about educational funding, financial aid support, program approval and allocation decisions. Parents look for information to use as the basis for deciding what to invest in their children's future. Students consider majors, select courses and choose institutions through a constant process of evaluating how a program, course or college will further their own professional interests.

Statement of the Problem

Donhardt (2004), notes that "The economic benefits of attending an institution of higher education are outcome assessments that garner the attention of parents, educational administrators, legislative policymakers, and concerned citizens" (p. 271).

Such financial performance measures are vital for assessing existing educational systems to illustrate the effects of higher education on the economy.

Rapidly changing technology has applied considerable pressure on society's educational system to prepare students for expanding skills and occupations. Ideally, employers reward new hires possessing the knowledge, skills or credentials required for their job. The importance placed on knowledge and skill acquisition has impacted the widening gap in wages between high school and college graduates.

According to the U.S. Department of Labor (2008), workers who have the most education tend to have the highest average annual earnings and the lowest unemployment rates. Since the turn of the century, however, much of the focus on education and employment has emphasized that as a global economy, the world is transforming from a manufacturing to a knowledge-based economy, something Milton Friedman recognized as early as 1962. Knowledge is now being recognized as being at least as important as physical and financial capital and can be considered one of the nation's greatest natural resources and the basis of national competitive advantage (Education in the Knowledge Economy, 2003). Knowledge is central to all economic activity, and different types of economic activity require different types of knowledge. Hudson (2008) stated, "The creation of knowledge has been integral to the development of capitalist economies since they were first considered capitalist" (p. 1). Economic wealth is created through the creation, production, distribution and consumption of knowledge. According to Harris (2001) "The economy of bricks and mortar is being replaced with software and digitized DNA codes" (p. 22).

This naturally raises questions about the ongoing value of occupational programs at community colleges, many of which still focus on traditional trades. As a result it is more important than ever to objectively evaluate the occupational arm of the community college educational experience. Yet to date, the State of Missouri has no direct evidence on the benefits of earnings derived from a community college education or four-year college education. Over 20 states have conducted statewide studies with wage record data to develop a methodology to assess the value of students' post-college earnings. Most of the studies have followed program completers into the workplace to estimate average annual earnings and track job placement. Since data is matched using the students social security number, privacy and confidentiality is a major issue. Though the State of Missouri would benefit from having similar data, this confidentiality issue has prevented the State of Missouri from pursuing this valid measure of accountability on a statewide basis.

From an institutional perspective, colleges are finding themselves handicapped when these data are not available on a state- and institution-specific basis. A recent announcement by the Aspen Institute stating that it would be awarding a $1 million prize to a model community college based on performance data, suggested that evidence that students benefit financially and professionally from the college experience would be part of the evaluative criteria in selecting the winner (Lorenzo, 2011). Colleges in states like Missouri where these data are not readily available will be seriously compromised in this selection process.

This study addresses these shortcomings in the data for one of these states and examines the impact of community college education on the occupational degree and certificate areas on earnings of both community college graduates and community college non-graduating students, using limited Unemployment Wage Data. This research follows all measures of privacy and confidentiality as outlined by standard research practice, the University of Missouri—St. Louis, the State of Missouri, and the Missouri Department of Higher Education.

The Research Hypotheses

The research hypothesis that will be tested and analyzed in this study is that a positive correlation exists between completion of an occupational degree or certificate at a Missouri Community College and increased wages and earnings following graduation. The study further hypothesizes that a positive, but less pronounced correlation exists between the completion of post-secondary credit hours at a community college in an occupational area and future wages and earnings. When compared to high school education alone the null hypotheses are that in both of these conditions, no correlation can be shown between postsecondary education at a Missouri community college in occupational disciplines and increased wages and earnings.

The following null hypotheses were formulated for this study:

HO1: There is no significant correlation between the number of hours completed while pursuing occupational studies at a Missouri community college and earnings one year after leaving the community college.

HO2: There is no significant correlation between the number of hours completed while pursuing occupational studies at a Missouri community college and earnings three years after leaving the community college.

HO3: For students completing 12 hours or more of occupational studies, but less than a Certificate or Associate's of Applied Science degree at a Missouri community college, there is no significant difference in earnings their last year of college and one year out of college.

HO4: For students completing 12 hours or more of occupational studies, but less than a Certificate or Associate's of Applied Science degree at a Missouri community college, there is no significant difference in earnings their last year of college and three years out of college.

HO5: For students completing an occupational certificate at a Missouri community college there is no significant difference in earnings their last year of college and one year out of college.

HO6: For students completing an occupational certificate at a Missouri community college there is no significant difference in earnings their last year of college and three years out of college.

HO7: For students completing an Associate's of Applied Science degree at a Missouri community college there is no significant difference in earnings their last year of college and one year out of college.

HO8: For students completing an Associate's of Applied Science degree at a Missouri community college there is no significant difference in earnings their last year of college and three years out of college.

Purpose of the Study

The purpose of this study is to determine how the skills, knowledge, and credentials obtained in community college occupational courses and the completion of occupational degrees in Missouri affect employability and future earnings. As a result, a valid source of accountability data will be produced, providing evidence to stakeholders throughout the State, community, and institution about whether the investment in higher education provides a positive rate of return and further validates the important skill development role of the community college.

While similar studies have been done in other states across the nation, it is important that data specific to the State of Missouri be available to policymakers. With decentralized systems of higher education in the United States it cannot be assumed that systems in each state will produce similar economic returns, nor that policymakers in one state will trust or pay attention to data produced in another state. Each state is responsible for making its own policy decisions and resource allocations related to education. State appropriations and allocations are made based on the best information available to policymakers at the time. Furthermore, the trend toward requiring institutionally specific accountability for the benefits of student learning demands that state-specific data be available for every state. The data provided by this research will provide a foundation of evidence for the economic benefits of the occupational experience at the Missouri community college.

Human capital theory suggests that a rational cost-benefit analysis guides students' decisions about whether to continue their education. The theory suggests that students assess the added value of further education in terms of the income rewards that

would result from their gains in skill and knowledge. This is particularly true of occupational education where acquisition of a skill set is associated with specific area of employment. A welding student, for example, takes prescribed courses in various welding techniques, expecting immediate application of these skills in the workplace once the course or program is completed. A psychology or sociology student may, on the other hand, have no clear sense of what employment opportunities will exist after graduation, but selects a major knowing that he or she "wants to work with people." Studies of human capital theory demonstrate that students must choose among work, school, and leisure activities. To do this, students must place a relative value on each activity. The value placed on education is determined, in part, by the anticipated gain in future earnings. (Beattie, 2002).

At the same time, this theory predicts that expected earnings affect individual educational attainment. Individuals make decisions to continue or terminate their education on the basis of the increases in income, skills, and knowledge they can expect from each additional year of education compared to the opportunity cost of staying in school, including lost wages and out-of-pocket costs, such as tuition and book expenses. As defined in traditional economic theory, students will continue their educational endeavors until they believe that the marginal cost of such activities exceed the marginal benefit.

Significance of the Study

U.S. Department of Education, National Center of Education Statistics (2010) data indicates that more than 73% of America's college students enroll at a community college at some point in their educational career. Community colleges serve as the

gateway to postsecondary education for many minorities, low income and first generation students. According to the American Association of Community Colleges [AACC] (n.d.b.), more than half of the students who receive their baccalaureate degree attend a community college in the course of their studies. For these students, the community college Associate's of Arts degree provides a low cost, close-to-home alternative to the university system for the first two-years of general studies. For students seeking occupational skills, the community college provides Associate's of Applied Science degrees and certificate programs that provide students with the skills and knowledge required to succeed in the workplace. Other students enroll in non-credit courses for personal or professional development. Regardless of the academic goal, students make the investment in education to improve their standard of living, employability and earning potential, with an increasing number selecting community colleges.

For example, more than 65% of America's new health care professionals receive their training at a community college (American Association of Community College [AACC], n.d.a), providing an invaluable service to the community, state and nation. Health care professions are some of the fastest growing occupations in the country and community colleges are able to respond quickly to the rapidly changing skill needs required by the health care industry. The emerging field of nanotechnology is another area that will require a strong commitment from community colleges to fill the 800,000 domestic job openings anticipated by 2015. These job openings will require a wide range of educational attainment, but the majority will require only an Associate's of Applied Science degree and the projected earnings for many of these positions will meet or

exceed those for the jobs requiring a baccalaureate degree (National Nanotechnology Infrastructure Network, n.d.).

As state budgets tighten and cutbacks take place, state and federal agencies are requiring more and more accountability to justify their allocations. Higher education also requires a substantial investment on the part of the student and society as a whole. Therefore, all stakeholders in education—taxpayers, legislators, employers, and students—want to know if they are getting their money's worth. Very few of our tax dollars provide an immediately recognizable positive rate of return on investment (CCBenefits, n.d.). This study will indicate whether in the case of Missouri community colleges, tax dollars spent on career education are an exception. If positive, state specific data will also serve as an illustration to prospective students the value of making an investment in education. A major report released in 2010 by the Lumina Foundation indicated that if the United States expects to remain competitive in the global economic market, it should strive, as a nation, to move from a 39% college completion rate to 60% by 2025 (Matthews, 2010). If we are to approach this goal, thousands of new students must be convinced of the value of additional education.

Brief Statement of Methodology

As a beginning point for this research, student databases were obtained through the offices of Institutional Research at two Missouri community colleges. Unemployment Wage Data for the State of Missouri were then accessed through the Department of Economics at the University of Missouri—Columbia, the data warehouse for unemployment wage database for the State of Missouri.

Wage data were then adjusted using the Gross Domestic Product Implicit Price Deflator to normalize the data for inflation. Data for selected students at the two community colleges were compiled and manipulated in a Microsoft Excel spreadsheet and subsequently imported into an SAS file, then screened for outliers. A regression analysis then examined the first two research questions. In the regression analysis, education was used as a predictor of earnings. The regression analysis provided a measure of the amount of influence education has on future earnings.

The research questions stated below were derived from the hypotheses and were answered using parametric statistical procedures, which allow inferences to be drawn on populations based on population samples. A paired samples t-test compared the mean of earnings for students attending a Missouri community college with earnings after the students exited the community college and had some work history. In addition to investigating earnings, the study was designed to follow employment patterns of former students and provide information about employment rates by major and type of degree.

Research Questions

The primary research question formulated to guide this study is: What, if any, are the economic returns of the Missouri community college occupational education? Secondary research questions are as follows:

1. Do the number of hours completed while pursuing occupational studies at a Missouri community college impact earnings one year after leaving the community college?

2. Do the number of hours completed while pursuing occupational studies at a Missouri community college impact earnings three years after leaving the community college?
3. For students completing 12 hours or more of occupational studies, but less than a certificate or Associate's of Applied Science degree at a Missouri community college, is there a significant difference in earnings between their last year of college and one year out of college?
4. For students completing 12 hours or more of occupational studies, but less than a certificate or Associate's of Applied Science degree at a Missouri community college, is there a significant difference in earnings between their last year of college and three years out of college?
5. For students completing an occupational certificate at a Missouri community college, is there a significant difference in earnings between their last year of college and one year out of college?
6. For students completing an occupational certificate at a Missouri community college, is there a significant difference in earnings between their last year of college and three years out of college?
7. For students completing an Associate's of Applied Science degree at a Missouri community college, is there a significant difference in earnings between their last year of college and one year out of college?
8. For students completing an Associate's of Applied Science degree at a Missouri community college, is there a significant difference in earnings between their last year of college and three years out of college?

Limitations of the Study

The following limitations and delimitations apply to this study:

1. The study was limited to students from two community colleges within the State of Missouri, one urban and one rural. While the students being evaluated were entering a state-wide labor market and should have experienced job successes similar to graduates of other similar community college programs, the analysis can not account for possible differences in curriculum, program quality, or student backgrounds.
2. The data for this study were limited to students enrolled in the Spring of 2002. In 2002, the national and State economy was expanding and unemployment rates were near 4%. Students completing their educational experience at different points in time will have varied labor market experiences. Labor market demands for specific skills and knowledge tend to be cyclical and are likely to have wide-ranging outcomes at different points in time.
3. By using Missouri Unemployment Wage Data, self-employed individuals and individuals who have moved or work outside of the State were excluded from the study. Students deciding to put their newly attained knowledge and skills to work for themselves by starting their own business also would be excluded from the study since the Missouri unemployment wage database does not capture self-employment earnings. The Missouri unemployment wage database only captures earnings from businesses within the State borders. Former students moving outside of the state of Missouri or working outside of the State would not appear

in the database. Contract workers are also excluded from the State unemployment wage database. These individuals are considered self-employed.

4. Students who have moved in and out of the State of Missouri may not reflect accurate data for the period in which they were out of the state. It is possible that individuals were employed in the State of Missouri for a portion of the year and employed outside of the State for a portion of the year. In this situation, total earnings would not be accurately reflected in the Missouri unemployment wage database.
5. Benefits of postsecondary education may not materialize until individuals reach their late twenties or early thirties. Since earnings for different education groups may not begin to diverge until after age 30, examining wages and earnings soon after students leave postsecondary education may not capture those significant differentials. This is a special problem with data sets based on young cohorts.

Assumptions of the Study

The following assumptions were made in designing this study:

1. Student databases accurately reflect hours earned and degrees completed. A detailed description of the required student data was provided to the institutional research staff at each institution. Based on the information requested the institutional research staff working within the confines of their respective institutions provided an electronic database.
2. Unemployment Wage Data provided by the University of Missouri—Columbia, Department of Economics was accurately matched to the student database.

Students were uniquely identified by their social security number, the identifier used by the Missouri unemployment wage database.

3. Wages reported through unemployment wage data accurately reflect students' earnings. Within the limitations stipulated above, Missouri's unemployment wage database provides the most comprehensive and reliable source of earnings' history available.

Definition of Terms

For the purpose of this study, the following definitions are used to bring clarity to the discussion and uniformity to the analysis:

Associate's of Applied Science degree – Occupational studies that are usually completed in two years of college and are generally sufficient for entrance into an occupation in the chosen field of study.

Baccalaureate education – Postsecondary education that takes place at a four-year college or university and culminates in a Baccalaureate degree.

Capital – Anything that can be used to produce further wealth.

Certificate – A non-degree offering in occupational education below the associate's degree, generally leading to employment in the chosen field of study.

Community College – A traditional two-year college offering programs of study leading to an Associate's degree. These institutions typically offer non-credit courses and workforce development. Community colleges are publically supported and locally oriented colleges.

Consumption -- The outlay of money and/or effort for a good or service whose use is solely for personal satisfaction.

Degree granting institution – postsecondary institutions that provide study beyond secondary school and offer programs terminating in an associates, baccalaureate, or higher degree and participate in federal financial aid programs.

Economic returns – The monetary benefits derived in the workplace as a direct result of the skills and knowledge gained at a community college.

Full-time equivalent (FTE) – The total number of student credit hours attempted at a particular institution during a particular semester divided by 12.

Full-time student –Any student enrolled at a postsecondary educational institution taking 12 or more credit hours per academic semester.

Investment -- The outlay of money and/or effort for the purpose of making a future profit.

Occupational education – Postsecondary education that trains/prepares students in any one of a variety of occupational careers.

Outliers – Numerical data that is more than 1.5 standard deviations from the mean.

Part-time student – Any student enrolled at a postsecondary educational institution taking less than twelve credit hours per academic semester.

Postsecondary educational institutions – Accredited public and private two-year and four-year colleges and universities, and accredited area vocational-technical schools offering certification programs.

SAS – A business analytics software used for statistical analysis and interpretation.

Sub-Baccalaureate student – Students enrolled in a two-year or less than two-year college independent of a four-year institution.

Summary of Chapter One and Overview of Remaining Chapters

Chapter one has provided an introduction to this research study including the background and context in which the study took place, a statement of the research problem, the purpose, and the significance of this study. Operational definitions, limitations, and assumptions of the study have also been included.

The literature review, found in chapter two, provides additional rationale for the importance of this study by summarizing the current state of knowledge concerning the economic benefits of occupational education, and by identifying areas requiring further exploration. In addition, the literature review reveals the value of applying Human Capital Theory to determine the value of the community college occupational education experience.

Chapter three provides a comprehensive description of the research design, research questions and hypotheses. The methods employed and the contexts to be explored are provided, as well as the procedures used in conducting the research.

Chapter four describes the design of the study, analysis and the research questions and hypotheses, a description of the data, and the statistical procedures of data analysis. This chapter presents the data obtained in the study and the results of the analysis of data used to test the eight hypotheses.

Chapter five is organized into eight sections. Sections one and two present an overview of the study, a description of the research design, and an explanation of the data. The third and fourth sections review the methodology, summarizing major findings by null hypotheses. A discussion of the findings in relationship to the current body of literature on human capital theory and how it related to the community college

occupational educational experience is presented in section five. The sixth section reviews the conclusions which can be drawn from the research. Section seven discusses opportunities for future research and the chapter closes with concluding remarks.

Chapter 2

Review of the Literature

Numerous areas of research contribute to the understanding and relevance of the data and methods used in this study and demonstrate the need for additional contributions to the discussion surrounding the economic value of education. Chapter two reviews these important bodies of research. Since the setting for the study is the community college sector, and specifically technical programs within that sector, the review begins with an overview of community college development, followed by a more specific discussion of Missouri community colleges, and of career and technical education. The review then examines the literature focusing on both direct and indirect benefits of higher education and how it is explained in Human Capital Theory. Previous research related to educational achievement and economic benefit is reviewed, along with the growing literature on educational accountability. The chapter closes with a summary of findings concerning education as both a personal and societal investment.

Community Colleges

> America's community colleges began as junior colleges and technical institutions, and moved toward more comprehensive programming and community engagement through the 1947 Truman Commission on Higher Education and burgeoned with the Baby Boom that hit higher education in the 1960s. Community colleges have now matured into essential engines of educational, economic, and social development.
>
> Today, the comprehensive community college is woven into the fabric of American life, and increasingly into the world's social tapestry. The students of

> community colleges run multinational corporations, fly through space, star in movies, provide leadership in statehouses, and map the human genome (Milliron & Wilson, 2004, p. 22).

Abundant challenges faced the United States early in the twentieth century, including global economic competition. Leaders acknowledged that a skilled workforce was key to the country's continued economic strength. This need called for a tremendous increase in the 25% of high school graduates pursing a college education at the beginning of the twentieth century (AACC, n.d.c.). The American junior college was formed in part as an answer to this need.

The movement began with the formation of several public two-year colleges in suburban Chicago in 1901, and enrolled a mere 2% of all college freshmen in 1920, the same year the American Association of Junior Colleges (AAJC) was founded. From that modest beginning, the community college has come to play a pivotal role in the nation's system of colleges and universities. Today over one-half of all college freshmen are enrolled in two-year institutions (Higher Education Research Institute, 2010), and these colleges have grown to become a cutting-edge provider of post-secondary education. Farnsworth (2007) believes that this "reflects the public's interest in relevant education delivered when and where consumers want it" (p. 66). The nations 1,167 community colleges (AACC, n.d.b) represent over 44% of America's college students serving more than 12.4 million students across the nation in the Fall of 2008.

Ninety percent of the Nation's high school students aspire to go to college (Lumina Foundation, n.d.a.). Even though only approximately 60% choose to enroll immediately following high school graduation, community colleges provide the open

door access that allows more students than ever to achieve their educational goals. Many choose to enter college after struggling in a workforce that increasingly values postsecondary education, and the average age of community college students remains near 29. Overall, community college students are ethnically diverse, older, first generation, employed parents reflecting the realities of American Higher Education. In addition, community college students are more likely to be from a disadvantaged background than their four-year counterpart (Lumina Foundation, n.d.a). Table 1 provides instructive data about the Nation's community college students.

Table 1

Facts on Community College Students

Measure	Percentage
Percent of U.S. undergraduates enrolled at a community college	46%
Percent of first-time freshmen enrolled at a community college	45%
Percent 25 or older	46%
Percent at least 30 years old	32%
Average Age	29
Percent with annual household income less than $20,000	29%
Percent that work full-time or part-time	85%
Percent who work full-time and attend school full-time	30%
Percent of community college students who are minorities	30%

Source: Matthews (n.d.a.) and AACC (n.d.b.)

Gleazer (1968) notes that the community college has opened postsecondary education opportunities to many individuals who, otherwise, would not be able to attend

due to a lack of funding, poor academic performance, geographic restrictions or varied occupational interests. These colleges enroll the majority of students from ethnic minorities with 45% of African American undergrads, 53% of Latinos, and 52% of Native Americans attending (AACC, n.d.a.). As a result, the community college has become the most effective and efficient democratizing agent in postsecondary education. The community college is a result of a community based initiative, bringing together students, their parents, political leaders, business and industry, and labor (Corazzini, 1968, as cited in Dougherty, 2001).

Because of their large numbers, open-door policy, and key role in occupational training, community colleges are the nucleus of higher education and are vital to the economic well-being of the communities they serve. Given their position in higher education, community colleges dominate the Nation's plan for expanding college opportunity in a systematic and cost-efficient way (Dougherty, 2001).

Broadly stated, the role of the community college is to provide access to postsecondary education by providing programs and services that lead to stronger, more vital communities (Vaughan, 2006).Vaughan states in *The Community College Story* (2006), that "Community colleges are distinguished from other institutions of higher education by their commitment to open access, comprehensiveness in course and program offerings and community building. These commitments shape the role and scope of the community college" (p. 1). In addition to offering credit and non-credit courses to a broad constituency, many community colleges serve as cultural, social, and intellectual hubs in their regions.

Missouri community colleges. In Missouri, the first public junior college was founded in 1915 in Kansas City, and later became the first two-year college in the United States to award the Associate's degree (Metropolitan Community College, n.d.). A distinctive feature of Missouri's first junior colleges was their accessibility to women, attributable primarily to the leading role the colleges played in preparing elementary school teachers. Missouri did not yet require K-8 teachers to possess a bachelor's degree. It was common for more than 60% of these junior college students to be women, and virtually all of these women were preparing to be teachers (AACC, n.d.b).

Largely through the efforts of Stratton D. Brooks, the president of the University of Missouri (1923-1930), by 1928 seven public colleges and eleven private colleges, all closely associated with the University of Missouri, were operating within the state. Brooks persuaded several of these four-year colleges to devote all of their resources to two years rather than four years of education. This not only benefited the University, but also was beneficial to the colleges themselves (Brint & Karabel, 1989). Between 1915 and 1961 a number of junior colleges were formed around the State, before the Missouri Junior College Act of 1961 allowed for the creation of junior college districts (Farnsworth, 1997).

Missouri's Community Colleges have grown to be a driving force in the State's higher education arena, enrolling almost 102,000 of the State's nearly 309,000 undergraduate college students in the Fall of 2009 (Missouri Department of Higher Education [MDHE], n.d.a.). Table 2 gives an overview of the founding and enrollment growth of Missouri's twelve community colleges.

Table 2

Missouri Community College Enrollment Growth

Missouri Community College	Year Founded	Fall 1985 Enrollment	Fall 1995 Enrollment	Fall 2009 Enrollment
Crowder	1963	1,281	1,698	4,495
East Central	1968	2,478	2,819	4,203
Jefferson	1963	3,332	3,783	5,788
Metropolitan	1915	13,071	17,392	19,487
Mineral Area	1922	1,552	2,347	3,671
Moberly Area	1927	1,552	1,754	4,945
North Central	1925	737	1,083	1,638
Ozarks Technical	1991	--	3,507	12,880
St. Charles	1986	--	4,576	7,814
St. Louis	1962	28,833	27,610	28,009
State Fair	1968	1,616	2,277	4,263
Three Rivers	1966	1,529	2,304	3,527
Total		55,503	71,150	100,720

Source: MDHE, (n.d.)

These dynamic institutions continue to grow and diversify while remaining strong and innovative with broad unduplicated programmatic offerings. Missouri's community colleges each provide a strong foundation of general education courses and occupational curricula designed to meet the needs of the communities they serve (Farnsworth, 1997).

Occupational education. Occupational majors are those that are typically viewed as terminal programs, preparing students to go directly into the workforce. Until recently, the nation's community colleges have seen a decline in transfer education and a rise in occupational education. This has resulted in community colleges enrolling an increasing number of students with the primary purpose of job preparation rather than preparation for life roles (Dougherty, 2001).

There are two dominating theories on why occupational education has become a major area of emphasis at community colleges. The functionalist theory asserts that it developed out of student demand for higher wages and a societal demand for a trained labor force (Medsker & Tillery,1971, Monroe, 1972, Thornton, 1972 as cited in Dougherty, 2001). The Marxist theory believes that the movement toward occupational education stemmed from the capitalist class demand for publically subsidized employee training and to insure the educational gap between social classes was maintained (Bowles and Gintis, 1976, Karabel, 1972, Pincus, 1980, 1983, as cited in Dougherty, 2001).

From Karabel's (1972) perspective, the community college's emphasis on occupational education arises from a class-sacrificed capitalist society. In this society, the demand for good jobs outweighs the supply, requiring the elite to find other ways of defusing this politically explosive contradiction. In addition, capitalist elites, those centered in business, the selective universities, and prestigious foundations support the occupational base in community colleges, because it provides business with publically subsidized employee training, and selective universities with a covert means of deflecting the enrollment demand of less desirable students. This particular theory receives some

support from evidence that our most prestigious universities remain under represented in minority enrollments (Brint, Turk-Bicakci, Proctor, & Murphy, 2009).

Dougherty (2001), favoring the functionalist approach, suggests that the reasons community colleges are so largely occupational in today's society are to provide opportunities to less academically able and motivated students, to meet business' need for trained employees, and satisfy government officials' desire for a nice incentive to offer business to secure political support and economic investment. Policymakers and business leaders alike look to the occupational education provided at community colleges to build the workforce for the next century (Herbel, 1999). These programs prepare a large percentage of the nation's computer operators, auto technicians and healthcare professionals. In addition, community colleges can adapt more easily and develop new programs more rapidly to provide training for new and exciting fields of study such as nanotechnology. These programs are vital to creating a competitive advantage in today's global economy. Regardless of the motives for their expansion, occupational education at community colleges continues to grow and maintain its prominence.

Dougherty notes that "When they first appeared around the turn of the century, community colleges were largely liberal-arts-oriented institutions, providing many students with the first leg of their baccalaureate preparation and others with a terminal general education" (p. 119). At this time, occupational offerings included business and commerce, manual training, home economics, agriculture, soils and farm mechanics. During World War II, many community colleges contracted with the military to offer training courses in order to survive (Monroe, 1972). When veterans returned home, occupational course offerings began to expand. In the 1960s and 1970s occupational

education came into its own with course offerings expanding as enrollments grew. During this time, preparation for blue-collar occupational course offerings such as welding and auto repair emerged as well as computer programming and associate degree nursing and medical technology.

Early in their history, community colleges began to develop relationships with employers in efforts to provide a trained workforce (Cohen & Brawer, 2008). These relationships allow community colleges to develop occupational education programs designed to meet the specific needs of the communities served while providing students a smooth transition into the workforce.

Today, community college occupational education course offerings run the spectrum from aquatics and life saving to alternative fuels and advanced transportation technology. The health care industry continues to rely heavily on community colleges to provide training for a shortage of health care professionals. These programs include a wide array of occupations from polysomnograpy to electro-neurodiagnostic technology and support professions such as biomedical instrumentation. (AACC, n.d.b.)

Over the last two decades, the United States has seen a rapid growth in employment opportunities in the field of environmental science. As the world strives to become environmentally sensitive and conscientious, the Nation's community colleges have developed degree programs ranging from environmental technologies and sustainable practice to environmental science and toxicology to fill these emerging workforce demands.

Benefits of Higher Education

The benefits of a college education have long been acknowledged. Pitirim Sorokin in his 1927 book, *Social and Cultural Mobility*, made the following assertion:

> In present Western societies, the schools represent one of the most important channels of vertical circulation. This is manifested in hundreds of forms…Many fields of social activity (especially professions) are practically closed to a man who does not have a corresponding diploma; a graduate is often paid better than a non-graduate at the same position (1927/1959, p.170-171).

Today, almost 85 years later, Sorokin's words continue to ring true. Late in the twentieth century, the need for post-secondary education became even more pronounced as economies transition from manufacturing to knowledge-based, and as work became digital and transportable around the globe. Peter Drucker, often referred to as the father of modern management recognizing this trend emphasized, "The knowledge economy will rely heavily on knowledge workers with the high growth in knowledge technologists" (Reingold & Drucker, 1990). He pointed out that education is no longer a luxury, as it was once considered, it is essential to a competitive advantage in an evolving global economy.

Building on this theme, Farnsworth (2010), in his examination of the American education system pointed out:

> In the United States, many students seem either unaware or unconcerned that we have lost our standing as the best educated population in the world, and are rapidly giving up our position as the dominant economy. They seem either oblivious to the fact or don't care that the major reason we are losing both our

> manufacturing base and our professional employment base to other countries is because these countries have better-educated workers, who will do the work for less money…Far too few of our young people are finishing school with the skills needed to compete in the new global economy. (p. 4-5)

According to the Lumina Foundation for Education (Matthews, 2010), less than 40% of the American labor force holds a two- or four-year college degree. This number has remained constant over the past four decades. The Lumina Foundation contends that if the United States wants to stay competitive in the global workplace and if future generations of Americans want to maintain the same high standard of living experienced by previous generations, the college completion rate must increase to 60% by 2025. To reach this 'Big Goal', as set forth by the Lumina Foundation, the return on the educational investment must be understood at a personal level to attract more students into postsecondary education since higher paying jobs and the related socio-economic benefits are the incentive for most individuals to continue their education (Aronowitz, 2000; Bailey & Alfonso, 2005; Becker, 1964; Gill & Leigh, 2003; Grubb, 1985, 1989; Grubb & Lazerson, 2004; Lucas, 1994; and Thelin 2004).

The community college plays an integral role in providing affordable education to students with different needs and varying levels of preparation. Two ways the economic benefits of a community college education could be defined are by the amount of money an individual receives from working after leaving the community college or by the gain in personal earnings over time. Beach observes that, "Americans view education, particularly postsecondary education and its system of credential, as a ladder of opportunity that will yield financial returns and upward social mobility" (2009, p. 24).

Postsecondary, but sub-baccalaureate education has grown substantially. Thirty-five years ago only 13% of the labor force had "some college" (Mortenson, 2007). Based on information from the U. S. Bureau of the Census (2011), three decades later about 28% of the nation's labor force had more than a high school diploma, but less than a baccalaureate degree. The U. S. Department of Commerce's (2009) forecast of the nation's occupations suggests that this trend will continue: the occupations with the highest growth rates include a variety of health technicians, scientific technicians and related support occupations, marketing and sales, and various administrative occupations, including computer operators—all of which generally require some education beyond high school, but less than a baccalaureate degree.

During this 35 year period of growth, the simple economic benefits of sub-baccalaureate education also increased. During the 1960s, national data indicated that those with some college earned a little less than high school graduates. Today compared to high school graduates, men with some college earn 9% more and women with some college earn 10% more (Belfield & Bailey, 2011). However, those with "some college" are a heterogeneous group. Some have completed credentials, particularly two-year associate degrees and one-year certificates; smaller numbers have received occupational licenses of various kinds. Many have entered two-and four-year colleges and then left, with the amount of postsecondary education ranging from a course or two to nearly a baccalaureate degree. Overall, non-completion from both two- and four-year colleges has increased since the mid 1970s (Grubb, 1989; Hudson & Carey, 2005).

Earning a degree or certificate, however, is now the most commonly cited reason among both occupational and academic students for enrolling at two-year and less than

two-year institutions (AACC, n.d.b). This is due, perhaps to the expectations of employers in a competitive job market. Nevertheless, the Associate's degree is still perceived to have a lower status in higher education systems predicated on the academic baccalaureate model of education. Even so, it is crucial for federal and state governments to support this significant component of American higher education and to continue their commitment to direct resources toward the group of postsecondary students from the most disadvantaged background, with the greatest barriers to educational achievement (Bailey, Leinbach, Scott, Alfonso, Kienzl, & Kennedy, 2004).

With more public access to information about the effectiveness and productivity of higher education institutions, accountability has become a buzzword among administrators, legislators, policymakers and all stakeholders. It is argued that a new kind of accountability has emerged because higher education is perceived as an investment and should earn returns (Sanchez & Laanan, 1998). The accountability issues of the 80s have grown and new means of assessing students and institutional outcomes have emerged. State appropriations to public colleges have in the past been based on enrollments or outdated funding formulas rather than on completions. As a result, there has been little incentive to ensure that students successfully earn degrees or even complete courses (Midwestern Higher Education Compact [MHEC], 2009). Based upon some rather dismal success rates, several states are considering incentives for higher education institutions to ensure that students earn the credentials that are needed and rewarded in the workplace.

Indiana, for example, adopted performance-based funding for degree completion, on-time graduation, and two-to-four-year transfer activity. Ohio's proposed performance

goals track with their 20-year strategic plan for higher education focusing on course completions and degree completions. In the state of Louisiana, the governor and legislature requested new performance-based funding in order to make their postsecondary institutions more competitive. Texas Legislature enacted Senate Bill 1231 which establishes that except in instances of good cause, undergraduate students entering a Texas public institution of higher education as a first freshman will be limited to a total of six dropped courses during their undergraduate career. Oklahoma's focus is on student retention, graduation and degree completion. Unfortunately, Missouri's efforts toward performance funding were abandoned due to budget cuts (MHEC, 2009).

According to Pascarella and Terenzini's (1991) analysis of college student outcomes, substantial evidence supports the high economic returns of a college education. Holding factors such as age, gender and occupational categories constant, formal education has a strong positive association with earnings (Belfield & Bailey, 2011; Blaug, 1970, 1972, 1976; Grubb, 1989, 1996, 1999a, 1999b; Grubb & Bragg, 1997; Jepsen, Troske, & Coomes, 2009; Psacharapoulos, 1972a, 1972b, 1973, 1985; Romano, 2011).

For baccalaureate graduates several variables have been associated with education and earnings, including academic achievement, major selection, age, gender, race and occupation (Blaug, 1976; Feldman, 1969; Pascarella & Terenzini, 1991). Public policy reflects the view that education provides a gateway to higher economic status and a greater quality of life. It emphasizes education as a strategy both for promoting community-wide or nation-wide economic growth and for helping the poor improve their economic position relative to other Americans (Jencks & Bartlett, 1979).

Measuring the direct impact of education on skill attainment is a complicated issue. “Effects of schooling on occupational status have generally not risen over time, but the effects of education on earnings have been increasing and schooling has become more important because levels of educational attainment have increased” (Bills, 2003, p. 458). ‘College effects’ refer to college-induced change in any of a wide variety of student attributes—including knowledge, skills, personality traits, interests, attitudes, orientations, values, beliefs, opinions, and behaviors (Foote, 1998).

Human Capital Theory

The term ‘human capital’ refers to knowledge, attitudes, and skills that are developed and valued primarily for their economically productive potential. It references the productive capacities of human beings as income-producing agents in an economy and to the present value of past investments in the skills of people (Heckman & Solomon, 1974).

Although a somewhat cynical quote by the 18th-century economist Adam Smith opened this study, he is also credited with having introduced the notion of humans as capital in his classic *Wealth of Nations* (Smith, 1759/1937). Others, such as Alfred Marshall (1890/1930) and Irvin Fisher (1906), elaborated on the concept. However, the theory of humans as capital remained relatively undeveloped until well into the 20th century (Baptiste, 2001).

Contemporary human capital theory was conceived in 1960 by Theodore Schultz. The birth took place two years later when the *Journal of Political Economy* published its October 1962 supplement volume on *Investment in Human Beings*. Blaug explains that “This volume included, among several other path breaking papers, the preliminary

chapters of Gary Becker's 1964 monograph *Human Capital*, which ever since served as the *locus classicus* of the subject" (1976, p. 827). Becker was later awarded the Nobel Prize in Economics for his work on human capital theory.

Prior to 1960 the demand for postsecondary education was viewed by economists as a consumption good and was therefore dependent upon price and perception. After the birth of human capital theory, education became viewed by many as an investment that generates a positive rate of return in the form of human capital (Hung, Chung, & Ho, 2000; Smith & Powell, 1990; Vandenberghe, 1999; Walters, 2004). Human capital theory recognizes two social entities: the utility-maximizing individual and the free market (Baptiste, 2001). One assumption is common to all human capital theory: That individuals seek to maximize their incomes by investing in themselves (Blinder, 1974).

> From the earliest formulations of the human-capital model by Schultz, Becker, and Mincer, it was on-the-job training and not formal schooling that was taken to be the paradigm case of self-investment. In the absence of post-school investment, lifecycle earnings profiles are assumed to show neither appreciation as a result of learning-by-doing, nor depreciation as a result of biological aging and obsolescence of knowledge; in graphical terms, the picture was that of a series of perfectly horizontal profiles, each higher profile being associated with an additional year of schooling. It was argued, however, that individuals tend to invest in themselves after completing schooling by choosing occupations that promise 'general training'; in so doing, they lower their starting salaries below alternative opportunities in exchange for higher future salaries as the training begins to pay off. (Blaug, 1976, p. 837)

Vandenberghe (1999), views human capital theory as optimistic, considering it a formidable individual and social lever. Nations populated with better educated people will have higher standards of living. Public investment in education can promote income equality and reduce poverty. By investing in themselves, people can enlarge the range of choices available to them. It is the most efficient way individuals living in a democratic society can improve their standard of living (Schultz, 1971). Sidorkin's (2007) position is, "The human capital theory rests on one mesmerizing empirical fact: more education generally means higher lifetime income" (p 159). Sidorkin also believes that formal education enhances individual productivity creating not only individual benefits, but benefits for business owners, the community, the state and the nation. Jepsen, et al. (2009) viewing human capital theory specifically from a community college perspective, indicates that the investment in community college education leads to increased earnings and lower unemployment rates.

Hanushek and Woessmann (2008) theorizes that it is the development of cognitive skills rather than years of schooling that have the greatest impact on individual income, the distribution of earning and economic growth. In essence it is a combination of both quantity and quality of education that have the most significant impact on future earnings and economic prosperity.

Several studies (Hanusherk & Woessmann, 2008; O'Dubhchair, Scott, & Johnson 2001; MHEC, 2009) have examined the relationship between national levels of education and economic growth. O'Dubhchair et al. (2001) acknowledge that, "In today's economy, what companies produce is not as important as what they know, and how they apply that

knowledge" (p. 6). Each study, based on research from various nations has found that educational outcomes relate to economic outcomes.

In his book *Human Capital,* Gary Becker (1964) demonstrates the increasing role of education in the economy as a whole as well as for the individual income of the worker. He sees investment in education as the creation of a special form of capital, one with a rather high rate of return. The concept of human capital, as used in this study, consists of individuals investing in themselves to create the economic property of rendering future services of value. The elements between learning and work and learning and time augment each other. The development of skills and knowledge requires both specialization and experience and can be acquired from the labor market and/or from educational sources. "Human capital theory was established on the foundation that labor skills can be maintained and adapted over a worker's lifetime" (Welch, 1975, p. 68).

In its broader sense, investment in human capital includes direct expenditures on education, health, and internal migration. This investment also includes indirect costs of earnings foregone by mature students attending school and by workers acquiring on-the-job training; the postponement of earnings by younger students; the use of leisure time to improve skills and knowledge; and so on—all of which constitute measures aimed at improving the quality of human effort and, ultimately, workers' productivity. Schultz (1971) wrote, "Although it is obvious that people acquire useful skills and knowledge, it is not so obvious that these skills and knowledge are a form of capital, or that this capital is in substantial part a product of deliberate investment" (p. 121). One can say that the procurement of skills and knowledge can be considered human capital only if they are used to increase productivity or wealth. However, it has been widely acknowledged that

there is a strong relationship between national outputs and national education levels (Hanushek & Woessmann, 2008; Jepsen, et al. 2009; Romano, 2011; Schultz, 1971; Sidorkin, 2007).

Nonetheless, theoretically, individuals will continue to pursue higher levels of education until the opportunity cost of acquiring more education is greater than the benefit it provides (Feldman, 1969; Walters, 2004). In the field of education, the principal theoretical implication of human capital is that the demand for higher education is responsive both to variation in the direct and indirect costs of schooling and to variations in the earning differentials associated with additional years of schooling.

Welch (1975) explains that earnings can be viewed as the sum of two terms at any point in a worker's career. One corresponds to his permanent income—the average annual equivalent value of his discounted lifetime earnings. The other, his net investment, is the sum of currently foregone earnings as investments in the future and the realized return on his past investments. This second term has zero discounted value over the life cycle. In other words, workers determine the rate of sacrifice of current earnings based on the prospective impact of education on future earnings.

An individual's decision to invest in new skills depends on anticipated future earnings, the time remaining in the work life, along with the direct and indirect cost of schooling (Jacobson, Ladonde, & Sullivan, 2005). A student may not be employed while in school or may be employed only on a part-time basis because of his schooling. The difference between potential earnings and actual earnings (including the value placed on the loss of leisure time) is considered the opportunity cost or indirect cost. Tuition and fees, books and supplies, along with lodging and transportation expenses are considered

direct costs. The consideration of indirect costs related to lost earnings and time suggest that shorter term occupational programs resulting in higher paying jobs should be particularly attractive to prospective students.

Welch (1975) notes that, "It seems noteworthy that the fundamental notion of human capital, of foregoing current income for the prospect of increased future earnings, assumes only that the schooling-income association is not spurious" (p. 65). Regardless of whether the results of education are predominately emotional or rational, the views are consistent that schools identify and build upon preexisting skills to develop skills that are of greater value to the market. The tie that binds all of these ideas together is not the question of whether an appreciation of skills and knowledge is actually taking place, but the fact that the decision maker is looking to the future for the justification of present actions.

A useful frame of reference is the large collection of literature on the returns to traditional schooling. A rough synopsis of the findings of that literature is that an additional year of schooling raises recipients' subsequent annual earnings by approximately 10%. The discounted internal rate of return, taking into consideration associated cost and adjusting for inflation, is approximately 7% (Jacobson, et al., 2005; Psacharopoulos & Patrinos, 2004).

Indirect benefits of higher education. Another way to invest in human capital is to improve emotional and physical health (Becker, 1992). Again, education plays a major role. Advocates of human capital theory contend that schools were developed and are maintained to prepare individuals for society's contemporary roles that are not addressed by the more time-honored means of socialization, such as the family or the church.

Education not only is assumed to provide students with the knowledge and skills they can bring to their jobs, it also is thought to prepare them to be more functional and productive members of society. Education represents a primary resource through which individuals acquire the mental skills and capacities of self-direction necessary for successful future performance in the workplace. In addition to developing employment skills, education encourages higher levels of competence and serves as a tool for augmenting social skills (Walters, 2004).

In terms of health, there have been numerous studies (Grossman & Kaestner, 1997; Hammond, 2002; Hartog & Oosterbeek, 1998) that document the positive correlation between higher levels of education and health. Health behaviors are adopted through processes of awareness raising, empowerment and socialization. Researchers have argued that the relationship between education and health is attributed to three general characteristics: Economic, social psychological and interpersonal, and health knowledge and behavior.

One theory documented by substantial research is that health and socioeconomic status are positively related (Bynner & Egerton, 2000; Feinstein, 2001; Gilleskie & Harrison, 1998). This theory is somewhat intuitive, since individuals of a higher economic status are likely to have better living and working conditions, better dietary options, and have greater access to doctors and medicine. The relationship is robust regardless of how socioeconomic status is measured, whether via income, occupation or education. In addition, these studies have shown that adults with higher levels of education are less likely to smoke or drink in excess.

As Sidorkin, (2004) states:

> Learning is much larger than creating labor power that we learn for ourselves, not for our future employer. The cultural archetype of education goes hand-in-hand with the ideals of personal emancipation, liberty, and democracy. Many educators think of education as the essential noble endeavor which, despite all of its shortcomings, contains a promise of human freedom and happiness. (p. 102)

Education delivers dynamic services by presenting the opportunity to improve decision making by augmenting individuals' abilities to think creatively and systematically about techniques. This escalation enables individuals to use their cognitive talents in the process to consciously modify their environment (Wozniak, 1984). By enhancing one's ability to learn and adjust to the ever changing environment, education aids individuals in keeping up with rapidly advancing technology.

Perceived economic value of education. Despite the important intellectual and political purposes of formal schooling, its economic value has come to be central. Based on findings from the Higher Education Research Institute [HERI] at UCLA, the home of the Cooperative Institutional Research Program (2010), in fall 2010, 72.7% of college freshmen indicated that, "The chief benefit of college is that it increases one's earning power" (p. 2). This is the highest percentage ever reported by students. The Higher Education Research Institute has been tracking this information since 1971 (HERI, 2010). Indeed the rhetoric of human capital—investing in education for the economic benefits it will generate in the future—dominated state and national policy and has led to an unquestioning acceptance of all schooling and training as routes to individual and collective advancement. However, while the economic benefits of the most familiar

credentials—the high school diploma, the baccalaureate degree, and various professional degrees—are well established, the economic benefits are much less clear for other kinds of education and training (Grubb, 1999a).

Several factors come in to play when deciding to remain in or return to the classroom. Learning capacity, age, and the amount of time for a worker to remain in the workforce all play a major role in human capital theory. Older workers are less likely to enroll in retraining because they have fewer remaining years left in their work lives and, possibly, because they face higher opportunity costs of training due to their higher foregone earnings. There is also perhaps a higher psychological barrier associated with returning to a classroom setting as an older student. Older students are more likely to be intimidated by new technologies that they have not been exposed to and may be uncomfortable in a classroom with students who are much younger (Jacobson, et al., 2005). Although the human capital framework suggests that older workers are less likely to enroll in retraining, among those who do enroll, the annual impact of retraining is likely to be larger than it is for younger workers (Jacobson, et al., 2005).

Typically, age-earnings profiles would be heightened by an investment in human capital. Reported earnings would be lower in the investment period and higher at a later time. But by investing in education that is specific to a current occupation, there may be the exact opposite effect—raising earnings more during the investment period than later, and as a result, flattening age earning profiles (Mincer, 1997).

Human capital investments over the life cycle have clear implications for interpersonal differences. At any life-cycle stage the marginal cost of producing human capital is lower for persons with greater learning ability. On the benefit side, marginal

revenue is greater, the easier the access to financing or the lower the interest rate on funds committed by parents, students, and other stakeholders (Ben-Porath, 1967). Therefore, persons with greater ability to learn and with lesser costs of funds or with a greater time potential for the future are more likely to invest more in human capital. Since more schooled individuals are likely to be more able and/or to face lower discount rates, they are also more likely to invest more on-the job training.

Schultz (1971) notes that it is the acquisition of knowledge and skills that turns labors into capitalists and creates economic value. It is this investment that predominantly accounts for the productive superiority and economic success of the technically advanced countries.

The debate over access to higher education and the role of higher education in economic development is primarily a debate over community colleges. In any discussion involving marginal incentives, community colleges have been the margin. They have been the gateway for underprepared students, older students, and those who typically cannot afford to attend college. It is ironic that so little research has been done to support or not support the economic benefits produced by community colleges while an abundance of research exists regarding the economic impact of four-year colleges (Sanchez & Laanan, 1997). The following literature review is representative of the limited research and studies that have been done to determine the economic advantages of attending a community college.

National educational attainment and associated wages. According to Buchinsky and Leslie (2009), the wage structure in the United States has transformed dramatically since the 1970s. Specifically, they note that the returns to both education

and experience have increased significantly. One explanation of this phenomenon, is the dramatic shift from a manufacturing based economy to a knowledge based economy where the need for education beyond a high school diploma is essential to economic stability and growth. A well educated population provides a higher level of labor productivity and it implies a greater ability to absorb and utilize advanced technology. Table 3, shown below, provides details on the levels of degree attainment among the United States adult population, age 25 and above.

Table 3

Educational Attainment in the United States, Age 25 and over

Level of Completion	Number	Percentage
Less than High School	25,710,000	12.9%
High School Diploma	62,456,000	31.2%
Some College	33,663,000	16.8%
Associate's Degree-Occupational	8,533.000	4.3%
Associate's Degree-Academic	9,726,000	4.9%
Bachelor's Degree	38,784,000	19.4%
Master's Degree	15,203,000	7.6%
Professional Degree	3,074,000	1.5%
Doctorate Degree	2,779,000	1.4%
Total	199,928,000	100.0%

Source: U.S. Census Bureau (2011)

The level of degree attainment among the United States adult population has increased less than 12% over the last 30 years. This creates serious economic concerns as

developed countries around the world recognize the importance of an educated workforce and are successfully increasing educational opportunities for their populations. In 2010, just over 39% of the United States population 25 years of age or older reported having at least an associate's degree. A larger portion of men than women receive a bachelor's degree

As outlined below in Table 4, on a National level, as educational attainment increases, annual earnings increase and unemployment rates decrease. As a result, individuals with higher levels of education will enjoy higher standards of living and the economy will benefit from increased productivity and higher tax revenues.

Table 4

Earnings and Unemployment Rates by Educational Attainment

Highest Level of Education Completed	2010 Median Annual Earnings	2010 Unemployment Rates
Less than High School	$23,088	14.9%
High School	$32,552	10.3%
Some College	$37,024	9.2%
Associate's Degree	$39,884	7.0%
Bachelor's Degree	$53,976	5.4%
Master's Degree	$66,144	4.0%
Professional Degree	$83,720	2.4%
Doctoral Degree	$80,600	1.9%
Average	$40,664	8.2%

Source: Bureau of Labor Statistics (2010)

Previous Research

While strides have been made in researching the economic returns of a community college education (Friedlander, 1993a, 1993b, 1996; Froeschle, 1991; Grubb, 1996; Pfeiffer, 1990; Sanchez & Laanan,1997; Seppanen, 1990, 1993, 1994, 1995) the number still pales in comparison to the studies done on the economic returns of a baccalaureate degree. The focus of many of these studies has been on the extent to which completing a certificate in a vocational program or an associate's degree affects post-two-year-college earnings (Friedlander, 1996; Grubb, 1996; Seppanen, 1990, 1993, 1994, 1995; Vanderheyden, 1994). Other studies look at the impact of completing only a few hours at the community college.

The media repeatedly publicize the "increased earning potential" of the baccalaureate degree over sub-baccalaureate degrees. Since Parnell wrote *The Neglected Majority* in 1985, proponents and opponents of the community college have conducted studies reviewing these claims (Beebe & Walleri, 2005). There is evidence, however, that simply comparing the average earnings of one degree to another is not all that revealing. Carnevale (2000) explains that the problem is that such comparisons are done on average earnings and maintains that almost 80% of employees with associate degrees or some college earn as much as those with bachelor's degrees, while a third actually earn more than the average four-year graduate. Other studies have indicated similar findings (Carvell, Graham, & Piland, 1998; Grubb, 1999b; Lin & Vogt, 1996). Carnevale (2000) suggests that it is the occupation—not necessarily the degree level—that determines salary. For example, the highest salaries are generally in the health sciences, business,

engineering/computers, and math/science; while the lowest are in social sciences, the humanities and education (U.S. Department of Labor, 2008).

Jack Friedlander (1993a) conducted one of the early studies which matched students' social security numbers to unemployment wage data from the State of California to track earnings one and three years post community college graduation, or after completion of 12 or more credits. Friedlander's (1993a) study followed 955 students earning an associate's degree and those earning 12 or more credit hours at Santa Barbara City College (SBCC) from 1986-87 to 1989-90. The study found that among degree recipients, annual wages increased by 41% between the first and third year of post-SBCC employment, as compared with a 28% increase for those leaving SBCC after earning 12 or more units, but no degree.

The study by Sanchez and Laanan (1997), which followed up on Friedlander's study, tracked 841,952 students enrolled in 103 of the 106 California Community Colleges who were either completers or were leavers during the 1991-92 academic year. Earnings from the students' last year in college were compared with earnings from the students' third year out of college. Salaries were adjusted using the Consumer Price Index. Sanchez showed that students who completed a certificate or associate's degree had substantial salary gains three years out of college. Consistent with Friedlander (1993a), associate's degree recipients evidenced the greatest percent change three years out of college, and they also had the highest median annual earning, compared to the students at other educational levels (Sanchez & Laanan, 1997). Sanchez and Laanan (1997) report, "On average, associate degree completers experienced a 59% earnings increase three years after graduation from community college. Those students who not

only completed the associate's degree but also were identified as vocational majors realized earnings gains of over 71%" (p. 78).

To date, several states have undertaken efforts to examine the post-college earnings of former community college students by using unemployment insurance (UI) wage records. The community college systems in these states typically have followed program completers or graduates into the workplace to estimate average annual earnings. The community college systems of Alaska (Wilson & Hadland, 1991), Colorado (Smith, 1989), Florida (Pfeiffer, 1990), Illinois (Merano, 1990), Texas (Froeschle, 1991), Washington (Seppanen, 1990,1993,1994, 1995), and California (Friedlander, 1993a, 1993b, 1996) have contracted with each state's Department of Labor to use quarterly wage and earnings files for those students identified as program completers or graduates from both community college vocational programs and proprietary programs (Sanchez & Laanan, 1997).

The effort and success of matching individual student data to UI data has varied from state to state. Sample sizes of students have ranged from 1,500 in Indiana, 200,000 in Florida to almost 850,000 in California. Florida has been the ground breaker in using UI data to study the return on investment for community college vocational and associate degree graduates. Overall, the research conducted in each state provides evidence that the community college plays a significant role in increasing the employment and earnings potential of its students and the entire United States workforce, though the majority of these studies are now between 15 and 20 years old.

Kane and Rouse (1995) used the National Longitudinal Study of the High School Class of 1972 (NLS-72) and the Longitudinal Survey of Youth (NLSY) to track the

economic success of community college graduates. Their study found that while only slightly more than one-fourth of initial community college entrants ever completed an associate's degree, the estimated increase in wage earning per year of schooling for 25-35 year olds was 9.6% for men and 10.7% for women. Few data sets include information about certificate programs. While some studies suggest a zero return to a certificate for both men and women, other data show significant returns (Grubb & Bragg, 1997). These shortcomings in the research illustrate that, in addition to the need for state-specific data, there is a need for further study examining the value of certificate completion.

Foote (1998) reviewed the results of several national surveys on the economic benefits of a community college. The overall findings of these surveys revealed that both certificates and associate degrees increased the earnings of those who received them, although, as would be expected, not by as much as a baccalaureate degree. In some cases, postsecondary education provided no economic advantage at all, and completion of a certificate proved more beneficial than completion of years of college without a credential. Foote's results varied significantly by the field of study.

Ghazalah (1993) found similar results when investigating the economic performance of 22,091 vocational program graduates in Ohio. Results showed predominately higher incomes for vocational graduates than for the general population of community college students, which includes those enrolled in general studies. Again the results varied by vocational program. The findings showed an increase in the income for graduates of secondary programs that ranged from 5 to 85%. For graduates of post-secondary associate degree programs the wage increase ranged from 12 to 68%.

The net effects of the community college experience indicate that those who earn an associate's degree double their chances of becoming a professional or manager when compared to the chances of someone with only a high school diploma. Furthermore, the chances of obtaining a technical job are greatly increased with an associate's degree or vocational certificate, and the likelihood of becoming a laborer or having an unskilled position is reduced (Sanchez & Laanon, 1997).

State and local data confirm most of the findings from national studies. The economic benefits of sub-baccalaureate education are clear, particularly for students completing an Associate degree. The variation in benefits among fields of study has been confirmed in several states, with more detail than is available in national data. The benefits of fewer than 12 hours of community college education remain unclear, partly because comparisons with individuals completing only high school are usually unavailable. Yet in some cases non-completers appear to benefit more than those who complete credentials, though this pattern may reflect experienced workers seeking to upgrade training. It may also suggest that those who leave early do so because of an immediate employment opportunity. Many results indicate that the benefits materialize relatively quickly, within three years of leaving education—though the long-run effects may be even greater.

Grubb and Bragg (1997) reported that, "Based on several different national data sets, research studies have clarified that the economic benefits of completing an associate degree are significant" (p. 10). The benefits are highest for those in occupational fields who find jobs related to their areas of study. Grubb and Bragg (1997) additionally report transfer rates to four-year colleges are now as high from occupational subjects as they are

from academic subjects. The occupational programs with the highest transfer rates include business and marketing, computer/information technology, and applied health sciences. Therefore, occupational programs can also be considered stepping stones to further education and lifelong learning. It is interesting to note that among certificate seeking students, the proportion holding a bachelor's degree grew significantly from just 1% in 1996 to over 8% in 2000 (Hughes & Karp, 2006).

In sum, though many of the studies are now dated, there is clear and substantial support for the financial returns of Associate's degrees. There is greater uncertainty about the benefits of certificates. The benefits to completing some coursework are comparatively smaller (in the range of 5 to 10%) and students need to complete one or two years of coursework to derive this benefit.

Grubb (1999b) observes that for students without an educational goal, employment benefits are trivial. Generally speaking, more education is better than less. A baccalaureate degree warrants higher earnings than an Associate's degree and an Associate's degree receives greater rewards than taking some coursework without completing a degree. Regardless of the level of completion, women have higher returns to their educational investment than men.

Access and Completion

The high levels of no-completion in community colleges have created lively debates among their proponents and critics. To the critics, these levels reflect a sign of failure. Supporters maintain that one must ask if these students would pursue higher education at all if not for the open-door policy, convenience, and affordability of the community college. Plus, what impact do external pressures such as families,

employment and lack of financial support play? Additionally, many college students "leave" when they have achieved their goal of completing a few courses needed to develop the skills necessary to succeed in the workplace.

Interestingly, noted educational demographer, Harold Hodgkinson (2002), has discovered that the elite institutions of higher education, both public and private, have almost ceased to admit students who are in poverty. Pell Grants are the only federal mechanism for funding the education of poor students, and today, far more than half of Pell Grants go to community college students, suggesting that economic segregation is once again on the increase in higher education. Research continues to be needed that assesses how effectively community colleges are positioned to serve these underprivileged students.

Accountability and Economic Return

For all the accountability measures required of institutions of higher education, particularly community colleges, little has been done to study the long-term effects of education on students' post-college earnings. Perhaps this failure has contributed to the onset of accountability mandates. Many of the accountability questions could be answered if community colleges across the nation took a statewide approach to analyzing the economic impact of the education they provide. In this era of "extreme accountability," student goal achievement and value added to society should be the ultimate measures of success. It is important to emphasize that the post-college earnings of students is one of several outcomes or performance measures that constitute the big picture of institutional effectiveness.

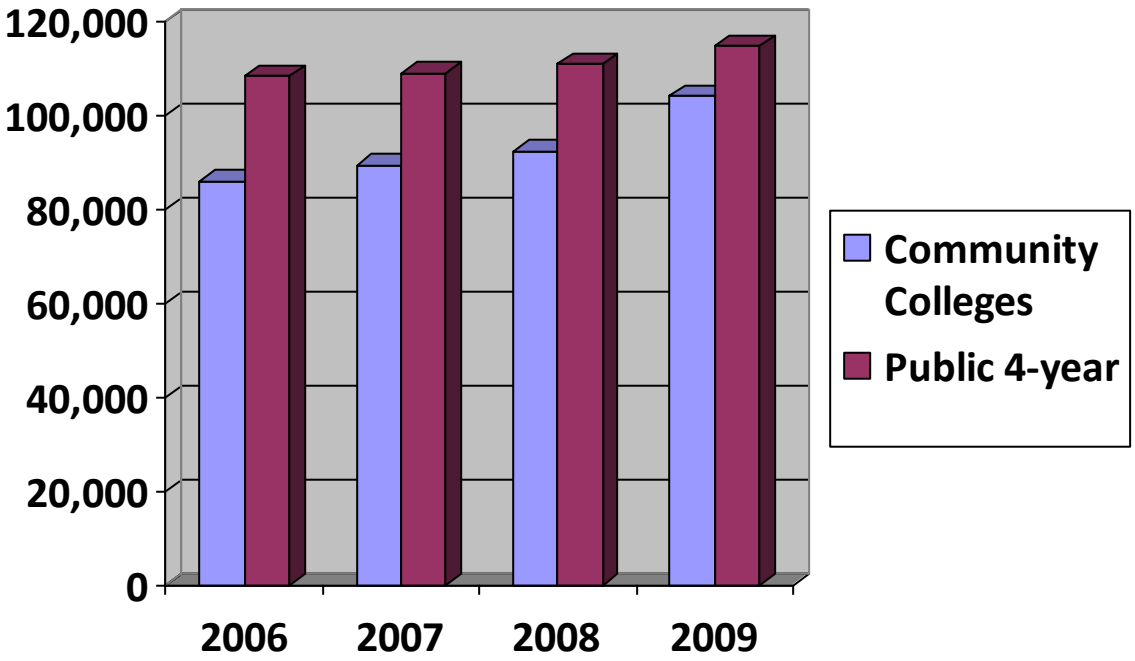
As a more learning-intensive economy emerges, the relationship between education and work is changing. In the context of rapid technological, structural and social change, there is increased danger of mismatches between what schools produce/supply and what firms want/demand. As a result, the need to create stronger links between educators and employers increases when the velocity of change increases. Higher education plays a pivotal role in providing students with the academic skills and training they need for success in the modern labor market (Workforce Economics, 1999).

The challenges faced by state community college systems that are interested in documenting student outcomes include methodological and philosophical concerns. In Missouri and in a number of other states, the primary obstacle is the lack of access to unemployment wage data at the state level. Further, arriving at a uniform and consistent definition for measuring the economic benefits of attending a community college appears to be warranted.

Students attend community colleges for numerous reasons: to better themselves financially, to obtain job entry skills, to upgrade job skills, to fulfill a personal interest or to take classes that will transfer to senior institutions. As illustrated earlier in this chapter the composition of the community college student body is both unique and diverse when compared to other institutions of higher education.

As illustrated earlier, the community college has experienced exponential growth over the past several decades and continues to grow today. The recession of 2008-2010 encouraged students, in ever increasing numbers, to enroll in the community college sector as economic considerations influenced where students chose to commit their educational dollars. From fall 2006 to fall 2009, enrollment at Missouri's community

colleges grew by almost 21%. During that same time period, enrollment at Missouri's four-year public institution grew by less than 6% (MDHE, n.d.). Figure 1, below illustrates the enrollment growth in Missouri's public higher education institutions between 2006 and 2009.



Missouri Department of Higher Education (n.d.a.)

Figure 1

Missouri Public Higher Education Enrollment

Between 2008 and 2019, the projected increase in the traditional college-age population enrolling in higher education is expected to offset declines in older student enrollment. During this time period, higher education enrollment at degree grating institutions across the Nation is projected to increase by 17% to 22.4 million. Enrollment projection levels are related to projections of college-age populations, disposable income and unemployment rates (National Center for Educational Statistics, 2010). There is little

to suggest that the country should expect a shift in this enrollment pattern toward growth in the community college sector.

If the students' primary purpose for continuing their education at the community college is to increase their earning potential, their post community college earnings should be a primary source of outcomes or performance measures. As stated earlier, more than ever before, higher education is seen as an investment and students and taxpayers alike are expecting a significant return on that investment. It is then the responsibility of higher education to provide evidence that higher earnings are a direct result of the community college experience.

Overall, community colleges do allow individuals to advance into "better" jobs—more stable, more likely to be professional or managerial, and of higher status. Based on research largely conducted in the 1990s, community colleges increase earnings, certainly for those who complete Associate degrees and according to some studies, for those who complete certificates or the equivalent. Moreover, the benefits appear to hold up for groups of special concern—blacks, older adults, displaced workers—and the returns are generally slightly higher for women than for men (Grubb, 1999b).

Greater levels of educational attainment create economic benefits for the public. These benefits include a better trained workforce, higher productivity, increased consumer spending, increased tax revenues, and as education levels increase, government support levels decrease. Better educated individuals receive private economic benefits that include better working conditions and higher mobility, lower rates of unemployment, greater job consistency and higher levels of savings (Pusser & Doane, 2001).

According to Pusser and Doane (2001), the public social benefits of education are substantial. These benefits include greater civic engagement which results in an increase in charitable giving and community service as well as improved voting rates. In addition, there are an abundance of private social benefits of higher education impacting overall quality of life. These benefits include improved health and longer life expectancy. Higher educated individuals can expect better working conditions and more leisure time. As education levels increase, so does the access to better information regarding consumer and life choices and enhanced personal status. Private benefits also increase public benefits. The private benefits of higher personal income generate greater public tax revenues and less dependence on government support. In addition, the many public benefits of higher education also lead to private benefits which occur when higher levels of community engagement provide individuals with opportunities to live in a more cohesive society.

Lewis, Hearn and Zilbert (1993) believe that based on social and economic benefits, there are two rationales for government subsidies of occupational education: an efficiency rationale and an equity rationale. The efficiency rationale suggests that investment in training leads to societal returns in the form of increased productivity and standards of living (Corazzini 1968; Farkas, Hotchkiss, & Stromsdorfer 1989). The equity rationale suggests that investment in postsecondary occupational education opportunities allows those from socioeconomically disadvantaged backgrounds a structured form of entry into the labor force and, therefore, into socially valued careers and enhanced individual earnings (Oakes, 1986; Silberman, 1982).

Unemployment wage data. The Missouri unemployment wage database provides the most reliable source of earnings for residents of the State. Wage earnings are reported on a quarterly basis by employers who report aggregate earnings by social security number. While it is possible to track employment by employer, the unemployment wage database does not reveal the position held within the company.

The aggregate unemployment wage data must be interpreted with caution, however. Facts to consider include industry- or job-specific characteristics. For example, in some fields, many individuals are self-employed or self-contractors and therefore are not included in the UI wage record file. Examples of occupations that typically have a large percentage of self-employed workers are: construction trades, landscaping, and drafting and design.

Employers' needs, certificate requirements, and educational stipulations further complicate the interpretation of UI wage data. Developing a dictionary of occupations and related contextual information would assist administrators, faculty, institutional researchers and other college personnel interpreting these data.

State specific information should be filtered down to counselors and other college personnel who work closely with students. Students can benefit from obtaining labor market information as it relates to programs they are interested in pursuing. The more information students have, the better prepared they will be to make informed decisions about their educational and employment plans.

In using earnings data as a performance measure for accountability purposes, caution is required. The data currently available only provides descriptive information and, therefore, no causal inferences can be made. That is, it is impossible with the

aggregate data to determine the link between students' educational training and actual employment. A more detailed follow-up study will have to be conducted to account for this relationship. Legislators, educators, policymakers, and researchers need to be aware of the methodological limitations in using administrative databases to derive performance measures. Several states have already implemented performance-based funding. Before other states begin to develop measures for accountability purposes, many variables need to be considered (Laanan, 1998).

The emerging knowledge based economy. Nobel Laureate, Paul Krugman (2009), in a *New York Times* article titled "The Uneducated American asserted:

> Until now, the results of educational neglect have been gradual—a slow-motion erosion of America's relative position. But things are about to get much worse, as the economic crisis…deals a severe blow to education across the board…We need to wake up and realize that one of the keys to our nation's historic success is now a wasting asset. Education made American great; neglect of education can reverse the process. (p. 18)

The 2008-2009 recession, often referred to as the Great Recession, shined a new light on the importance of education in today's knowledge based economy. The rapid changes in the global economy are associated with technological innovation and the swift exchange of creativity and new ideas. Cooke and Leydesdorff (2006), maintain that in a knowledge based society the sources of innovation are increasingly derived from research and development, and the weight of the society is increasingly in the field of knowledge. Following are ten examples of changes taking place at the global level, as set forth by Stukalina (2008), that serve as the driving forces in today's knowledge based economy.

1. Rapid technological progress and innovation
2. Manufacturing globalization
3. Improved international cooperation
4. Efficient global communication
5. Increased competition
6. Socio-cultural and demographic changes
7. Multicultural communities
8. Globalization of jobs
9. Displacement of jobs and unemployment
10. Polarized work opportunities

This list makes clear the important role higher education plays in developing a workforce that meets the demands set forth by these rapid changes. According to Valimaa (2009), "A new situation (exists) in which knowledge information and knowledge production are the defining features of the relationships within and among societies, organizations, industrial production, and human lives" (p. 27). As such, educational attainment beyond high school is required not only to insure individual success, but also success at the national level as the United States competes in the global economy. According to Atack and Passell (1994), economists estimate that almost 50% of the growth in the net national product over the last 150 years was due to the development of human labor supplies and skilled laborers.

The increases in unemployment during the 2008-2009 recession have had a much bigger impact on workers from goods-producing industries, young workers, and non-college workers. The dramatic rise in offshoring has lead to a polarization of the United

States labor market. There has been solid growth in higher-end, high-skill jobs while traditional middle-class jobs such as manufacturing and middle management positions gradually fade away. (Autor, Katz & Kearney. 2006, 2008; National Center on Education, 2007).

Structural unemployment results from changes in the demand patterns of employers based on the continuous development of new technologies. Katz (2010) formulates that the United States labor market is likely to see persistent unemployment problems as the current labor force faces a mismatch between the skills and knowledge possessed and the expectations of employers. The long-term unemployed and permanently displaced workers are likely to face the most difficulty in finding suitable employment and as a result will likely face many years of lower earnings and a dramatic decrease in their standard of living unless they are able to take steps to enhance their knowledge base. These trends are not only expected to continue, but increase over time. Katz (2010) believes that direct action is needed to provide employment opportunities for youth and young adults, especially in distressed areas. Young people must have the financial resources to gain valuable postsecondary education along with the guidance necessary for making intelligent educated choices.

Sheepskin effect. The philosophy behind the sheepskin effect, or the possession of a degree, is that degree completion (credentialing) is rewarded with higher earnings. This may be more true than ever in today's tight economy with national and state unemployment rates hovering around 10%. With more people competing for fewer jobs, employers often use credentials to distinguish workers with desirable traits that cannot be directly observed or communicated. There has been some debate whether this is a

reflection that the best learners are the ones who stay in school long enough to complete a degree or if it is because of the increased skill acquisition associated with degree completion (Flores-Lagunes & Light, 2009). Another theory exists that degree completion sends a signal to a perspective employers that an individual is able to establish goals and see those goals through to completion. Regardless of the underlying reasons, substantial evidence exists that degree completion is rewarded with higher likelihood of employment and with higher earnings (Goldberg & Smith, 2007; Hungerford & Solon, 1987; Jaeger & Page, 1996; Lumina, 2009).

"What is less understood is that the gap in earnings between these groups is growing. Even in this job market, employers are paying an increasing premium for college graduates" (Matthews, 2010. p. 4). There is a greater division in the United States economy than ever before. The gap between the upper-class and the lower-class continues to broaden while the middle-class is slowly erodes. Higher education is the one factor that has the power to stop this erosion and narrow the gap. Lumina Foundation for Education offers this explanation:

> In almost all other developed nations, attainment rates are increasing – in many cases dramatically and to levels significantly above (the United States). As a result, ours is one of the very few nations in the world in which younger adults are not better educated than older adults. (Matthews, 2010, p.3)

The economies for the State of Missouri and the United States face many challenges. One of the biggest challenges lies in the education of its citizens. In order to achieve the 60% state and national graduation rates established as the "Big Goal" by the Lumina Foundation for Education (Matthews, 2009), it is important to provide

information to perspective students on the value of education and degree attainment. The findings from this study will resonate with residents of Missouri, providing specific evidence of the economic returns associated with occupational education obtained through Missouri community colleges.

Education as an Investment

Viewing education as a private investment tool can be a two-edged sword. As a private good, Massey (2003) argues that the economic benefits college confers on individuals are sufficient to offset tuition payments—even if costs are higher than they need to be. It is no wonder then that higher education gets a smaller share of public expenditures and that even foundations, traditionally an important source of support for institutional development, are refocusing their priorities elsewhere.

It is important for educational stakeholders to help all students move with confidence from school to work and further education. Parnell (1985) observes that, "Today, we track students into programs for those who 'think' and those who 'work', when in fact, life for all of us is a blend of both" (p. 65). As data reviewed earlier demonstrated, for most students 12 years of schooling is insufficient. Today's graduates will change jobs many times. Changing jobs may account for 30% or more of the increase in earnings over a lifetime (Mortenson, 2007). New skills will be required, new cultural obligations will be confronted. Our society has become one where lifelong learning is a necessity.

In the next several decades, if the Lumina Foundation's "Big Goal" of achieving a 60% college completion rate among 24-25 year olds is to be achieved, every state will face a mounting demand for access to quality higher education opportunities. This rising

demand is fueled not only by population demographics, but is due equally to the fact that more and more economic self-sufficiency and the ability to actively participate in our democracy require knowledge and training beyond high school. In a time when not only manufacturing jobs, but an increasing number of white collar positions are relocating overseas and service-sector jobs fail to pay living wages, a college education is an important gateway to economic and social stability and to breaking through racial and ethnic barriers (Hodgkinson, 2000). The next generation of college students will be more diverse with higher expectations than ever before. It will be up to institutions of higher education to help mold these students into a productive and innovative workforce capable of meeting the daunting challenges of the future.

Summary

Chapter two provided a review of the literature related to this study beginning with community colleges, particularly Missouri community colleges and their occupational education programs. Literature discussing the direct and indirect benefits of higher education was reviewed with how it is explained in Human Capital Theory. Previous research analyzing the relationship between educational attainment and future earnings was reviewed, focusing on the impact of community colleges. The impetus toward accountability and the need for meaningful data was reviewed followed by an examination of the rapidly changing economic landscape and labor market expectations. The chapter concludes with a summary and the review of literature relating to education as an investment.

In brief, chapter two has provided a brief overview of human capital theory as it relates to formal education and in-particular to the community college. On average, the

higher the level of education the higher the salary earned. Overall, standards of living are positively correlated with levels of education.

Chapter 3, provides a comprehensive description of the research design, research questions and hypotheses. The methods employed and the contexts to be explored are provided as well as the procedures used in conducting the proposed research.

Chapter 3

Methods

The goal of this research is to develop a greater understanding of the economic benefits of the Missouri community college occupational education experience. The research and analysis is quantitative in nature.

To provide the rational for the quantitative approach, this chapter restates the research questions of the study and describes the null hypothesis to be tested. Additionally, this chapter includes a detailed description of participants, procedures and the types of data analysis used in the study. The sections include: research questions, design of the study, null hypotheses, description of data, participants, analysis of data, and procedures for the data analysis and concludes with a summary.

Research Questions

The research questions formulated to guide this study are:

1. Do the number of hours completed while pursuing occupational studies at a Missouri community college influence earnings one year after leaving the community college?
2. Do the number of hours completed while pursuing occupational studies at a Missouri community college influence earnings three years after leaving the community college?
3. For students completing 12 hours or more of occupational studies, but less than a certificate or Associate's of Applied Science degree at a Missouri community college, is there a significant difference in earnings their last year of college and one year out of college?

4. For students completing 12 hours or more of occupational studies, but less than a certificate or Associate's of Applied Science degree at a Missouri community college, is there a significant difference in earnings their last year of college and three years out of college?
5. For students completing an occupational certificate at a Missouri community college, is there a significant difference in earnings their last year of college and one year out of college?
6. For students completing an occupational certificate at a Missouri community college, is there a significant difference in earnings their last year of college and three years out of college?
7. For students completing an Associate's of Applied Science degree at a Missouri community college, is there a significant difference in earnings their last year of college and one year out of college?
8. For students completing an Associate's of Applied Science degree at a Missouri community college, is there a significant difference in earnings their last year of college and three years out of college?

Design of the Study

The design of the study is two-fold. Research questions one and two regarding how the number of hours completed impacts earnings are answered using correlation analysis. Correlation analysis in this case assesses the impact postsecondary education, specifically community college occupational education, has on the future earnings of students.

Research questions three through eight are answered using parametric statistical procedures, which allow inferences to be drawn on populations based on population samples. Paired samples t tests were conducted to compare the means of earnings for students attending a Missouri community college with earnings after the student exited the community college. In addition to looking at earnings, the study followed employment patterns of former students and provides information about employment rates by major and type of degree.

The economic value of occupational education at all levels has been widely debated. A great deal of research supports the view that college is a profitable investment in that more schooling leads to higher earnings. However, most of the research on the economic returns to college has focused on the four-year level despite the fact that almost 46% of the students who attend college soon after high school enroll in a community college. Moreover, of these students, the majority are enrolled in occupational programs (Bailey, Kienzl, & Marcotte, 2004), and very limited and conflicting data examines the effect of certificate completion.

Databases of students enrolled in the spring 2002 semester at two Missouri community colleges were utilized in this study. The cohort used in the research included students who graduated in the spring of 2002 with an Associate of Applied Science degree or certificate and students who completed a minimum of 12 credit hours in the 2001-2002 academic year in occupational studies. Data on both groups of students were sent to the National Student Clearinghouse to determine if the students returned to college in subsequent semesters. If students returned to college following

the 2002 spring semester, they were removed from the database and omitted from the study.

Student earnings were then compared using earnings for the 2001 calendar year (the earnings the last year the student was in college), earnings in 2003 (one year out of college), and 2005 (three years out of college). Unemployment Wage Data were adjusted for inflation using the Gross Domestic Product Implicit Price Deflator.

Null Hypotheses

The following null hypotheses were formulated for this study and became the formal assertions for testing statistical measures:

HO1: There is no significant correlation between the number of hours completed while pursuing occupational studies at a Missouri community college and earnings one year after leaving the community college.

HO2: There is no significant correlation between the number of hours completed while pursuing occupational studies at a Missouri community college and earnings three years after leaving the community college.

HO3: For students completing 12 hours or more of occupational studies but, less than a Certificate or Associate's of Applied Science degree at a Missouri community college, there is no significant difference in earnings their last year of college and one year out of college.

HO4: For students completing 12 hours or more of occupational studies, but less than a Certificate or Associate's of Applied Science degree at a Missouri community college, there is no significant difference in earnings their last year of college and three years out of college.

HO5: For students completing an occupational certificate at a Missouri community college there is no significant difference in earnings their last year of college and one year out of college.

HO6: For students completing an occupational certificate at a Missouri community college there is no significant difference in earnings their last year of college and three years out of college.

HO7: For students completing an Associate's of Applied Science degree at a Missouri community college there is no significant difference in earnings their last year of college and one year out of college.

HO8: For students completing an Associate's of Applied Science degree at a Missouri community college there is no significant difference in earnings their last year of college and three years out of college.

The data described below were applied to these null hypotheses and become the primary basis for analysis in Chapter 4 of the research study.

Description of the Data

Student databases obtained from two Missouri community colleges contain the following information on each student:

1. Student ethnicity
2. Student age
3. Student gender
4. Student major
5. College hours completed
6. Degree or certificate

7. Institution attended

The students who declared an occupational major and ended their higher education experience in the Spring of 2002 were then matched with Unemployment Wage Data obtained through the University of Missouri-Columbia using social security numbers. The Unemployment Wage Database is maintained by the Department of Economics at the University of Missouri—Columbia. Unemployment wage records contain quarterly reports of earnings submitted by each employer in compliance with Missouri's Unemployment Compensation law.

For each employee covered, an employer is required to report the employee's social security number and the total amount of earnings received during the quarter. The employer also reports their own unique employer identification number, the county in which the business is located, and the industry affiliation of the business using the Standard Industrial Classification Code. Information on actual hours worked and the position held is not collected.

Participants

In Missouri, each community colleges district is assigned a service region that includes counties beyond the college's statutorily established taxing district. Currently, there are12 districts established within the State.

Five of Missouri's community colleges were approached to participate in this study based on size, location, and previous relationships with college personnel. Two colleges declined to participate based on concerns over student confidentiality involving the use of student social security numbers to track student wages. The Institutional Research office of another community college has been a proponent of using

Unemployment Wage data for tracking student success for several years. Unfortunately, the State of Missouri has refused to make this information available to higher education institutions. As a result, the third community college declined to participate based on the principle that Unemployment Wage data should be made available to all institutions rather than one limited study.

The two Missouri community colleges that participated in this study were selected based upon their willingness, diversity, and their ability to be representative of the state population. Community College One is located in the state's third largest urban area and Community College Two is located in rural Missouri. Table 3 provides population and per capita information for the areas in which the community colleges are located.

Table 5

Population and per capita income of proposed community colleges

Community College	Area/Region	2010 Population	2010 Per Capita Income
Community College One	MSA	426,000	$31,485
Community College Two	County	55,750	$25,986

Source: Bureau of Economic Analysis (n.d.)

In addition to offering a wide range of occupational degree programs, Associate of Arts (AA), Associate of Science (AS), and Associate of Arts in Teaching (AAT) degrees are offered by these community colleges. The AA, AS and AAT degrees offered by the community colleges included in this study are designed to prepare students for transfer to a four-year institution and upper division course work. The Associate of Science degree in Missouri is a specifically articulated degree with one of the state's colleges or universities, such as in engineering or nursing. The purpose of the Associate's

of Applied Science Degree (AAS) and Certificate program is to provide students with the skills and knowledge required to succeed in their chosen career path immediately following completion of the credential. AAS and certificate programs are designed specifically to prepare students for the workplace.

Community college one. Community College One is located in a rapidly growing urban area of the State. It is a relatively young community college and was initially established as a technical college. Over its 20 year history, it has evolved into a comprehensive community college offering both technical and transfer degree options. During its years of existence the college has experienced phenomenal growth, with an enrollment of almost 14,000 students in the Fall of 2010. This Community College serves students on two campuses and at three education sites with expansion in progress. Appendix A provides a list of occupational programs offered at Community College One.

Community college two. Community College Two is located in a rural county of Missouri, and in a community of just over 20,000. It is approximately 90 miles from one of the state's largest metropolitan areas. The college, founded in 1966, had a Fall 2010 enrollment of over 4,000 students. College Two serves students at eight extended campus sites and more than 20 other smaller locations throughout the college service area, including one military installation. Community College Two also provides educational opportunities through web-based courses and interactive television. The occupational programs offered by Community College Two are listed in Appendix B.

Analysis of Data

Wage data were adjusted using the Gross Domestic Product, Implicit Price Deflator to normalize the data for inflation. Data were then compiled and manipulated in

a Microsoft Excel spreadsheet and subsequently imported into an SAS file and when screened for outliers, two students were eliminated.

Descriptive data analysis was used to provide further meaning to the research and to determine if the data in this study supported previous research which looked at earnings by gender and field of study. Students were quantitatively identified by gender, field of study, and level of completion. Student gender was converted to a numerical value, males were given the value of 1 and females were identified by the number 2. These numerical values enabled SAS to isolate the number of students and earnings by gender. This information was then used to calculate average earnings for both males and females. Using the same process, CIP codes, discussed in Chapter Four, served to identify students by field of study. This information was used to calculate average earnings by field of study.

Level of completion was also converted to a numerical value. Students completing 12 hours of occupational hours but less than a certificate or AAS degree were identified with a 0. Students completing a certificate were identified with a 1, and students completing an AAS degree were identified with a 2. Using these identifiers, students were isolated by level of completion and average annual earnings were calculated. Following the calculation of average earnings by gender, field of study and level of completion growth rates were calculated and comparisons provided.

The data were then analyzed using a simple linear regression analysis to answer research questions one and two. In the regression analysis, educational hours completed were used as a predictor of earnings. The regression analysis provided a measure of the amount of influence education had on future earnings.

Regression analysis is a statistical technique that can be used to develop a mathematical equation showing how variables are related. In regression terminology the variable which is being predicted by the mathematical equation is called the dependent variable. For research questions one and two the dependent variable is earnings as reported in Unemployment Wage Data. The variable being used to predict the value of the dependent variable is referred to as the independent variable. In other words, a change in earnings is viewed as "depending" on an independent factor—the amount of postsecondary education an individual received. For research questions one and two, the independent variable was the number of hours completed in occupational studies at a Missouri community college.

Correlation analysis determined the extent to which the variables are linearly related. Correlation analysis is a procedure for making this determination and, if such a relationship exists, provides a measure of the relative strength of the relationship.

SAS generates a score that measures the strength of relationship between the dependent variable (wages) and the independent variable (education). The score was designated with a capital R and simply designates the strength of the relationship. Along with the computation of R, SAS provides a probability value (p) associated with R to indicate the significance of that association (George & Mallery, 2005).

SAS also calculates the constant and the coefficient for the regression equation and the R squared. The R squared has significance because it is the proportion of variance in one variable accounted for or explained by the other variable. Conclusions from the simple linear regression analysis indicate whether or not a significant prediction equation was obtained, the direction of the relationship, and the equations itself.

Paired t tests were conducted to answer research questions three through eight. This test using the t-statistic establishes whether two means collected from the same sample differ significantly. For the purpose of this study, mean earnings the last year the student attended college were compared to earnings one and three years out of college to determine if there was a significant difference. Significant values indicate the two scores are different to a statistically important degree. Values that are 'not significant' indicate that scores are not different to a statistically important degree.

Although it would provide additional insight to calculate earnings by college, an agreement with the colleges supplying the student data restricted this analysis to the aggregate. The fact that the labor markets for the two colleges participating in this study are quite different creates the potential for the results to be misconstrued and misinterpreted. Therefore, analyses by college were not included in this study.

Procedures

Institutional Review Board (IRB) approval was obtained through the formal IRB process at the University of Missouri-St. Louis and at the individual colleges participating in the study. The institutional research staff at each college provided a database of students meeting the designated criteria. These student databases were matched against Missouri unemployment wage data using the procedures reviewed above. Each of the null hypotheses was then analyzed to determine if the statement was supported by the statistical review.

Summary

This chapter provided a description of the design and procedures used in this study, research questions and hypotheses, data description, and a detailed description of

the statistical procedures for data analysis. Likewise, this chapter has provided a thorough description of the participants for this research and the degree programs available at these institutions.

Chapter four describes the design of the study, the research questions and hypotheses, a description of the data, and the statistical procedures of data analysis. This chapter presents the data obtained in the study and how the results of the analysis of data were used to test the eight hypotheses.

Chapter 4

Results and Discussion

> In July 2009, President Obama announced a $12 billion initiative to increase assistance to the nation's community colleges (Kellogg & Tomsho, 2009). The announcement delivered at Macomb Community College in Michigan, illustrates the administration's view that community colleges are an essential component of the nation's economy. Nationally, over 45% of undergraduate students were enrolled in public community colleges. These students are pursuing higher education in hopes of a better future and a higher standard of living. (Belfield & Bailey, 2011 p. 48)

This call from President Obama for community college programming that provides education leading to a higher standard of living for graduates emphasizes the need for additional research that validates the value of occupational education. The previous chapter described the design of this study, aimed at providing some of that validation, the research questions and hypotheses that may provide evidence, a description of the data to be gathered, and the statistical procedures of data analysis. This chapter presents the data obtained in the study and the results of the analysis of data used to test the eight hypotheses.

The chapter seeks to answer the question, "What impact does the occupational education experience at Missouri community colleges have on future earnings?" by presenting quantitative data from two Missouri community colleges and unemployment wage data administered by the Department of Economics at the University of Missouri—

Columbia. Organization of the chapter follows the eight research questions, which were initially presented in Chapter 1.

1. Do the number of hours completed while pursuing occupational studies at a Missouri community college influence earnings one year after leaving the community college?
2. Do the number of hours completed while pursuing occupational studies at a Missouri community college influence earnings three years after leaving the community college?
3. For students completing 12 hours or more of occupational studies, but less than a certificate or Associate's of Applied Science degree at a Missouri community college, is there a significant difference in earnings their last year of college and one year out of college?
4. For students completing 12 hours or more of occupational studies, but less than a certificate or Associate's of Applied Science degree at a Missouri community college, is there a significant difference in earnings their last year of college and three years out of college?
5. For students completing an occupational certificate at a Missouri community college, is there a significant difference in earnings their last year of college and one year out of college?
6. For students completing an occupational certificate at a Missouri community college, is there a significant difference in earnings their last year of college and three years out of college?

7. For students completing an Associate's of Applied Science degree at a Missouri community college, is there a significant difference in earnings their last year of college and one year out of college?
8. For students completing an Associate's of Applied Science degree at a Missouri community college, is there a significant difference in earnings their last year of college and three years out of college?

Reliability and Validity

Internal validity is used to emphasize cause and affect relationships with reference to constructs that imply meaning. How findings fit with prior research explanations serves to develop understanding. The student data obtained for this study was initially processed through their colleges' respective Institutional Research Offices, which verified the validity of the information provided. In collaboration with the University of Missouri, the student database was matched to the Missouri unemployment wage database for: 2001, the last year the students attended college, 2003, one year out of college, and 2005, three years out of college. The number of students matched to the unemployment wage database using the students' social security number, varied from year to year. Students' absence from the unemployment wage database could result from a variety of reasons. For example, students moving out of the State of Missouri, students who are self-employed, and students doing contract work would not appear in the unemployment wage database.

Prior to providing the data to the University of Missouri, the data were restructured with data for the two community colleges included in this study combined into one file, resulting in a total sample size of 449 students. Students were identified by

school, gender, ethnicity, area of study, hours completed and degree completed. Only students found in both unemployment wage comparative databases (2001-2003 and 2001-2005) were included in each respective analysis.

The data obtained from the Missouri unemployment wage database was adjusted for inflation using the Gross Domestic Product, Implicit Price Deflator obtained from the Bureau of Economic Analysis. By doing this, unemployment wage data is reported in real dollars, meaning that any inflationary effects have been removed and a dollar amount reported within each time period would have the same buying power. Unemployment wage data presented in this study is reported in 2005 dollars. Table 4 provides the Gross National Product, Implicit Price Deflators used to normalize the wage data used in this research.

Table 6

Gross Domestic Product, Implicit Price Deflator (IPD)

Year	IPD
2001	89.979%
2002	91.49%
2003	93.496%
2004	95.626%
2005	100.000%

Bureau of Economic Analysis (n.d.a.)

Description of Variables

Variables included in the student database include: last semester enrolled, student identifier, gender, date of birth, ethnicity, cumulative hours, program of study, CIP code

(Classification of Instruction Programs), degree earned, and college attended. Tables 5, 6, 7 and 8 summarize the student data. As shown in Table 5, female students represented 54% of the total participants in this study, with male students representing the remaining 46%. According to the American Associated of Community Colleges, on a national level, female students comprise 58% of the community college enrollment and male students comprise 42% (AACC, n.d.a.), indicating a slightly higher percentage of male students in the occupational program pool. This is not unexpected given the mix of career programs shown in Appendices A and B, many of which traditionally have been male dominated.

Table 7

Students by Gender

Gender	Number	% of Total
Male	204	46%
Female	245	54%

As shown in Table 8 below, Caucasians made up 95% of the students included in this study. While this is not indicative of the community college enrollment across the State, it is consistent with the student population breakdown of the community colleges included in this study. Asian, Black and Hispanic students cumulatively made up four percent of the students included in this study. Two percent reported unknown ethnic background.

Table 8

Students by Ethnic Background

Ethnicity	Number
Asian	6
Black	7
Caucasian	425
Hispanic	3
Unknown	8

Almost 65%, or 291 students included in this study completed 12 or more hours of occupational studies, but did not complete an occupational certificate or Associate's degree. Almost 8% completed an occupational certificate and over 27% completed an Associate's of Applied Science Degree. It is noteworthy that two-thirds of those entering an occupational program which, unlike enrollment in general Arts and Sciences curricula, indicates an interest in obtaining a specific skill, did not complete the program of study. This finding makes it all the more critical that the economic value of hours completed, short of receiving a degree or certificate, be assessed.

Table 9

Students by Degree Type

College Experience	Number of Students	Percentage of Total
No Degree	291	64.8%
Certificate (1 year)	35	7.8%
Associate's Degree (2 year)	123	27.4%

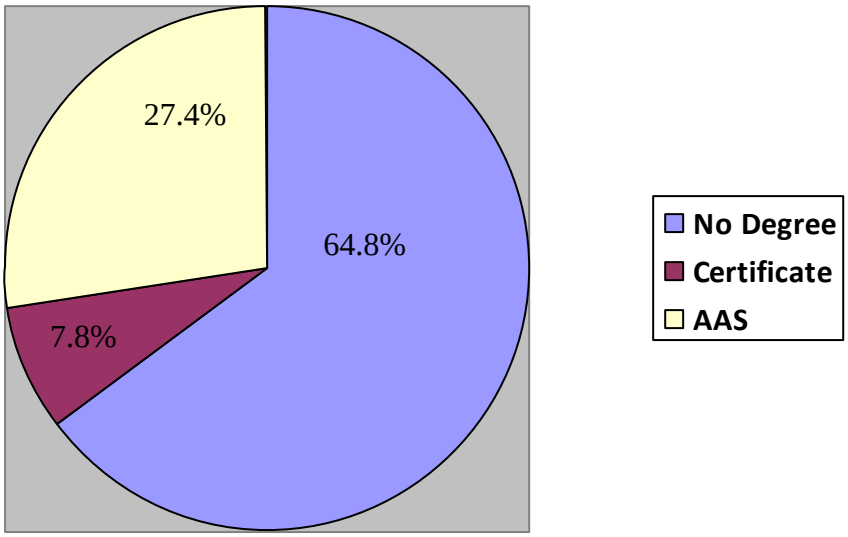


Figure 2

Participants by Completion

Classification of Instruction Programs (CIP) was developed by the U.S. Department of Education in 1980. "The purpose is to provide a taxonomic scheme that will support the accurate tracking, assessment and reporting of fields of study and program completion activity" (Institute of Education Statistics [IES], n.d.). Table 10 breaks down study participants by CIP, with each CIP representing multiple degrees. For example, CIP 51, Health Professions, includes registered nursing, dental hygiene, physical therapy assistant and respiratory therapy, among others.

Business management and marketing students made up almost 27% of the total participants and health professions accounted for 21% of the total. Areas of study with three or fewer participants were excluded from the study to insure confidentiality.

Males dominated nine of the twelve fields of study covered in this analysis. The three fields dominated by female students were business, health professions and family and consumer sciences. As mentioned above, health professions and business, management and marketing are the areas of study with the most participants. Females represented 88% (n = 84) of the students enrolled in the health professions field and more than 74% (n = 89) of the students studying business, management and marketing.

Table 10

Students by Major using CIP

		Number of Students	
CIP	Field of Study	Female	Male
01	Agriculture	7	12
10	Communication Technology	7	9
11	Computer and Information Systems	35	58
12	Personal and Culinary Services	0	3
15	Engineering Technologies	5	20
19	Family and Consumer Sciences	8	0
43	Law Enforcement, Firefighting, & Protective Services	6	8
46	Construction Trades	1	4
47	Mechanic and Repair Technologies	2	41
48	Precision Production	1	6
51	Health Professions	84	11
52	Business, Management, and Marketing	89	32

Research Questions

In the section that follows, data are applied to each of the eight research questions, followed by a summary and discussion of the findings. For each research question there is a review of the analysis conducted as well as the outcomes of that analysis.

Research question one. Once basic demographic statistics were computed, analytical attention turned to Research question one: *Do the number of hours completed while pursuing occupational studies at a Missouri community college impact earnings one year after leaving the community college?* Regression analysis, using salary as the dependent variable and hours completed in occupational studies at a Missouri community college as the independent variable, was conducted to answer this question. Conclusions from the regression analysis indicate whether or not a significant prediction equation was obtained, the direction of the relationship, and the equation itself.

A simple linear regression was calculated predicting students' salary one year out of college based on the number of occupational hours completed at the two Missouri community colleges being examined. This regression analysis equation was not significant ($F(1,274) = 0.04$, $p > .05$) with an R squared of -0.0035. Without other factors being taken into account, the number of hours completed at a Missouri community college cannot be used to predict income one year out of college.

Research question two. *Do the number of hours completed while pursuing occupational studies at a Missouri community college impact earnings three years after leaving the community college?*

Research Question Two, like Research Question One, uses a linear regression analysis to determine the relationship between the number of occupational hours

completed at a Missouri community college and subsequent earnings. However, rather than looking at earnings one year after leaving college, Research question two uses earnings three years out of college.

A simple linear regression was calculated predicting students' salary three years out of college based on the number of occupational hours completed at one of the two Missouri community colleges included in this study. The regression equation was not significant ($F(1,274) = 0.05$, $p > .05$) with an R squared of 0.0002. The number of occupational hours completed at a Missouri community college cannot be used to predict income three years out of college.

Research question three. *For students completing 12 hours or more of occupational studies, but less than a certificate or Associate's of Applied Science degree at a Missouri community college, is there a significant difference in earnings their last year of college and one year out of college?*

As discussed in the Methodology chapter, Chapter Three, a paired-samples t test was run to determine whether or not the two salaries are significantly different from each other. Significant values indicate the two salaries are different. Values that are not significant indicate the scores are not significantly different.

Student salaries were found to be significantly different their last year in college to one year out of college ($M = 1417.4$, $SD = 2855.4$), ($t(149) = 6.08$, $p < .00005$) indicating a degree of freedom of 149, meaning that 150 students were matched in the 2001 and 2003 unemployment wage database. The p value associated with this analysis is quite small (<.00005) indicating there is a significant difference in the positive direction in the mean scores of these two paired samples. In other words, salaries showed a

significant increase between the two years tested. The effect size, which determines the importance of the statistical significance, of 0.50 indicates a moderate effect. Average earnings for students included in this analysis were $19,879 one year out of college, an increase of 50% over earnings their last year in college.

Research question four. *For students completing 12 hours or more of occupational studies, but less than a certificate or Associate's of Applied Science degree at a Missouri community college, is there a significant difference in earnings their last year of college and three years out of college?*

A paired-samples t test was calculated to compare the students' mean salary their last year in college (2001) and the students' mean salary three years out of college (2005). This analysis revealed a significant increase in earnings from the students' last year in college to three years out of college ($M = 3893.4$, $SD = 4250.8$), ($t(72) = 7.83$, $p < .00005$, with an effect size of 0.92 indicating a large difference effect. Seventy-three students were matched in the 2001 and 2005 unemployment wage databases with a t value of 7.83 and a very small p value of < .00005. The positive sign associated with the t value indicates the mean values increased from 2001 to 2005.

The 73 students included in this analysis had a average salary of $13,209 their last year in college, their salaries increased to $19,878 one year out of college and to $23,004 three years out of college. This provides evidence of a 74% increase in average earnings, adjusted for inflation, three years after leaving the community college. Even without the benefits of a degree, these occupational education students were able to increase their income significantly using the skills and knowledge obtained through the community college occupational education experience.

Research question five. *For students completing an occupational certificate at a Missouri community college, is there a significant difference in earnings their last year of college and one year out of college?*

Again a paired-samples t test was calculated to compare students' mean salary their last year in college with their salary one year out of college. Certificate completers were the smallest of the groups analyzed. Thirty-five students completing a certificate program were included in the student database, and 15 of these students were identified in both the 2001 and 2003 unemployment wage database. Analysis indicated that there was a significant increase in students' salary from their last year in college to their salary one year out of college ($M = 1996.6$, $SD = 2761.4$), ($t(14) = 2.74$, $p < .0079$) with an effect size of 0.71 indicating a large difference effect. The t test is designed to test if the averages of two samples are significantly different. In doing so, it not only compares the means, but it also judges the means relative to variability or spread of, in this case, salaries. The positive $t = 2.74$ indicates an increase in earnings from 2001 to 2003 and $p = 0.0079$ indicates a high level of significance.

Earnings for certificate completers increased an average of 34% between the student's last year of college and one year out of college. On average earnings grew from $17,871 in 2001 to $23,967 in 2003.

Research question six. *For students completing an occupational certificate at a Missouri community college, is there a significant difference in earnings their last year of college and three years out of college?*

When a paired-samples t test was applied comparing the mean salary of students' last year in college for those completing an occupational certificate with their mean

salary three years out of college, a significant increase was found for salaries three years out of college ($M = 2619.4$, $SD = 5438.0$), ($t(14) = 1.87$, $p < .0416$). The effect size of 0.48 indicates moderate to large difference effect. Again, the certificate completers represented only 15 students.

It is interesting to note that of the certificate completing students included in the student database, more than 50% completed a certificate in the health occupations field. Almost one-third of these students completed a certificate in the field of business systems technology, with these two program areas accounting for approximately 80% of the sample. Certificate completion in the health occupations programs is understandable, since many of these programs require the certificate before a student can sit for a credentialing examination. Certificate completers salaries continued to grow three years out of college to an average of $26,662, an increase of 49% over their last year of college.

Research question seven. *For students completing an Associate's of Applied Science degree at a Missouri community college, is there a significant difference in earnings their last year of college and one year out of college?* Again, a paired-samples t test was applied comparing the salary of students completing an Associate's of Applied Science degree their last year in college with their salary one year out of college, there was a significant increase in earnings from the students' last year in college to their earnings one year out of college ($M = 2827.3$, $SD = 4798.6$), ($t(67) = 6.14$, $p < .00005$). Findings were significant with a $p < 0.00005$ and an effect size of 0.74 indicating a large difference effect. Sixty-seven students completing an AAS degree were identified in both the 2001 and 2003 unemployment wage database. One year out of college, these students

recorded average annual earnings of $28,637, an 85% increase in real dollars from their last year in college.

Research question eight. *For students completing an Associate's of Applied Science degree at a Missouri community college, is there a significant difference in earnings their last year of college and three years out of college*? The paired-samples t test comparing the relationship found that there was a significant increase in earnings from the students' last year in college to their earnings three years out of college ($M = 4222.9$, $SD = 3876.0$), ($t(57) = 8.30$, $p < .00005$). Again, findings were significant with $p < 0.00005$ and an effect size of 1.09 indicating a large difference effect size. Fifty-seven students completing an AAS degree were matched in the 2001 and 2005 unemployment wage database.

Students completing an AAS degree saw their earning increase over 100% between their last year in college and three years out of college. On average earnings increased to $28,637 in 2005, an increase of 119% over the 2001 average earnings of $13,067.

Thirty-one percent of the students completing an AAS degree majored in business, while 22% completed a degree in health occupations, accounting for 53% of the sample. Students completing computer degrees such as networking and computer information systems within the general business CIP code comprised 13% of the AAS degree recipients.

For this group of students, earnings continued to rise beyond the level of inflation three years out of college. AAS degree completers saw a three year real increase in earnings of 119%.

Summary and Discussion

Based on the findings of the research conducted, the number of hours completed in occupational studies at a Missouri community college cannot serve as a predictor of future earnings for any given student, without application to a specific area of study. There is not a strong correlation, either positive or negative, between hours earned and future earnings. Based on the findings of the last six hypotheses, one might expect to see earnings increase in relation to the number of occupational hours completed. However, due to the variety of occupational programs and the varied nature of the occupational education programs, hours completed, in and of itself, does not serve as a predictor. This finding is of particular importance in that it indicates, at least in these two cases, that colleges and counselors cannot tell students that taking more hours in an occupation area will lead to greater income, without consideration of the program of study.

Table 9 outlines earnings by hours completed and does indicate that in aggregate, the higher the level of educational attainment, the higher the earnings one and three years out of college. Students with 12 or more hours of occupational education, but less than a certificate show a 50% increase in real earnings one year out of college and a 74% increase in real earnings three years out of college.

Students completing an occupational certificate posted an increase in real earnings of 34% one year out of college, and 49% three years out of college. Certificate completing students showed smaller gains, but actually had higher salaries than the students completing less than a certificate. This was due, in part, to the higher average earnings of Certificate completing students their last year in college.

Students completing an Associate's of Applied Science degree showed the greatest gains and the highest earnings one and three years out college of the three student groups. Average real earnings for students completing as Associate's of Applied Science degree was $24,146.68 (n=103) one year out of college, an increase of 85% over their salary in their last year of college. Average earnings three years out of college for this group were $28,637.44 (n=94), an increase of 119% from their last year in college earnings. Research questions three through eight provide evidence that an associate's degree receives more monetary rewards in the labor market than a Certificate, which in turn receives more monetary rewards than taking some coursework without completing a degree.

Table 11

Earnings by Completion

Completion	Year	n	Annual Earnings	Percentage Increase from 2001
12 or more hours, but less than a certificate	2001	204	$13,208.92	
	2003	194	$19,878.60	50%
	2005	192	$23,004.24	74%
Occupational Certificate	2001	19	$17,870.80	
	2003	29	$23,966.68	34%
	2005	27	$26,661.64	49%
Associate's of Applied Science	2001	79	$13,067.12	
	2003	103	$24,146.68	85%
	2005	94	$28,637.44	119%

As illustrated in Figure 3, the greatest gains in earnings occurred the first year out of college. However, earnings for all groups continued to grow through the three year time period. It is important to keep in mind that this growth is on top of adjustments for inflation, indicating that these students are receiving more than cost of living increases and improving their standard of living.

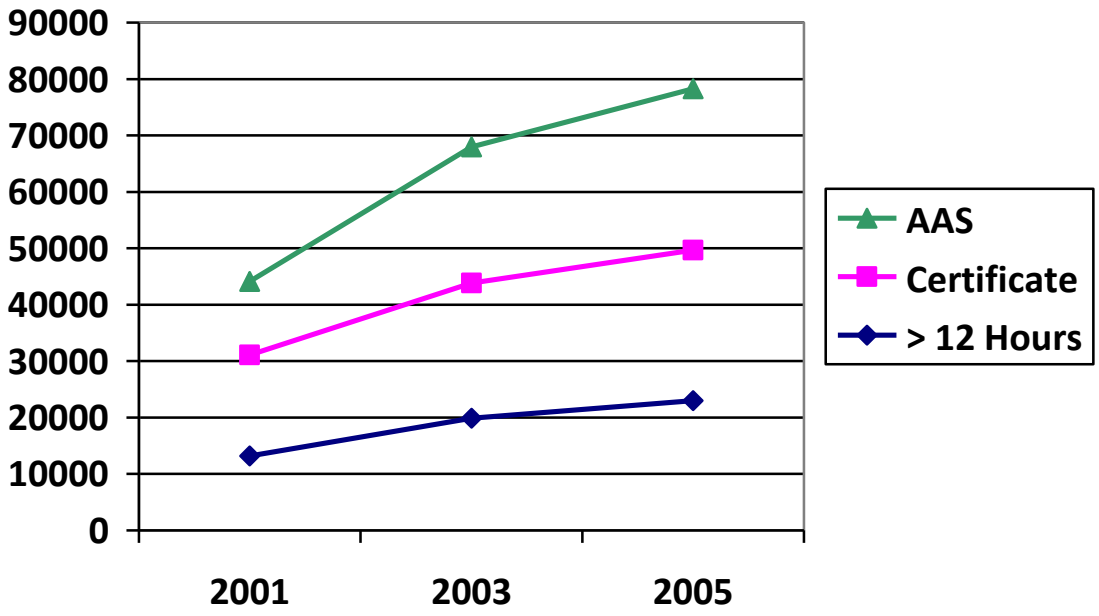


Figure 3

Earnings by Completion

Earnings by gender. Like previous studies analyzing the impact of the community college experience, the female subjects in this research posted higher gains in earnings than their male counterparts. In an article by Belfield and Bailey (2011) reviewing previous studies on the impact of community college education on future earnings they state, "Earnings gains from community colleges are much higher for females than for males…this male-female gap remains stable as community college graduates gain experience in the labor market" (p. 51). Findings from this study show that

average earnings for male students completing an Associate's of Applied Science Degree three years out of college was $29,047.72 (n=135) an 86% increase in earnings from their last year in college. Female students completing an Associate of Applied Science showed average annual earnings of $21,961.12 (n=178) three years out of college, an increase of 89%. Table 10 does illustrate that when all hours completed are considered without regard to degree completion, increases in earnings are substantially higher by percentage for women than for men, however, annual earnings are still higher for males.

Table 12

Earnings by Gender

Gender	Year	n	Annual Earnings	Percentage Increase from 2001
Female	2001	165	$13,208.92	
	2003	184	$19,878.60	50%
	2005	178	$23,004.24	74%
Male	2001	137	$17,870.80	
	2003	142	$23,966.68	34%
	2005	135	$26,661.64	49%

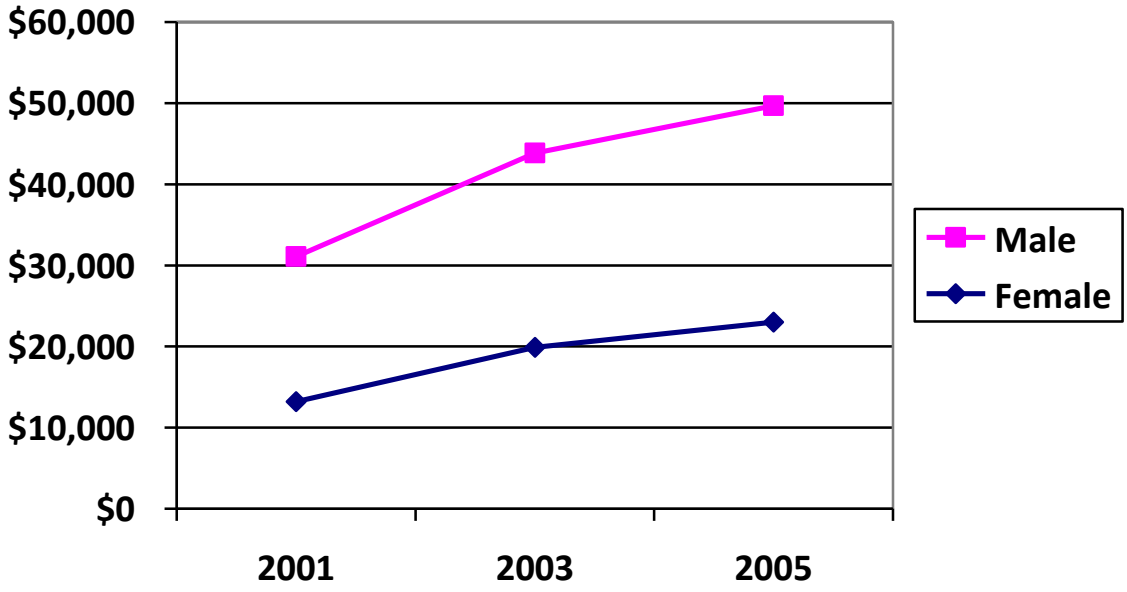


Figure 4

Earnings by Gender

Further discussion of gender differences is provided in Chapter 5 of this study.

Earnings by field of study. Naturally, earnings by field of study vary substantially and account to some degree for the differences seen in gender. In addition, the impact of a Certificate or an Associate's of Applied Science degree will vary among fields of study. For example, a student in the field of diesel technology may take a few classes, demonstrate strong aptitude and show great potential and an employer may hire him or her out of the program before completing their degree. On the other hand, a student in health occupations must complete the degree program before being permitted to sit for the respective licensure exam to be eligible for employment in that field. Table 11 provides details on earnings by field of study for students included in this research. Fields of study with three or fewer students were omitted to ensure confidentiality.

Table 13

Earnings by Field of Study

Field of Study	Year	n	Annual Earnings	Percentage Increase from 2001
Agriculture	2001	12	$11,838.48	
	2003	13	$19,708.60	66%
	2005	12	$27,443.88	132%
Communication	2001	13	$ 8,774.36	
Technology	2003	9	$17,125.40	95%
	2005	9	$14,384.84	64%
Computer Information	2001	61	$15,170.68	
Systems	2003	62	$22,861.28	51%
	2005	65	$24,288.76	60%
Engineering	2001	19	$13,599.16	
Technologies	2003	17	$36,453.64	168%
	2005	16	$39,560.64	191%
Family and Consumer	2001	79	$15,894.52	
Sciences	2003	103	$17,478.64	10%
	2005	94	$17,557.40	10%
Law Enforcement, Fire	2001	10	$19,251.80	
Fighting and Protective	2003	8	$28,642.12	66%
Services	2005	11	$27,182.68	39%

Mechanic and	2001	27	$14,910.36	
Repair Technologies	2003	36	$25,249.48	69%
	2005	30	$27,778.20	86%
Health	2001	63	$12,046.12	
Professions	2003	103	$23,213.16	93%
	2005	94	$28,229.44	134%
Business, Management	2001	85	$12,948.60	37%
and Marketing	2003	92	$17,769.40	37%
	2005	87	$25,230.64	95%

All fields of study posted significant increases in earnings one year out of college, and all but two degree fields continued this trend three years out of college. Students in the degree fields of communication technology and law enforcement, fire fighting and protective services actually saw a decrease in earnings between their first year out of college and third year out of college. The reasons for these anomalies could be varied. These degree fields represented the smallest student populations in this study, therefore, one or two students transitioning to part-time work would have a significant impact on the average salary. Another possibility might be that these former students chose to take a different job with a short-term pay cut in exchange for greater benefits and future growth potential. In the case of law enforcement, fire fighting and protective services, the just over 5% decrease in salary from 2001 to 2003 was less than the adjustment for inflation. These students actually saw a nominal increase in their earnings that was more than offset by inflation. Individuals working in this field would likely be employed by city and

county governments that have experience tight budgets for the last several years with pay increases for their employees few and far between.

Summary

Although the data show that additional hours in an occupational program for a specific individual in an unspecified program cannot be shown to guarantee increases in earnings, it is clear that in general, additional occupational education pays substantial dividends for most. The affects of this added education differ by gender and program, with some programs showing very modest gains, and others demonstrating earning growth in excess of 100%.

Fields of study often are chosen with little regard to earning potential, but rather because of aptitude and fondness for a particular type of work. For example, most students entering the field of family and consumer sciences, specifically, early childhood development know that this is not a career that will make them rich. However, because of their love for children and/or the ability to be with their own children while they are working, this is their chosen field and the result is a positive impact on their quality of life rather than their standard of living.

Chapter five, Summary, Discussion and Recommendations, includes an overview of the research and study. The overview reviews America's higher education system and, the impact of the current economic condition through the lens of Human Capital Theory. Chapter five then reviews the study's purpose statement, research question and null hypotheses, with an analysis of each. The major findings are then discussed in detail by null hypotheses, with a discussion of application to Human Capital Theory. Conclusions

are developed and opportunities for future research are explored. The chapter wraps up with concluding remarks.

Chapter 5

Summary, Discussion, and Recommendations

This chapter is organized into eight sections. Sections one through three present an overview of the study, a description of the research design, and an explanation of the data. The fourth section summarizes major findings of the study followed by a discussion of these findings in relationship to the current bodies of literature. Sections five and six review the conclusions which can be drawn from the current study. The chapter continues with recommendations for future research in section seven followed by concluding remarks.

In Missouri, only 30% of the state's 2.9 million working age adults (25-64 year olds) hold at least a two-year degree, according to 2000 Census data. The numbers are better for young adults, with 33% of Missouri's 25- to 34-year-olds holding degrees. Still, the overall percentage is far below the goal of 60% degree attainment as set forth by the Lumina Foundation for Higher Education. In fact, a 60% rate in Missouri today would represent more than 1.7 million degree holders – a huge increase over the 867,000 reflected in the 2000 Census data (Matthews, 2009). The Foundation's goal is not an arbitrary one, but is based on data that show that the new jobs being created in the United States require some level of postsecondary education, and that many of our economic competitors on the international scene have levels of college attainment approaching this percentage – i.e. Canada 55%, Japan 54%, and South Korea 53% (Matthews, 2009).

These findings indicate that Missouri faces a major challenge as it works to attract more students into the ranks of college completers. It is imperative that a stronger case be made with both prospective college students and with state policymakers that additional

education will pay significant economic returns to both the recipient and to the state. The findings of this study provide a major contribution to making that case for those in occupational programs in community colleges.

Overview

Socrates once said, "One thing only I know, and that is that I know nothing" (Durant, 1933). It's a common feeling for anyone who tries to make sense of the American postsecondary education system.

In 2010, nearly one trillion dollars were spent on education in the United States. That is a tremendous amount of money, approaching 10% of the overall economy (US Department of Education, 2011). The human capital model views education as an investment, which creates a return in excess of the cost of attendance. If this is the case, what is the return to this one trillion dollar investment? While the costs associated with education are fairly simple to calculate, the benefits of education are more difficult to capture and isolate to the educational experience.

What is the expected or desired return from these education dollars? Much of what a nation, state, or community wants from its education system has nothing to do with money. Consider the social and cultural benefits, for instance: networking, learning social rules and norms and understanding civic roles. Some of the fiscal benefits are indirect; evidence exists that the higher the level of education, the less likely a person will be incarcerated during their lifetime. Evidence also exists that the higher the level of education, the less likely an individual is to smoke, decreasing dependence on healthcare. But some of the most sought-after benefits from education are economic. (CCBenefits, n.d.). Specialized knowledge and technical skills for example, lead to higher incomes,

greater productivity and generation of valuable ideas. These benefits are vital to national, state, and community growth. In recent years, Americans have become more aware than ever of the impact of education on quality of life and standard of living, particularly as freshly educated workers from China and India compete for good jobs once held in the United States. Many of the benefits can be quantified in additional tax revenues from higher salaries earned and lower unemployment rates which leads to a healthier, more robust economy.

In light of the recent economic recession and high unemployment rates, the nation's community colleges are gaining more attention than ever. With their open-door policy, developmental education opportunities, and broad spectrum of occupational programming, they provide higher education opportunities for thousands of individuals every year who would otherwise not be able to pursue their educational ambitions. The power of higher education has become more apparent than ever. In 2010, the national unemployment rates stayed near ten percent and the Missouri unemployment rates hovered in the same range (Bureau of Economic Analysis [BEA], n.d.). The recession of 2008 demonstrated clearly, however, the clear relationship between education and unemployment, with those holdings a college degree experiencing unemployment at half the rate of those with a high school diploma or less.

On December 5, 2010, Scott Pelley, a reporter for 60 Minutes interviewed Ben Bernanke, Chair of the Federal Reserve, to discuss the state of the economy and the Federal Reserve's plan to buy back $600 billion in Treasury Securities. During the interview, Mr. Pelley asked Chairman Bernanke, "The gap between rich and poor in this country has never been greater. In fact, we have the biggest income disparity gap of any

industrialized country in the world and I wonder where you think this is taking America?" In response, Chairman Bernanke stated,

> It is a very bad development, it's creating two societies and it is based very much, I think, on education differences. Concerning the unemployment rate, (9.5% national unemployment) if you're a college graduate the unemployment rate is five percent, if you are a high school graduate, it is ten percent or more. It is a very big difference and it leads to an unequal society and a society which doesn't have the cohesiveness we like to see. (Frager, 2010)

This sentiment is shared with Belfield and Bailey (2011) who state, "Education increases the likelihood that a person will be employed as well as have a higher wage" (p.49).

The traditional unemployment rate understates current labor market concerns and does not take into consideration the huge growth in underemployment (involuntary part-time work) and a substantial increase in discouraged workers who are no longer counted in the labor force (Katz, 2010). The United States is facing an enormous job creation challenge even if there is a strong economic recovery. Unemployment increases during the Great Recession have had a greater impact on men, workers from goods-producing industries, young workers, and non-college workers. Over the last 20 years there has been a rapid increase in the rate of technological change and a rise in offshoring that has lead to a divergence of the United States labor market with a strong growth in high-end, high-skill jobs and in traditionally lower-wage jobs in the in-person service sector, but particularly weak demand for traditional middle-class jobs such as manufacturing production jobs and middle management positions (Autor, Katz, & Kearney 2006, 2008 as cited in Katz, 2010). The United States labor market is likely to have continuous

structural unemployment problems as a result of disparity between job seekers and job openings even in the face of a strong economic recovery. The long-term unemployed and permanently displaced workers are the most likely to face difficulties gaining suitable new employment and face several years of lower earnings and financial difficulties without further education and training. Longer-term trends of rising inequality and job market discrimination worsen adjustment problems. "This dismal state of the youth labor market requires direct action in providing more employment opportunities for distressed areas, making sure all young people have the resources to gain post-secondary education and appropriate guidance for making sensible educational choices" (Katz, 2010, p. 8).

The economic returns to further education and training at community colleges that lead to degrees and certificates are also high for dislocated workers and young workers (Jacobson et al., 2005). There is an abundance of evidence that well-functioning job training and education programs improve the labor market and social outcomes of disadvantaged youth and other citizens.

What role does the community college play in today's economic recovery and in providing job training appropriate to personal economic well-being? Beyond providing open-door access to citizens who wish to pursue their higher education dream, the community college provides occupational education opportunities for individuals seeking short-term, one- to two-years, training providing them with skills and knowledge needed for specialized jobs. This study focuses on pecuniary benefits by comparing the earnings of students finishing college coursework or programs in occupational education with earnings of the same student one and three years post-college.

Purpose Statement, Research Questions, and Null Hypotheses

The purpose of this study was to determine how the skills, knowledge, and credentials obtained in community college occupational courses and the completion of occupational degrees in Missouri affect employability and future earnings. As a result, a valid source of accountability data was produced that provides evidence to stakeholders throughout the State, community, and institutions about whether the investment in higher education provides a positive rate of return, and further validates the important skill development role of the community college. The research questions found in Table 14 served as a guide in this study and indicates the statistical method of analysis utilized to address each research question.

Table 14

Data and Analyses Summary by Research Question

Research Question	Analysis
RQ1: Do the number of hours completed while pursuing occupational studies at a Missouri community college influence earnings one year after leaving the community college?	Simple Linear Regression
RQ2: Do the number of hours completed while pursuing occupational studies at a Missouri community college influence earnings three years after leaving the community college?	Simple Linear Regression
RQ3: For students completing 12 hours or more of occupational studies, but less than a certificate or Associate's of Applied Science degree at a Missouri community college, is there a significant difference in earnings their last year of college and one year out of college?	Paired t-test
RQ4:For students completing 12 hours or more of occupational studies, but less than a certificate or Associate's of Applied Science degree at a Missouri community college, is there a significant difference in earnings their	Paired t-test

last year of college and three years out of college?	
RQ5:For students completing an occupational certificate at a Missouri community college, is there a significant difference in earnings their last year of college and one year out of college?	Paired t-test
RQ6: For students completing an occupational certificate at a Missouri community college, is there a significant difference in earnings their last year of college and three years out of college?	Paired t-test
RQ7: For students completing an Associate's of Applied Science degree at a Missouri community college, is there a significant difference in earnings their last year of college and one year out of college?	Paired t-test
RQ8: For student completing an Associate's of Applied Science degree at a Missouri community college, is there a significant difference in earnings their last year of college and three years out of college?	Paired t-test

Each of these research questions were restated as a null hypothesis and tested as part of the study. The following null hypotheses were formulated for the purposes of this research

HO1: There is no significant correlation between the number of hours completed while pursuing occupational studies at a Missouri community college and earnings one year after leaving the community college.

HO2: There is no significant correlation between the number of hours completed while pursuing occupational studies at a Missouri community college and earnings three years after leaving the community college.

HO3: For students completing 12 hours or more of occupational studies, but less than a Certificate or Associate's of Applied Science degree at a Missouri community college, there is no significant difference in earnings their last year of college and one year out of college.

HO4: For students completing 12 hours or more of occupational studies, but less than a Certificate or Associate's of Applied Science degree at a Missouri community college, there is no significant difference in earnings their last year of college and three years out of college.

HO5: For students completing an occupational certificate at a Missouri community college there is no significant difference in earnings their last year of college and one year out of college.

HO6: For students completing an occupational certificate at a Missouri community college there is no significant difference in earnings their last year of college and three years out of college.

HO7: For students completing an Associate's of Applied Science degree at a Missouri community college these is no significant difference in earnings their last year of college and one year out of college.

HO8: For students completing an Associate's of Applied Science degree at a Missouri community college these is no significant difference in earnings their last year of college and three years out of college.

Review of the Methodology

Student databases were obtained through the Offices of Institutional Research at two Missouri community colleges; one an urban college in a population area of approximately 425,000, and the second a rural college in a community of 23,000 and a county of 60,000. Unemployment Wage Data for the State of Missouri were accessed through the Department of Economics at the University of Missouri—Columbia, the data warehouse for unemployment wage database for the State of Missouri.

Wage data were adjusted using the Gross Domestic Product, Implicit Price Deflator to normalize the data for inflation. Data for students meeting the criteria of the study outlined in Chapter Three at the two community colleges initially were compiled and manipulated in a Microsoft Excel spreadsheet and subsequently imported into an SAS file where they were screened for outliers. As Table 14 above indicates, to answer the first two research questions, data were analyzed using regression analysis, with education used as a predictor of earnings. The regression analysis provided a measure of the amount of influence education had as a predictor of future earnings.

Research questions three through eight were analyzed using paired t tests. The paired t tests tested for significant differences in students' salaries their last year in

college to their salaries one and three years out of college. Paired t test computes the difference between the two variables for each case, and tests to see if the average difference is significantly different than zero.

Major Findings

Completion of this study has yielded important information for those enrolled in occupational studies that is consistent with previous work, and supportive of the premises of Human Capital Theory. Most importantly this study provides data specific to Missouri community colleges. While there is an abundance of research that track the economic benefits of a baccalaureate degree, very few studies exist that track the impact of the community college occupational education experience and none that exist for the state of Missouri. The findings of this study validate the belief that education can be viewed as an investment that has a return over the cost of attendance that can be measured through an increase in future earnings.

Statistical analysis revealed a significant increase in earnings, regardless of the level of completion, both one and three years post-college. Females tend to have a greater percentage increase in earnings for both the one and three year time frames. However, men showed higher average earnings than women. This appears largely to be a reflection of the gender mix within programs of study, with far more males in agriculture, computer and information systems and engineering technologies, which provided the highest entering salaries.

As expected, the increase in earnings varied significantly between occupational fields of study. Increase in earnings ranged from a low of 10% for students of Family and Consumer Sciences to an increase of 191% for students of Engineering Technologies,

three years out of college. The average growth in earnings for all students included in the study was 86% in real dollars three years out of college. Further discussion of these and other findings has been organized by null hypotheses and is provided below.

Null hypothesis one. The first null hypothesis, which states that there is no significant correlation between the number of hours completed while pursuing occupational studies at a Missouri community college and earnings one year after leaving the community college was supported. A simple linear regression was calculated to predict students' salary one year out of college based on the number of occupational hours completed at a Missouri community college. The results of the regression equation were not significant ($F(1,274) = 0.04$, $p > .05$) with an R squared of -0.0035. The number of hours completed at a Missouri community college cannot be used to predict income one year out of college.

These findings would indicate that there are many variables in place that play a role in how occupational education translates into future earnings. These variables include field of study, labor market supply and demand, aptitude of the student, and college success.

In essence, this hypothesis contends that the greater the number of credit hours completed at a Missouri community college the greater the levels of future income. This would follow the rationale implying that the higher the level of educational achievement, the greater the economic returns. In addition to the variables listed above, several factors may have an impact on the outcomes of this research question. Students were filtered using the criteria of completing 12 or more credit hours in occupational education, however, some students pursuing occupational education degrees may be returning to

college after completing a fine arts degree or may have changed their major after completing several hours toward an Associate's of Arts degree. While these students may represent a minority of the sample used in this study, the impact of the additional credit hours completed by these students has the potential to skew the results. To control for these factors is outside the scope of the study. To summarize, however, it cannot be said that taking additional hours in a technical program at a Missouri community college will necessarily result in higher wages.

Null hypothesis two. The second null hypothesis also uses a simple linear regression analysis to determine the relationship between the number of occupational hours completed at a Missouri community college and earnings three years after leaving the community college. Null Hypothesis two was also supported. Like null hypothesis one, a simple linear regression was calculated to predict students' salary three years out of college based on the number of occupational hours completed at a Missouri community college. The regression equation was not significant ($F(1,274) = 0.05$, $p > .05$) with an R squared of 0.0002. Again, the number of occupational hours completed at a Missouri community college cannot be used to predict income three years out of college for the same reasons outlined in the discussion of Null Hypothesis One. Economic returns on education are a reflection of a combination of factors that are reflective of the aptitudes, choices and commitments of each individual student and cannot be predicted in aggregate. Additional analysis outside the scope of this study, would be required to isolate the variables that serve as the best predictors of future earnings and this could reasonably be done. (That is, however, outside the scope of this study.)

Null hypothesis three. Null hypothesis three states that for students completing 12 hours or more of occupational studies, but less than a Certificate or Associate's of Applied Science degree at a Missouri community college, there is no significant difference in earnings between their last year of college and one year out of college. A paired-samples t test was calculated to compare the students' mean salary their last year in college and the students' salary one year out of college. There was a significant increase from the students' earnings their last year in college to their earnings one year out of college ($t(149) = 6.08$, $p < .05$). Null hypothesis three was rejected.

There can be multiple reasons why students end their college career before completing a degree. In occupational studies, one scenario is that students may take the classes that they find the most beneficial to gain the level of skill and knowledge they need to further their career. In many cases employers identify promising students and hire them before they have the opportunity to complete their degree. In her role as a community college faculty member, the researcher has had colleagues in high demand occupational areas comment numerous times about how difficult it is to keep students enrolled through the entire program, because once they acquire key job-related skills, they are immediately hired into full-time work. This would indicate that these employers value the skills and knowledge developed by the community college experience while the certificate or degree is of secondary importance. For some career paths a few hours of occupational education training may be enough to open doors for various employment opportunities.

This study revealed that students completing 12 or more hours of occupational studies had average annual earnings of $19,878.60 ($n = 194$) one year out of college.

This is an increase of 50% over their average annual earnings of $13,208.92 (n = 204) their last year in college.

Belfield and Bailey (2011) reporting on studies of wage earnings stated, "The average earnings gain for attending community college without obtaining a credential is estimated at nine percent for males and ten percent for females" (p. 30). The studies referenced, however, looked at all community college enrollment not just occupational students.

Null hypothesis four. Null hypothesis four states that for students completing 12 hours or more of occupational studies, but less than a Certificate or Associate's of Applied Science degree at a Missouri community college, there is no significant difference in earnings their last year of college and three years out of college. A Paired-samples t test showed that there was a significant increase from the students' last year in college to three years out of college ($t(72) = 7.83$, $p < .05$). Null hypothesis four was rejected.

As stated above, students have many reasons for ending their college experience before completing a certificate or degree. In occupational fields, the skills and knowledge obtained through the educational experience may be enough to warrant an increase in earnings. In a society where it is becoming increasingly difficult to keep up with the rapid technological changes and the new fields of study that are constantly evolving, it is more important than ever to possess the knowledge and skills necessary to compete in today's workforce. Employers complain that they have difficulty finding workers with the needed skills for specific areas and once a student acquires those skills, he or she becomes a valuable asset. For students completing 12 or more hours of occupational studies, but less

than a certificate or degree, earnings were $23,014.24 (n = 192) three years after college. Evidence is, then, that the benefits of additional hours of career education continue to pay dividends with each year out of college, though the most significant benefit comes at the time of initial employment. This is a 74% increase over average earnings their last year in college and a 16% increase in earnings from their first year out of college. All earnings are reported in real dollars.

Null hypothesis five. Null hypothesis five states that for students completing an occupational certificate at a Missouri community college there is no significant difference in earnings their last year of college and one year out of college. Null hypothesis five also used a paired-samples t test to compare students' mean salary their last year in college with their salary one year out of college. There was a significant increase from the students' last year in college to one year out of college ($t(14) = 2.74$, $p < .05$). Null hypothesis five was rejected.

Occupational certificates typically require a minimum of 30 credit hours of course work that focus specifically on employment competencies. Certificate programs allow students to focus almost exclusively on courses within a chosen discipline without the general education course work that accompanies longer degree programs. The certificate completers in this study showed higher average earnings ($17,870.80, n = 19) their last year in school than either of the other two student sub-groups, but also consisted of the smallest number of participants. Average earnings for this group of students increased by 34% one year out of college, showing average annual earnings of $23,966.88 (n = 29).

Several certificate programs prepare students for employment in health occupation fields and some health related certificate programs, such as practical nursing

and surgical technology, prepare students for licensure exams required for employment in certain occupations. According to the American Association of Community Colleges (2011), the majority of health care professionals are educated at community colleges with many requiring only an occupational certificate. Because of high demand in the allied health professions, these occupations often provide comparatively high wages for the amount of education required, providing some explanation for these findings.

A possible explanation for the relatively high "last year of college" wages for this group is that many students in health occupations programs are already employed in healthcare positions as certified nursing aides, etc., and use the certificate programs to upgrade to a high level of certification. This explanation is partly conjecture in the case of this study, and deserves further research.

Null hypothesis six. Null hypothesis six also focuses on future earnings of students completing an occupational certificate and states that for students completing an occupational certificate at a Missouri community college there is no significant difference in earnings their last year of college and three years out of college. Again, a paired samples t test was calculated to compare the mean salary of students their last year in college with their mean salary three years out of college. Again, in this case, there was a significant increase in average earnings ($t(14) = 1.87$, $p < .05$). Null hypothesis six was rejected.

Average annual earnings for students earning a certificate were 49% higher three years out of school than their last year in school ($26,661.64, $n = 27$). Again, student earnings have been adjusted for inflation.

According to Jepsen, et.al. (2009) :

> A few studies look at the effects of certificates on labor-market outcomes, but these results are often inconclusive and are based on small samples of certificate recipients drawn from national longitudinal surveys. Given the growing importance of these awards and of community colleges in general, it seems important to document the economic returns associated with this form of human capital investment. (p. 2)

This study provides needed documentation, and fills an important gap in the literature concerning the economic return of shorter term certificate programs. As the cost of higher education continues to rise and the burden of this expense shifts toward the students, it seems logical that individuals will be looking for ways to minimize their investment while maximizing the return. Certificate programs requiring only one year of college may be a wise choice. Further study does need to be done, however, to determine if the relatively lower return on investment (smaller percentage increase for this group) was unique to the population studied in this research, or is characteristic of those completing certificate programs.

Null hypothesis seven. The majority of occupational programs at Missouri's community college are developed as Associate's of Applied Science degrees. Null hypothesis seven states that for students completing an Associate's of Applied Science degree at a Missouri community college there is no significant difference in earnings their last year of college and one year out of college. A paired samples t test was calculated to compare the mean salary of students completing an Associate's of Applied Science degree their last year in college with their salary one year out of college. This comparison also demonstrated a significant increase in earnings from the students' last

year in college to their earnings one year out of college ($t(67) = 6.14$, $p < .05$). Null hypothesis seven was rejected.

Students earning an Associate's of Applied Science degree posted an increase in earnings of 85%, ($28,637.44, n=103) from their last year in college to their first full-year in the labor force. This evidence strongly reaffirms the economic benefits of occupational education. According to the Carnevale, Smith and Strohl (2010) at least 63% of the 46.8 million job openings expected in the United States between 2006-2018 will require some postsecondary education. Many of these employment opportunities will not require a baccalaureate degree (Carnevale, Strohl, & Smith, 2009). Twenty-six percent of the new jobs created will come from the health care industry growing by more than four-million new jobs. Based on this information, it is evident that future employability will be contingent upon post-secondary education – much of that at the associate degree level. Belfield and Bailey (2011) note that "The earnings gains and benefits are the full set of advantages from attending community college. It is against these full benefits that enrollees should consider the cost of attendance when deciding on whether to enroll, and for how long" (p. 47).

Null hypothesis eight. Students earning an Associate's of Applied Science degree, on average, earned $28,637.44 three years out of college. This is an increase of 119% over their average annual earnings their last year in college. As discussed in Chapter Two, several different studies have been conducted to determine the relationship between education and subsequent earnings. Jepsen, et.al. (2009) studied the labor-market returns for students earning associate's degrees from the Kentucky community college system and found labor market returns of nearly 40% for women and returns of

18-20% for men. The findings from this research are consistent with this previous research indicating educational attainment is rewarded monetarily in the labor force.

Null hypothesis eight anticipated no significant difference in earnings for students' last year of college and three years out of college. Using a paired-samples t test to compare the mean salary of students completing an Associate's of Applied Science degree their last year in college with their salary three years out of college, this hypothesis was rejected. The test revealed a significant increase in earnings from the students' last year in college to their earnings three years out of college ($t(57) = 8.30$, $p < .05$).

Table 15 summarizes the findings for each null hypothesis and provides the statistical data used to make each judgment.

Table 15

Summary by Null Hypothesis

Null Hypothesis	Results	Methods	Findings
HO1	Retained	Simple Linear Regression	(F(1,274) = 0.04, p > .05)
HO2	Retained	Simple Linear Regression	(F(1,274) = 0.05, p > .05)
HO3	Rejected	Paired t-test	(t(149) = 6.08, p < .05)
HO4	Rejected	Paired t test	(t(72) = 7.83, p < .05)
HO5	Rejected	Paired t test	(t(14) = 2.74, p .05)
HO6	Rejected	Paired t test	(t(14) = 1.87, p < 0.05)
HO7	Rejected	Paired t test	(t(67) = 6.14, p < .05)
HO8	Rejected	Paired t test	(t(57) = 8.30. p < .05)

Support for Human Capital Theory.

According to Becker (1964) and Mincer,(1962), human capital arises out of any activity able to raise individual worker productivity. Human Capital Theory suggests that an investment in human capital, either through formal education or informal training, will be rewarded in higher future earnings. On the aggregate, investment in human capital creates a labor force required for economic growth. In order to make the investment in human capital, individuals weigh the direct and indirect costs of this investment and compare this investment with the potential return. The results of this study are largely supportive of the theoretical conclusions of Human Capital Theory, to the degree that this research tested them. The study suggests that additional hours, in and of themselves, cannot be assumed to result in higher earnings without consideration of other factors such

as study ability, course completion, and program of study. When considered in aggregate, however, additional hours of occupational education did result in higher earnings, and completion of an associate's degree (the highest level of education tested) resulted in a greater increase in earnings than did random hours or certificate completion. Additionally, the relatively high rates of return on investment (ranging from 34% a year after completing a certificate to 119% three years after completing an associate's degree) would indicate that, given the comparatively low costs of community college enrollment, both the costs of attendance and the opportunity costs in lost wages are well worth the investment for the students who made them.

Conclusions

According to the Lunima Foundation's *A Stronger Nation Through Higher Education* report (Matthews, 2009):

> College attainment is increasingly important to the U.S. economy as the workforce demands education and training that properly prepares our students for success in the global knowledge economy. The implications of this trend can scarcely be overstated. For generations, the American economy has created large numbers of middle class jobs that required no college-level knowledge or skills. Because of global competition, these jobs are rapidly disappearing. Lower-skill jobs do exist in the U.S., of course, but Americans who hold them are not likely to enter or remain in the middle class. These workers are less likely to have access to quality health care, save for retirement, or assure their children access to higher education. The consequences of failing to reach the middle-class are increasingly

> severe, and access to middle class jobs is now mostly dependent on completing some form of postsecondary education. (p. 1)

This study provides the first empirical evidence of the labor-market returns to the State of Missouri community college occupational education experience. The increase in earnings was significant for each sub-group of students researched. The methods used in this study cannot establish causality, however the findings are compelling.

As Belfield and Bailey (2011) stated in their recent review of literature on the economic benefits of attending a community college:

> If community college attendance increases the probability of employment (as seems likely if attendance increases productivity), then the earnings gains should be adjusted upward to account for the higher probability of being employed. Similarly, if community college attendance increases the probability of receiving fringe benefits at work (such as a health plan or pension contribution), this too should be counted as part of the full earnings gain…It may be that these benefits are as large as the earnings gains. (p. 49)

Community colleges are diverse institutions of higher education that offer immense opportunities for individuals to gain human capital. The research in this report has provided evidence for all stakeholders in the State of Missouri that occupational education obtained from two of Missouri's community colleges is rewarded with higher earnings one and three years out of college. It provides evidence for policymakers that the investment made in community college occupational education is indeed an investment; one that yields additional tax revenue throughout students' lifetime. This study does not compare increases in earnings to that realized by students who complete

high school alone, or those who complete a baccalaureate degree, but it is difficult to imagine those with only high school degrees showing this degree of wage increase, or much greater gains from many baccalaureate degrees than some of these occupational programs realize. Since states often invest significantly less in their per-student commitment to community college programs, these findings suggest that state policymakers should consider the possibility that the state receives a much greater return on investment for its community college appropriation, than it does for investments in many baccalaureate programs.

The state must also consider earnings that weren't captured by this research -- earnings from students becoming entrepreneurs because of their educational experience; students who are willing to take the risk to create a business that puts their skills to work with the potential for growth and job creation for others. Many of the occupational disciplines lend themselves to small business development, and that earning power was not captured by this study, since it relied on wages reported by other employers.

The Lumina Foundation (Matthews, 2009) recommended one way to bolster the nation's community colleges and improve student success rates is to align programs to workforce needs. Data from this study do indicate that program of study is very important to rates of return on the educational investment, and alignment to workforce needs may be correlated to this observation. As the number of dislocated workers rises, programs to support retraining and skill development of these individuals are vital. Developing advisory boards made up of local business leaders and major employers is a good way for community colleges to understand emerging developments and workforce needs within their community. Working collaboratively with the local K-12 systems is another way to

strengthen community college occupational programs. Encouraging open two-way communication between high school counselors and occupational educators and administrators can benefit students by providing them with realistic expectations of occupational course offerings and degrees. It can benefit the community college by helping them understand the needs of future students.

This study also demonstrates how critical broad availability of unemployment insurance wage information is to educational institutions, if they are expected by the public and state/federal policymakers to provide convincing accountability data. Employees and employer surveys by institutions produce low returns and unreliable results, and when this valuable source of wage information is available, it is very poor public policy to restrict its use by responsible institutional research offices.

Opportunities for Future Research.

As is often the case with research, the findings of this study raised many more questions than they answered. In a number of ways, these questions become as important to the value of the study as are the actual statistical results. Considering the conclusions and implications from the findings of this study, following are opportunities for further research: These recommendations serve as additional observations about the value and findings of this study.

1. A study should be conducted that tracks earnings five and ten years after leaving the community college. Many times it takes several years for individuals to reap the monetary benefits of their occupational education experience. Returns on the investment in occupational education may mature at various points in time. In speaking with potential employers of students majoring in automotive trades,

these employers indicated that while they might not require a certificate or an AAS degree for entry level positions, they would favor employees with a certificate or an AAS degree in supervisory positions. This would indicate a growing wage differential between degree completers and non-degree completers five to ten years after leaving college.

2. A study should be conducted that tracks unemployment rates for high school graduates, and specifically compares them to rates for students completing 12 or more hours of occupational education, students completing an occupational certificate at a Missouri community college and students completing an Associate's of Science Degree at a Missouri community college. The 2008-2010 recession, brought to light the impact of a college degree on employability in a knowledge-based economy where the jobless rate hovers in the 10% range. The study of the impact on employability at high school level and various levels of occupational education completion would be informative.
3. A study should be conducted that tracks earnings by area of occupational study and degree level. As discussed earlier in this study, the broad spectrum of occupational degrees yields wide-ranging returns in the labor market. These wage differentials are largely determined by supply and demand and will vary over time. For example, health occupations are some of the most in-demand occupations due to an aging population and rapidly changing technology. A study focusing specifically on earning by occupation and level of completion would yield valuable insight.

4. A study should be conducted that tracks actual return on investment from the State's perspective, for students completing an occupational degree at a Missouri community college and students completing a bachelor's degree at Missouri's public college and universities. This study should take into consideration State support and subsidies for education as well as future earnings, specifically return on investment. Average annual community college tuition and fees are less than half those at public four-year colleges and universities and one-tenth those at private four-year colleges and universities. A study that calculates actual return on investment would provide beneficial information regarding the impact of the two degree levels. This study should be program specific, since averages will mask some of the important data related to education and earnings.
5. A study should be conducted that seeks to identify the socioeconomic benefits of the community college educational experience. This study provides quantitative evidence on the economic returns, however, there are other benefits that could only be captured through qualitative research. For example, did the educational experience result in a healthier lifestyle and/or increased community involvement, Results would provide additional evidence to determine overall impact of the community college occupational education experience and would test another postulate of Human Capital Theory—that individuals grow in a number of areas beyond actual wage increases.
6. A study should be conducted that focuses on the employer side of the equation; a study that seeks to determine what value employers put on the various aspects of the community college occupational education experience. Human Capital Theory

suggests that an investment in human capital results in increased productivity and that employers reward this higher level of productivity with higher wages. How do employers measure the return on investment, via higher wages, in association with higher productivity?

7. Even in economics, critics of Human Capital Theory point to the difficulty of measuring key concepts. Using a stepwise regression, a study should be conducted to isolate the best predictors of future earnings. As discussed earlier there may be several factors beyond additional hours of education (student ability, occupational degree, age, gender) that influence future earnings. Identifying the variables that serve as the best predictors would provide useful information and may serve to better advise prospective students about the value of additional education.
8. The results of this study provided evidence that females see a greater return on their investment in occupational education than their male counterparts, however, average earnings for females remain lower than males at every level of completion. A study should be conducted to determine what factors play a role in this wage differential. Are these differences a result of the gender gap, productivity differences, choices of occupation, or other workplace biases? Gender differences by program were evident in the data reviewed here, but this research did not attempt to examine wage changes within areas of study by gender. That study would be a natural extension of this research.
9. Additional research is required to seek further insight into the economic return to community college certificate completers. The research contained in this study as

well as previous research conducted on community college certificate completers was based on relatively small student samples. By looking at a larger sample from this pool of students and analyzing data by field of study, valuable information could be made available to prospective students.

10. Recommendation nine points immediately to another need – to expand this study to all community colleges within the state. The number of certificate completers was limited by the fact that only two colleges were involved in this study, and a statewide examination of the impact of occupational education would be useful.
11. Among those areas that a statewide replication of this study would address is the effect of ethnicity on future earnings resulting from additional occupational education. The colleges involved in this study were unusually homogeneous for American community colleges, while the state of Missouri offers an opportunity through its array of community colleges to include ethnicity as a variable. Further research is needed to determine if, like gender, ethnicity impacts future earnings as a result of further education.
12. Additional research is required that looks at post-college earnings and the impact of job related employment. Is the greatest impact on earnings a result of training is a specific area, or does it result simply from gaining more education? Should students who are employed in a job related to their community college occupational educational training expect higher average earnings than students who were not able to find a job related to their training. Isolating students who are employed in their field of training and determining the return on their investment would provide beneficial insight.

Concluding Remarks

Higher education has historically experienced significant increases in enrollment during times of economic recession and this predisposition has been heightened by the growing economic importance of postsecondary education in a knowledge based economy. Nationally, FTE enrollment grew 6% between 2009-2010. During this same time period, total state support for higher education declined from $78.3 billion to $74.8 billion, a decrease of almost 4.5%. An additional $2.5 billion in federal monies were made available to offset some of the decrease in state support, however, that left an additional $5 billion to fall on the shoulders of students in terms of net-tuition (State Higher Education Executive Officers, 2011). The Lumina Foundation indicated in its 2009 report that the United States is the only developed country that is not increasing its college completion rate –- and indication that other post-industrial nations are seeing the value of "educating" their way out of the Great Recession, while the U.S. is responding by significantly cutting support for education.

According to the State Higher Education FY 2010 report, educational appropriations reached a 25 year low of $6,454 per FTE. The student share of total education revenue to support higher education operations has grown steadily since the early 1980s. By FY 2010, net tuition made up over 40% of the revenue. As a result, the number of students incurring debt to finance their education continues to climb. For these students it is increasingly important to provide solid evidence on the economic returns to their investment in education.

Higher education in the United States is at a crossroads. According to Farnsworth (2010), "We have lost our standing as the best-educated population in the world, and are

rapidly giving up our position as the dominant economy." At the national, state and community levels the power and importance of education must come to the forefront. Education must be accessible and affordable and the impact of education must be communicated in a manner that resonates with individuals throughout the country.

The primary resource used to respond to inquiries on the potential earnings of graduates of various occupational programs have been reports from the U.S. Department of Labor and MERIC on the average earnings of people employed in specific occupational categories at the national, state, and county levels. While this information is valuable, it does not allow one to relate post-college earnings by participation in particular occupational programs, level of educational attainment, or number of years in the workforce.

This study provides compelling evidence on the economic benefits of the Missouri community college occupational education experience. For potential students intimidated by the thought of four years of college or for those who shy away from the college experience in general, the community college occupational experience provides open-door access to educational degrees, certificates and opportunities that can be completed in a short period of time and result in a significant improvement in standards of living. In addition to providing a career path, occupational education has the potential to engage students in the learning process while creating lifelong learners. The Lumina Foundation (Matthews, 2010) said it nicely:

> Analysis of economic growth shows that the vitality of economies depends less on "home runs" (such as securing a new manufacturing plant) than on the skills and

knowledge of the workforce. Talent is the key, and higher education is the lever for developing it. (p. 5)

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Appendix A

Degrees Offered by College One

Occupational programs offered by Community College One

Major	Degree
Accounting	AAS
Auto Collision Repair	AAS, CERT
Automotive Technology	AAS, CERT
Business and Marketing	AAS, CERT
Business Systems Technology	AAS, CERT
Computer/Info Technology	AAS, CERT
Computers and Networks	AAS
Construction Technology	AAS, CERT
Culinary Arts	AAS
Dental Assistant	AAS, CERT
Dental Hygiene	AAS
Diesel Technology	AAS, CERT
Drafting and Design Technology	AAS, CERT
Early Childhood Development	AAS, CERT
Electronic Media Production	AAS
Electronic Technology	AAS, CERT
Graphic Design Technology	AAS, CERT
Health Information Technology	AAS, CERT
Heating, Refrigeration and Air Conditioning	AAS, CERT

Hospitality Lodging Management	AAS
Hospitality Management	AAS
Industrial Electronics	AAS
Industrial Maintenance	AAS
Internet Application Development	AAS
Machine Tool Technology	AAS, CERT
Medical Record Technology	CERT
Occupational Therapy Assistant	AAS
Physical Therapy Assistant	AAS
Practical Nursing	AAS, CERT
Printing/Graphics Technology	AAS, CERT
Respiratory Therapy	AAS
Surgical Technology	CERT
Turf and Landscape Management	AAS, CERT
Welding Technology	AAS, CERT

Appendix B

Degree Offered by College Two

Occupational programs offered at Community College Two	
Major	Major
Accounting	AAS
Agriculture	AAS
Agriculture, Horticulture emphasis	AAS
Automotive Technology	AAS, CERT
Building Materials Merchandising	AAS
Business Management	AAS
CIS/Accounting	AAS
CIS/Programming	AAS
Computer Aided Drafting Technology	AAS
Criminal Justice	AAS
Dental Hygiene	AAS
Early Childhood Development	AAS
Electricity/Electronics	AAS, CERT
Industrial Maintenance	AAS, CERT
Machine Tool Technology	AAS, CERT
Marine Technology	AAS
Network Administration	AAS
Networking/PC Technician	AAS
Nursing, Practical	CERT

Nursing, Associate Degree	AAS
Occupational Education	AAS
Occupational Therapy Assistant	AAS
Radiologic Technology	AAS
Secretarial Science—Medical	AAS, CERT
Secretarial Science—Administration	AAS, CERT
Web Development	AAS
Welding Technology	CERT

Appendix C

Combined Student Database

Sex	Age	Ethnic	Cum Hrs	0Program	CIP	Degree	College
M	28	CA	24.00	AAS.ABR	47.0603	0	1
M	26	CA	12.00	AAS.ABR	47.0603	0	1
M	55	CA	77.00	AAS.ABR	47.0603	2	1
M	30	CA	47.00	AAS.ABR	47.0603	0	1
M	28	CA	34.00	AAS.ABR	47.0603	0	1
M	28	CA	22.00	AAS.ABR	47.0603	0	1
F	53	CA	64.00	AAS.ACC	52.0101	2	1
F	26	CA	16.00	AAS.ACC	52.0101	0	1
F	43	CA	44.00	AAS.ACC	52.0101	0	1
F	39	CA	71.00	AAS.ACC	52.0101	2	1
F	28	CA	16.00	AAS.ACC	52.0101	0	1
M	45	CA	70.00	AAS.ACC	52.0101	2	1
F	29	CA	70.00	AAS.ACC	52.0101	2	1
M	52	UK	32.00	AAS.ACC	52.0101	0	1
F	26	CA	12.00	AAS.ACC	52.0101	0	1
M	28	CA	41.00	AAS.AGR	1.0301	0	1
F	39	CA	51.00	AAS.AGR	1.0301	2	1
F	27	CA	31.00	AAS.AGR	1.0301	0	1
F	30	CA	80.00	AAS.AGR	1.0301	2	1
M	38	CA	51.00	AAS.AGR	1.0301	2	1
M	29	CA	76.00	AAS.AUM	47.0604	2	1
M	27	CA	21.00	AAS.AUM	47.0604	0	1
M	29	CA	72.00	AAS.AUM	47.0604	2	1
M	28	CA	70.00	AAS.AUM	47.0604	2	1
M	26	CA	15.00	AAS.AUM	47.0604	0	1
M	42	AS	76.00	AAS.AUM	47.0604	2	1
F	27	CA	24.00	AAS.BUS	52.0201	0	1
M	28	CA	55.00	AAS.BUS	52.0201	2	1
F	26	CA	17.00	AAS.BUS	52.0201	0	1
F	27	CA	41.00	AAS.BUS	52.0201	0	1
F	29	CA	19.00	AAS.BUS	52.0201	0	1
M	27	CA	48.00	AAS.BUS	52.0201	2	1
F	30	CA	54.00	AAS.BUS	52.0201	0	1
M	28	CA	38.00	AAS.BUS	52.0201	0	1
F	27	CA	30.00	AAS.BUS	52.0201	0	1
M	49	CA	26.00	AAS.BUS	52.0201	0	1
F	44	CA	73.00	AAS.BUS	52.0201	0	1

M	30	CA	53.00	AAS.BUS	52.0201	2	1
M	27	CA	18.00	AAS.BUS	52.0201	0	1
M	35	CA	33.00	AAS.BUS	52.0201	0	1
F	26	CA	18.00	AAS.BUS	52.0201	0	1
F	31	CA	67.00	AAS.BUS	52.0201	2	1
F	27	CA	66.00	AAS.BUS	52.0201	2	1
F	45	CA	65.00	AAS.BUS	52.0201	2	1
M	27	CA	68.00	AAS.BUS	52.0201	0	1
M	29	OR	24.00	AAS.BUS	52.0201	0	1
M	30	CA	63.00	AAS.BUS	52.0201	2	1
F	27	CA	24.00	AAS.BUS	52.0201	0	1
M	33	CA	43.00	AAS.BUS	52.0201	2	1
F	27	CA	31.00	AAS.BUS	52.0201	0	1
F	26	CA	35.00	AAS.BUS	52.0201	0	1
F	30	CA	92.00	AAS.BUS	52.0201	2	1
F	30	CA	74.00	AAS.CIT	11.0101	0	1
M	50	CA	49.00	AAS.CIT	11.0101	2	1
M	42	CA	13.00	AAS.CIT	11.0101	0	1
M	26	CA	15.00	AAS.CIT	11.0101	0	1
F	57	CA	59.00	AAS.CIT	11.0101	0	1
F	40	CA	56.00	AAS.CIT	11.0101	2	1
M	28	CA	77.00	AAS.CIT	11.0101	2	1
F	28	CA	18.00	AAS.CIT	11.0101	0	1
M	30	CA	44.00	AAS.CIT	11.0101	2	1
M	27	CA	29.00	AAS.CIT	11.0101	0	1
M	52	AS	29.00	AAS.CIT	11.0101	2	1
M	35	CA	13.00	AAS.CIT	11.0101	0	1
M	37	CA	51.00	AAS.CIT	11.0101	2	1
M	28	CA	52.00	AAS.CIT	11.0101	0	1
M	29	CA	78.00	AAS.CIT	11.0101	2	1
M	51	CA	46.00	AAS.CIT	11.0101	0	1
M	29	CA	23.00	AAS.CIT	11.0101	0	1
M	26	CA	22.00	AAS.CST	46.0201	0	1
M	27	CA	14.00	AAS.CST	46.0201	0	1
M	28	CA	37.00	AAS.CST	46.0201	0	1
M	60	CA	69.00	AAS.CST	46.0201	0	1
F	27	CA	12.00	AAS.CST	46.0201	0	1
M	26	CA	26.00	AAS.CUL	12.0503	0	1
M	31	CA	39.00	AAS.CUL	12.0503	0	1
F	35	CA	99.00	AAS.DDT	15.1302	2	1
M	30	CA	31.00	AAS.DDT	15.1302	0	1
M	27	CA	16.00	AAS.DDT	15.1302	0	1

M	28	CA	70.00	AAS.DDT	15.1301	2	1
M	30	CA	55.00	AAS.DDT	15.1301	0	1
M	55	CA	13.00	AAS.DDT	15.1301	0	1
M	48	CA	28.00	AAS.DDT	15.1301	0	1
F	29	CA	78.00	AAS.DDT	15.1301	2	1
F	31	CA	62.00	AAS.DDT	15.1301	2	1
M	55	CA	59.00	AAS.DSL	47.0605	2	1
M	27	CA	14.00	AAS.DSL	47.0605	0	1
M	32	IN	27.00	AAS.DSL	47.0605	0	1
M	28	CA	37.00	AAS.DSL	47.0605	0	1
M	28	CA	69.00	AAS.DSL	47.0605	0	1
F	50	CA	68.00	AAS.ECD	19.0706	2	1
F	46	CA	59.00	AAS.ECD	19.0706	2	1
F	49	CA	73.00	AAS.ECD	19.0706	2	1
F	27	CA	28.00	AAS.ECD	19.0706	0	1
F	59	CA	60.00	AAS.ECD	19.0706	2	1
F	29	CA	79.00	AAS.ECD	19.0706	2	1
M	31	CA	12.00	AAS.ELT	15.9999	0	1
M	28	CA	79.00	AAS.ELT	15.9999	2	1
M	27	CA	57.00	AAS.ELT	15.9999	2	1
M	34	CA	17.00	AAS.ELT	15.9999	0	1
M	29	CA	39.00	AAS.ELT	15.9999	0	1
M	29	CA	18.00	AAS.ELT	15.9999	0	1
M	44	CA	63.00	AAS.ELT	15.9999	2	1
M	45	CA	76.00	AAS.ELT	15.9999	2	1
M	31	CA	12.00	AAS.ELT	15.9999	0	1
M	27	CA	66.00	AAS.EMP	10.0299	2	1
M	32	CA	49.00	AAS.EMP	10.0299	0	1
M	40	CA	47.00	AAS.EMP	10.0299	0	1
F	29	CA	75.00	AAS.EMP	10.0299	0	1
M	35	CA	23.00	AAS.EMP	10.0299	0	1
M	46	CA	18.00	AAS.FST	43.0201	0	1
F	29	CA	24.00	AAS.FST	43.0201	0	1
M	42	CA	48.00	AAS.FST	43.0201	2	1
M	37	CA	24.00	AAS.FST	43.0201	0	1
M	32	CA	35.00	AAS.FST	43.0201	0	1
M	32	CA	41.00	AAS.FST	43.0201	2	1
F	28	CA	16.00	AAS.GDT	10.0301	0	1
M	29	CA	72.00	AAS.GDT	10.0301	0	1
F	34	CA	43.00	AAS.GDT	10.0301	2	1
F	29	CA	71.00	AAS.GDT	10.0301	2	1
M	28	CA	52.00	AAS.GDT	10.0301	0	1

F	26	CA	14.00	AAS.GDT	10.0301	0	1
M	32	CA	83.00	AAS.GDT	10.0301	2	1
F	29	CA	25.00	AAS.GDT	10.0301	0	1
M	28	CA	89.00	AAS.GDT	10.0301	2	1
F	29	CA	60.00	AAS.GDT	10.0301	2	1
F	39	CA	64.00	AAS.HLM	52.0901	2	1
F	26	CA	20.00	AAS.HLM	52.0901	0	1
M	29	CA	58.00	AAS.HLM	52.0901	2	1
M	31	OR	41.00	AAS.HRA	47.0201	0	1
M	39	CA	16.00	AAS.HRA	47.0201	0	1
M	28	CA	46.00	AAS.HRA	47.0201	0	1
F	33	CA	70.00	AAS.HSM	52.0999	2	1
M	39	CA	68.00	AAS.HSM	52.0999	2	1
M	28	CA	60.00	AAS.HSM	52.0999	2	1
M	42	CA	109.00	AAS.IAD	11.1004	2	1
M	53	CA	50.00	AAS.IAD	11.1004	0	1
M	45	CA	18.00	AAS.MTT	48.0501	0	1
M	28	CA	69.00	AAS.MTT	48.0501	0	1
F	37	HI	52.00	AAS.MTT	48.0501	2	1
M	29	CA	44.00	AAS.NET	11.0901	0	1
M	26	CA	30.00	AAS.NET	11.0901	0	1
M	27	CA	49.00	AAS.NET	11.0901	0	1
M	29	CA	25.00	AAS.NET	11.0901	0	1
M	35	CA	36.00	AAS.NET	11.0901	0	1
M	29	CA	37.00	AAS.NET	11.0901	0	1
M	33	CA	16.00	AAS.NET	11.0901	0	1
M	28	CA	75.00	AAS.NET	11.0901	2	1
M	45	CA	48.00	AAS.NET	11.0901	2	1
M	27	CA	33.00	AAS.NET	11.0901	0	1
M	34	CA	13.00	AAS.NET	11.0901	0	1
F	27	CA	25.00	AAS.OST	52.0499	0	1
F	56	CA	70.00	AAS.OST	52.0499	2	1
F	29	CA	16.00	AAS.OST	52.0499	0	1
F	31	CA	75.00	AAS.OST	52.0499	2	1
F	50	CA	71.00	AAS.OST	52.0499	2	1
F	50	CA	36.00	AAS.OST	52.0499	1	1
F	33	CA	64.00	AAS.OST	52.0499	2	1
F	39	CA	14.00	AAS.OST	52.0499	0	1
F	41	CA	70.00	AAS.OST	52.0499	0	1
F	52	CA	72.00	AAS.OST	52.0499	2	1
F	64	CA	67.00	AAS.OST	52.0499	2	1
F	50	CA	82.00	AAS.OST	52.0499	2	1

F	30	CA	95.00	AAS.OTA	51.0803	2	1
F	29	CA	83.00	AAS.OTA	51.0803	2	1
F	41	CA	28.00	AAS.PAH	51.9999	0	1
F	27	CA	14.00	AAS.PAH	51.9999	0	1
F	41	CA	16.00	AAS.PAH	51.9999	0	1
M	26	CA	18.00	AAS.PAH	51.9999	0	1
F	26	CA	13.00	AAS.PAH	51.9999	0	1
F	28	CA	16.00	AAS.PAH	51.9999	0	1
M	35	CA	12.00	AAS.PAH	51.9999	0	1
M	31	HI	17.00	AAS.PAH	51.9999	0	1
F	29	CA	28.00	AAS.PAH	51.9999	0	1
F	40	HI	21.00	AAS.PAH	51.9999	0	1
F	29	CA	12.00	AAS.PAH	51.9999	0	1
M	26	CA	28.00	AAS.PAH	51.9999	0	1
F	30	CA	15.00	AAS.PAH	51.9999	0	1
M	30	CA	82.00	AAS.PRT	10	2	1
F	29	CA	92.00	AAS.PTA	51.0806	2	1
F	46	CA	75.00	AAS.PTA	51.0806	2	1
F	27	CA	45.00	AAS.PTA	51.0806	0	1
F	30	CA	63.00	AAS.PTA	51.0806	2	1
M	32	CA	90.00	AAS.PTA	51.0806	2	1
F	28	CA	83.00	AAS.PTA	51.0806	2	1
F	32	CA	79.00	AAS.PTA	51.0806	2	1
M	32	CA	66.00	AAS.PTA	51.0806	2	1
M	31	CA	119.00	AAS.PTA	51.0806	2	1
F	32	CA	49.00	AAS.RST	51.0908	2	1
F	33	CA	65.00	AAS.RST	51.0908	2	1
F	28	CA	92.00	AAS.RST	51.0908	2	1
M	30	CA	12.00	AAS.WLD	48.0508	0	1
M	29	CA	13.00	AAS.WLD	48.0508	0	1
M	29	CA	50.00	CT.ABR	47.0603	1	1
M	26	CA	14.00	CT.AGR	1.0301	0	1
M	26	CA	32.00	CT.AGR	1.0301	0	1
F	56	CA	15.00	CT.AUM	47.0604	0	1
M	26	CA	24.00	CT.BUS	52.0201	0	1
M	48	BL	16.00	CT.BUS	52.0201	0	1
M	29	CA	86.00	CT.BUS	52.0201	2	1
M	35	BL	16.00	CT.BUS	52.0201	0	1
F	42	CA	18.00	CT.BUS	52.0201	0	1
M	48	CA	15.00	CT.BUS	52.0201	0	1
M	29	CA	18.00	CT.BUS	52.0201	0	1
F	47	CA	12.00	CT.CIT	11.0101	0	1

F	38	CA	26.00	CT.CIT	11.0101	0	1
M	27	CA	18.00	CT.CIT	11.0101	0	1
M	26	CA	12.00	CT.CUL	12.0503	0	1
F	27	CA	41.00	CT.DAS	51.0601	1	1
F	53	CA	41.00	CT.DAS	51.0601	1	1
M	39	CA	47.00	CT.DAS	51.0601	1	1
F	29	CA	56.00	CT.DAS	51.0601	1	1
F	28	CA	46.00	CT.DDT	15.0301	0	1
F	46	CA	40.00	CT.ECD	19.0706	1	1
F	28	UK	62.00	CT.ECD	19.0706	0	1
M	28	CA	23.00	CT.HRA	47.0201	0	1
M	38	CA	32.00	CT.HRA	47.0201	0	1
F	33	CA	36.00	CT.OST	52.0499	1	1
F	51	CA	33.00	CT.OST	52.0499	1	1
F	39	CA	30.00	CT.PAH	51.9999	0	1
F	26	CA	25.00	CT.PAH	51.9999	0	1
F	28	AS	19.00	CT.PAH	51.9999	0	1
F	26	CA	41.00	CT.PAH	51.9999	1	1
F	51	CA	21.00	CT.PAH	51.9999	0	1
F	38	CA	24.00	CT.PAH	51.9999	0	1
F	56	CA	12.00	CT.PAH	51.9999	0	1
F	28	CA	24.00	CT.PAH	51.9999	0	1
F	31	CA	38.00	CT.PAH	51.9999	1	1
F	26	CA	25.00	CT.PAH	51.9999	0	1
F	43	CA	18.00	CT.PAH	51.9999	0	1
F	29	CA	88.00	CT.PAH	51.9999	0	1
F	38	CA	13.00	CT.PAH	51.9999	0	1
F	31	CA	59.00	CT.SUR	51.0909	1	1
F	50	CA	38.00	CT.SUR	51.0909	1	1
F	30	CA	45.00	CT.SUR	51.0909	1	1
F	29	CA	48.00	CT.SUR	51.0909	1	1
F	31	CA	87.00	CT.SUR	51.0909	1	1
F	26	CA	42.00	CT.SUR	51.0909	1	1
F	49	CA	42.00	CT.SUR	51.0909	1	1
F	43	BL	35.00	CT.SUR	51.0909	1	1
F	29	CA	72.00	CT.SUR	51.0909	1	1
M	28	CA	15.00	CT.WLD	48.0508	0	1
M	27	CA	32.00	CT.WLD	48.0508	0	1
F	30	Caucasian	26	AAS.PAH	51.9999	0	2
F	42	Caucasian	21	AAS.PAH	51.9999	0	2
F	28	Caucasian	13	AAS.PAH	51.9999	0	2
F	28	Caucasian	13	AAS.PAH	51.9999	0	2

F	30	Caucasian	14	AAS.PAH	51.9999	0	2
F	23	Caucasian	12	AAS.PAH	51.9999	0	2
F	23	Prefer not to respond	15	AAS.PAH	51.9999	0	2
F	19	Caucasian	36	AAS.PAH	51.9999	0	2
F	37	Caucasian	20	AAS.PAH	51.9999	0	2
F	20	Caucasian	12	AAS.PAH	51.9999	0	2
F	19	Caucasian	24	AAS.PAH	51.9999	0	2
M	43	Caucasian	15	AAS.PAH	51.9999	0	2
F	40	Caucasian	20.5	AAS.PAH	51.9999	0	2
F	24	Caucasian	17.5	AAS.PAH	51.9999	0	2
F	20	Caucasian	27	AAS.PAH	51.9999	0	2
F	39	Caucasian	18	AAS.PAH	51.9999	1	2
M	18	Caucasian	12	AAS.ACC	52.0101	0	2
F	31	Caucasian	12	AAS.ACC	52.0101	0	2
F	29	Caucasian	37	AAS.ACC	52.0101	0	2
F	33	Caucasian	12	AAS.ACC	52.0101	0	2
F	20	Caucasian	22	AAS.ACC	52.0101	0	2
F	19	Caucasian	12	AAS.ACC	52.0101	0	2
M	20	Caucasian	12	AAS.AGR	1.0301	0	2
M	20	Caucasian	14	AAS.AGR	1.0301	0	2
M	21	Caucasian	26	AAS.AGR	1.0301	0	2
M	21	Caucasian	15	AAS.AGR	1.0301	0	2
M	20	Caucasian	37	AAS.AGR	1.0301	0	2
M	21	Caucasian	37	AAS.AGR	1.0301	0	2
F	20	Caucasian	28	AAS.AGR	1.0301	0	2
M	22	Caucasian	19.5	AAS.AGR	1.0301	2	2
M	21	Caucasian	24.5	AAS.AGR	1.0301	2	2
F	41	Caucasian	16.5	AAS.AGR	1.0301	2	2
F	22	Caucasian	37.5	AAS.AGR	1.0301	2	2
F	46	Caucasian	20.5	AAS.AGR	1.0301	2	2
M	32	Caucasian	12	AAS.AUM	47.0604	0	2
M	20	Caucasian	15	AAS.AUM	47.604	0	2
M	20	Caucasian	19	AAS.AUM	47.0604	0	2
M	20	Caucasian	13	AAS.AUM	47.0604	0	2
M	19	Caucasian	16	AAS.AUM	47.0604	0	2
M	20	Caucasian	12	AAS.AUM	47.0604	0	2
M	20	Caucasian	37.5	AAS.AUM	47.0604	1	2
M	20	Caucasian	37.5	AAS.AUM	47.0604	1	2
M	20	Caucasian	15	AAS.AUM	47.0604	0	2
F	19	Caucasian	23	AAS.BUS	52.0201	0	2
M	21	Caucasian	27	AAS.MUS	52.0201	0	2
F	44	Caucasian	12	AAS.BUS	52.0201	0	2

M	21	Caucasian	18	AAS.BUS	52.0201	0	2
F	20	Caucasian	32	AAS.BUS	52.0201	0	2
F	24	Caucasian	18	AAS.BUS	52.0201	0	2
F	38	Caucasian	24	AAS.BUS	52.0201	0	2
F	20	Caucasian	19	AAS.BUS	52.0201	0	2
F	23	African American	12	AAS.BUS	52.0201	0	2
M	21	Caucasian	12	AAS.BUS	52.0201	0	2
F	19	Caucasian	12	AAS.BUS	52.0201	0	2
F	20	Caucasian	12	AAS.BUS	52.0201	0	2
F	20	Caucasian	20	AAS.BUS	52.0201	0	2
F	21	Caucasian	12	AAS.BUS	52.0201	0	2
F	58	Caucasian	12	AAS.BUS	52.0201	0	2
F	26	Caucasian	15	AAS.BUS	52.0201	0	2
F	41	Caucasian	17	AAS.BUS	52.0201	0	2
F	31	Caucasian	18	AAS.BUS	52.0201	0	2
F	20	Caucasian	31	AAS.BUS	52.0201	0	2
M	46	Caucasian	23	AAS.BUS	52.0201	0	2
F	21	Caucasian	12	AAS.BUS	52.0201	0	2
M	22	Caucasian	37	AAS.BUS	52.0201	0	2
F	21	Caucasian	15	AAS.BUS	52.0201	0	2
F	20	Caucasian	13.5	AAS.BUS	52.0201	0	2
F	19	Caucasian	25	AAS.BUS	52.0201	0	2
M	18	Caucasian	12	AAS.BUS	52.0201	0	2
F	21	Caucasian	17	AAS.BUS	52.0201	0	2
F	23	Caucasian	12	AAS.BUS	52.0201	0	2
M	24	African American	13	AAS.BUS	52.0201	0	2
M	21	Caucasian	20	AAS.BUS	52.0201	0	2
F	21	Caucasian	28.5	AAS.BUS	52.0201	2	2
F	32	Caucasian	19.5	AAS.BUS	52.0201	2	2
F	48	Caucasian	16.5	AAS.BUS	52.0201	2	2
F	22	Caucasian	31.5	AAS.BUS	52.0201	2	2
F	49	Caucasian	43.5	AAS.BUS	52.0201	2	2
F	21	Caucasian	30	AAS.BUS	52.0201	2	2
M	20	Caucasian	24	AAS.CIS	11.0201	0	2
M	20	Caucasian	12	AAS.CIS	11.0201	0	2
M	50	Caucasian	15	AAS.CIS	11.0201	0	2
F	21	Asian or Pacific Islander	14	AAS.CIS	11.0201	0	2
M	27	Caucasian	23	AAS.CIS	11.0201	0	2
M	22	Caucasian	15	AAS.CIS	11.0201	0	2
F	23	Caucasian	25	AAS.CIS	11.0201	0	2
M	26	Caucasian	23	AAS.CIS	11.0201	0	2
M	29	Prefer not to	12	AAS.CIS	11.0201	0	2

		respond					
F	55	Caucasian	18	AAS.CIS	11.0201	0	2
M	23	Caucasian	35	AAS.CIS	11.0201	0	2
M	34	Caucasian	12	AAS.CIS	11.0201	0	2
M	21	Asian or Pacific Islander	25	AAS.CIS	11.0201	0	2
F	46	Caucasian	12	AAS.CIS	11.0201	0	2
M	46	Caucasian	14	AAS.CIS	11.0201	0	2
F	25	Caucasian	12	AAS.CIS	11.0201	0	2
F	20	Caucasian	24	AAS.CIS	11.0201	0	2
F	51	Caucasian	18	AAS.CIS	11.0201	0	2
F	39	Caucasian	12	AAS.CIS	11.0201	0	2
F	20	African American	40	AAS.CIS	11.0201	0	2
F	39	Caucasian	15	AAS.CIS	11.0201	0	2
M	19	Asian or Pacific Islander	39	AAS.CIS	11.0201	0	2
M	20	Caucasian	27	AAS.CIS	11.0201	0	2
M	19	Caucasian	18	AAS.CIS	11.0201	0	2
F	44	Caucasian	21	AAS.CIS	11.0201	0	2
M	55	Caucasian	24.5	AAS.CIS	11.0201	0	2
F	35	Caucasian	29	AAS.CIS	11.0201	0	2
F	34	Caucasian	12	AAS.CIS	11.0201	0	2
F	39	Caucasian	28.5	AAS.CIS	11.0201	1	2
F	26	Caucasian	13.5	AAS.CIS	11.0201	1	2
F	21	Caucasian	29.5	AAS.CIS	11.0201	1	2
M	43	Caucasian	22.5	AAS.CIS	11.0201	1	2
F	48	Caucasian	22	AAS.CIS	11.0201	1	2
M	50	Caucasian	19.5	AAS.CIS	11.0201	1	2
F	42	Caucasian	22	AAS.CIS	11.0201	2	2
M	34	Caucasian	27	AAS.CIS	11.0201	0	2
F	22	Caucasian	15	AAS.CIS	11.0201	0	2
F	26	Caucasian	14	AAS.CIS	11.0201	0	2
F	19	Caucasian	17	AAS.CAD	15.1302	0	2
M	19	Caucasian	13	AAS.CAD	15.1302	0	2
M	20	Caucasian	29	AAS.CAD	15.0302	0	2
M	24	Caucasian	33	AAS.CRJ	43.0107	0	2
F	24	Caucasian	18	AAS.CRJ	43.0107	0	2
M	21	Caucasian	20	AAS.CRJ	43.0107	0	2
F	26	Caucasian	30	AAS.CRJ	43.0107	0	2
F	27	Caucasian	12	AAS.CRJ	43.0107	0	2
M	34	Caucasian	12	AAS.CRJ	43.0107	0	2
F	35	Caucasian	12	AAS.CRJ	43.0107	0	2
F	39	Caucasian	21	AAS.CRJ	43.0107	0	2

M	22	Caucasian	30	AAS.CAT	52	0	2
M	21	Caucasian	24.5	AAS.ELT	47.0303	0	2
M	32	Caucasian	32	AAS.ELT	47.0303	0	2
F	34	Caucasian	14	AAS.ELT	47.0303	0	2
M	48	Caucasian	17	AAS.ELT	47.0303	1	2
M	20	Caucasian	19	AAS.IMT	47.0303	0	2
M	39	Caucasian	20	AAS.IMT	47.0303	0	2
M	21	Caucasian	22.5	AAS.IMT	47.0303	2	2
M	40	Caucasian	18	AAS.IMT	47.0303	2	2
M	47	Caucasian	18	AAS.MTT	15.0613	0	2
M	20	Caucasian	17	AAS.MTT	15.0613	0	2
M	28	Caucasian	20	AAS.MTT	15.0613	0	2
M	20	Caucasian	26	AAS.MRT	47.0616	0	2
M	20	Caucasian	36.5	AAS.MRT	47.0616	2	2
F	20	Caucasian	17	AAS.HIT	51.0716	0	2
F	46	Caucasian	18	AAS.HIT	51.0716	0	2
F	31	Caucasian	31	AAS.HIT	51.0716	0	2
F	51	Caucasian	15	AAS.HIT	51.0716	0	2
F	21	Caucasian	14	AAS.HIT	51.0716	0	2
F	28	African American	12	AAS.HIT	51.0716	0	2
F	32	Caucasian	45.5	AAS.HIT	51.0716	2	2
F	21	Caucasian	37	AAS.HIT	51.0716	2	2
F	21	Caucasian	44.5	AAS.HIT	51.0716	2	2
F	20	Caucasian	21.5	AAS.HIT	51.0716	1	2
M	29	Caucasian	18	AAS.NET	11.0901	0	2
F	20	Caucasian	12	AAS.NET	11.0901	0	2
F	19	Caucasian	15	AAS.NET	11.0901	0	2
M	30	Caucasian	14	AAS.NET	11.0901	0	2
F	27	Caucasian	29	AAS.NET	11.0901	0	2
F	42	Caucasian	21	AAS.NET	11.0901	0	2
M	27	Caucasian	21	AAS.NET	11.0901	0	2
M	24	Caucasian	18	AAS.NET	11.0901	0	2
F	34	Caucasian	24	AAS.NET	11.0901	0	2
M	34	Caucasian	28	AAS.NET	11.0901	0	2
F	20	Caucasian	25	AAS.NET	11.0901	0	2
M	25	Caucasian	28	AAS.NET	11.0901	0	2
M	44	Caucasian	12	AAS.NET	11.0901	0	2
M	20	Caucasian	25	AAS.NET	11.0901	0	2
M	21	Caucasian	12	AAS.NET	11.0901	0	2
F	35	Caucasian	13	AAS.NET	11.0901	0	2
M	18	Caucasian	16	AAS.NET	11.0901	0	2
M	21	Caucasian	26.5	AAS.NET	11.0901	2	2

M	46	Caucasian	32	AAS.NET	11.0901	2	2
F	25	Caucasian	35.5	AAS.NET	11.0901	2	2
M	20	Caucasian	30.5	AAS.NET	11.0901	2	2
F	50	Caucasian	15	AAS.NET	11.0901	2	2
F	29	Caucasian	22.5	AAS.RN	51.1601	2	2
F	45	Caucasian	22.5	AAS.RN	51.1601	2	2
F	32	Caucasian	25.5	AAS.RN	51.1601	2	2
F	24	Caucasian	22.5	AAS.RN	51.1601	2	2
F	46	Caucasian	22.5	AAS.RN	51.1601	2	2
F	58	Caucasian	22.5	AAS.RN	51.1601	2	2
M	33	Caucasian	22.5	AAS.RN	51.1601	2	2
F	44	Caucasian	22.5	AAS.RN	51.1601	2	2
F	21	Prefer not to respond	25.5	AAS.RN	51.1601	2	2
F	27	Caucasian	25.5	AAS.RN	51.1601	2	2
F	41	Caucasian	22.5	AAS.RN	51.1601	2	2
F	24	Caucasian	22.5	AAS.RN	51.1601	2	2
F	20	Caucasian	12.5	AAS.BST	52.0401	0	2
F	52	Caucasian	13	AAS.BST	52.0401	0	2
F	37	Caucasian	14	AAS.BST	52.0401	0	2
F	19	Caucasian	32	AAS.BST	52.0401	0	2
F	21	Caucasian	17	AAS.BST	52.0401	2	2
F	21	Caucasian	22.5	AAS.BST	52.0401	2	2
F	40	Caucasian	36.5	AAS.BST	52.0401	2	2
F	28	Caucasian	17	AAS.BST	52.0401	2	2
F	22	Caucasian	36.5	AAS.BST	52.0401	2	2
F	20	Caucasian	41.5	AAS.BST	52.0401	2	2
F	56	Caucasian	28	AAS.BST	51.0716	1	2
F	22	Caucasian	14	AAS.BST	52.0401	2	2
F	37	Caucasian	18	AAS.BST	52.0401	0	2
F	21	Caucasian	25	CT.HEA	51.1614	0	2
M	19	Caucasian	12	CT.HEA	51.1614	0	2
F	20	Caucasian	20	CT.HEA	51.1614	1	2
F	19	Caucasian	12	CT.BST	52.0401	0	2
F	35	Caucasian	16	CT.BST	52.0401	0	2
F	20	Caucasian	14	CT.BST	52.0401	1	2
F	29	Caucasian	41.5	CT.BST	52.0401	1	2