

The Pennsylvania State University

Department of Learning Performance Systems

The Impact of Technology Education Course Offerings on Career and Technical
Education Enrollment

A Master's Paper in
Workforce Education and Development


By

David A. Becker

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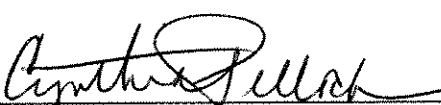
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The Master's Paper of David A. Becker was review and approved by the following:



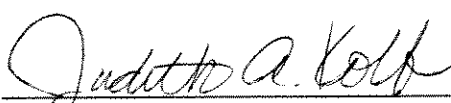
Richard A. Walter
Associate Professor of Education
Master's Paper Advisor

8/07/06



Cynthia Pellock
Assistant Professor of Education

8/08/06



Judith A. Kolb
Associate Professor of Education
Professor-in-Charge
Program of Workforce Education and Development

8/08/06

August 2006

ABSTRACT

The Pennsylvania State Board of Education mandates that Technology Education and Career and Technical Education shall be made available to all students in Pennsylvania. These two programs often offer similar opportunities for students. This creates a natural competition between the two programs. The mission statement of the International Technology Education Association and the mission statement of the National Association of State Directors of Career Technical Education is applied to Super's five stages of career development. Through the analysis one could conclude that technology education is more focused on the crystallization sub-stage of exploration, while career and technical education is more focused on the specification and implementation sub stages of exploration. Thus the more related technology education courses the higher the enrollment in career and technical education. Using Pearson's Correlation, the research indicates quite the opposite; a low to moderate inverse correlation. As the relationship of technology education courses to career and technical programs increased the enrollment in career and technical education programs decreased. The study also examined how long since technology education teachers visited the Career and Technical Center, showing that only 55% of the technology education teachers surveyed had visited the Career and Technical Center the past 3 years. Finally courses taught by teachers who have visited the Career and Technical center within the past 3 years were grouped together and analyzed for correlation to enrollment as well as the courses taught by teachers who had visited more than 3 years ago. For both groups a low to moderate inverse correlation was discovered.

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Chapter 1

INTRODUCTION

Historical Perspectives

Differences between Technology Education (Industrial Arts) and Career and Technical Education (formerly Vocational Education) can be traced to the late 1800's when the effects of the Industrial Revolution caused a decline in apprenticeships and free public elementary schools developed (Gordon, 2000). With the need to train young people came two different systems, the Manual (Russian) Training System, and the Sloyd (Swedish) System (Gordon, 2000). Today there are still two basic systems for training students in secondary schools. The differences between the systems prevent them from working together for the betterment of students.

History of Career and Technical Education.

Worcester Polytechnic Institute at Worcester, Massachusetts, opened in 1868 and was the first manual training school. The school offered a combination of theoretical and production classes so that it would not be necessary for the schools' graduates to complete apprenticeships. At Washington University, Calvin Woodward introduced the shopwork concept to applied mechanics students in 1870. He used the shopwork as a way to give a visual representation of the problems that his students were solving. In time, he developed specific projects that would require students to practice using machines and tools. At the Centennial Exposition in Philadelphia in 1876, Victor Della Vos, director of the Imperial Technical School of Moscow, exhibited a system of tool-based instruction based on the construction of models from plans drawn by students.

John Runkle of Massachusetts Institute of Technology saw the exhibition and was able to influence his institution to develop laboratories to teach tool and machinery skills to both college level and secondary school students. This was very beneficial because his engineering students, who were well-schooled in theory, were able to develop mechanical skills and were no longer required to complete an apprenticeships.

The skills of machinery and tools at these manual training schools were taught by a “skilled craftworker,” much like the master of an apprentice. The success of Woodward and Runkle caused a national forum at the national convention of the National Education Association in 1884. Some educators were opposed to the idea of having manual training in public high schools, stressing that it was a replacement for apprenticeship. The result was that manual training was limited to separate schools, thus creating the system of career and technical centers and teachers that have experience in a specific field; the system that we have today (Gordon, 2000).

History of Technology Education.

In 1888, after the National Education Association forum, Gustaf Larson from Sweden came to America and established the first Sloyd instruction in Boston, Massachusetts. The Sloyd system was different from the Manual Training System in that it recommended that manual labor be taught in a pre-vocational sense as part of the general curriculum. The work was to be given by a trained teacher rather than a skilled craftworker, and emphasis was placed on developing the learner rather than development of skill with hand tools. Today technology education is very similar to the Sloyd system that Gustaf Larson brought to America with in 1888. Technology education is taught as

part of the general education curriculum, and technology education teachers typically go to college and pursue degrees in teaching (Gordon, 2000).

Development of Current Career and Technical Centers.

In 1917, the Smith-Hughes Act, P.L. 64-347, was signed by President Woodrow Wilson. This was the first time that vocational education received federal funding. The funding, which extended vocational education, required that vocational education be a separate entity from the general curriculum offered at the high school. The separation that resulted from the Smith-Hughes Act is still evident today as most vocational students must attend a separate career and technical school. These career and technical schools are funded independently from high schools and have a differentiated curriculum; where as technology education is offered as part of the general curriculum with secondary school funding (Gordon, 2000).

The Problem

A student's first technical education experience in school is typically in the middle or junior high school, where a class experience in technology education is mandated in Pennsylvania (Pennsylvania State Board of Education, 1999). In high school, technology education classes are electives offered as single-period classes, usually every year in high school. In 10th or 11th grade, students also have the option of spending up to half of their time at school pursuing career and technical education. A student's technology education experiences in middle and high school should be coordinated with the available career and technical education creating a seamless career education system. Without the coordination of both technology education and career and technical education students must decide which courses to use to get their desired

technical education offered in courses that have similar objectives. This confuses students and causes a potential duplication of courses if left uncoordinated.

Significance of Study

The purpose of this study is to determine the impact of technology education courses on the enrollment of students in related courses at career and technical education centers. According to recent statistics, 80% of high school graduates are going to college to fill 20% of the jobs in the labor market (Wonacott, 2000). "Of 147 million jobs by the year 2005, only 32 million, or 21% will require a college degree. The largest and fastest-growing segment of the emerging technical workforce is occupations that do not require a 4-year college degree" (Gray and Herr, 1995, p.98). America must invest in human capital; training our people for high wage, high skill jobs. Super and Thompson (1979) identified six factors in vocational maturity: (1) awareness of the need to plan ahead, (2) decision-making skills, (3) knowledge and use of information resources, (4) general career information, (5) general world of work information, and (6) detailed information about occupations of preference. Coordinating technology education and career and technical education will increase students' vocational maturity; educators must be able to recruit students from the general high school population, allow them to experience many different career opportunities, allow them to find which field is right for them, and have them attend a career and technical center to get their start in their chosen field. This process is not being accomplished because of the competition between technology education and career and technical education. In order to maximize student opportunities these two groups need to work together.

Conclusions of this research could be of ultimate benefit to the schools used in the study and could have implications in other situations in which career and technical education and technology education are not coordinated. This study will outline a student's transition in programs, as well as possible financial savings considerations for the schools.

Research Questions

This study will answer the following questions:

1. What is the correlation between technology education course offerings and enrollment in related career and technical courses?
2. How recently have technology education teachers visited or toured the career and technical education center which their school sends students?
3. To what extent does the technology education teachers visiting of career and technical education centers impact the overall enrollment in career and technical education courses?

Limitations

The purpose of this study is to determine the impact of technology education courses on the enrollment of students in related courses at career and technical education centers. Every high school that sends students to a career and technical center must have at least a part-time technology education teacher. However, each school can elect to have more than one technology education teacher if their Board of Directors permits it. The study does not include technology education teachers from comprehensive high schools in which career and technical education and technology education are offered in the same school.

To determine the technology education classes offered at each high school and the number of students who are taking the different classes, a survey was given to all high school technology education teachers in each district. To find the number of students enrolled in each career and technical area by school district the Career and Technical Education Information System (CATS) is used. (http://www.catsreports.ed.state.pa.us/SelectReport_eGrants.asp) and the occupational objectives of each program (<http://www.ntccschool.org>). A modified Delphi Study will be used to determine if technology education courses overlap with career and technical education courses and to what extent. This analysis will indicate where overlaps occur more frequently and which school overlaps the most.

Definition of Terms

Career and technical education – “Organized educational programs offering a sequence of courses directly related to the preparation of individuals in paid or unpaid employment and in current or emerging occupations requiring other than a baccalaureate or advanced degree. Such programs should include competency-based applied learning that contributes to an individual’s academic knowledge, higher order reasoning, problem-solving skills, work attitudes, general employability skills, and occupational specific skills necessary for economic independence as a productive and contributing member of society” (Gordon, 2000, p. 290). According to the National Association of State Directors of Career Technical Education Consortium (NASDCTEC), this education has also been referred to as vocational education, technical education, career education, applied education, professional-technical education, occupational education, and workforce training (NASDCTEC, 2000, p. 1).

Technology Education – “An applied discipline designed to promote technological literacy that provides knowledge and understanding of the impacts of technology including its organizations, techniques, tools, and skills to solve practical problems and extend human capabilities” (Gordon, 2000, p. 290).

Career and technical center – “A public school that provides vocational-technical education to secondary school students, out-of-school youth and adults in a geographical area comprised and operated by one or more school districts” (State Board of Education of Pennsylvania Regulations, 1999, p. 2).

Assumptions

It is assumed that technology education and career education is available to everyone. This assumption is based on Chapter 4 Academic Standards and Assessment Regulations from the Pennsylvania State Board of Education(1999), technology education and career and technical education “shall be made available to every student in the high school program” (p. 13)

Conceptual Framework

This study is based on Super’s Life-Span Theory of Career Development. The mission statements of both subjects will be examined and applied to Super’s Life-Span Theory of Career Development to determine at what stage in a student’s educational development is appropriate in each subject. Literature does not exist that analyzes career and technical education and technology education using this model.

The five stages of Super’s Life-Span Theory of Career Development are the following:

Growth - characterized by the sub-stages of fantasy, interest, and capacity.

Children progress through these stages from birth to age 14 by using their curiosity to acquire information about the world of work (Niles and Harris-Bowlsbey, 2002).

Exploration - is comprised of three sub-stages that occur between the ages of 15-25: crystallization, a person clarifies what he/she wants to do; specification, preferences are specified; and implementation, the individual makes plans to fulfill his/her career objectives (Niles and Harris-Bowlsbey, 2002).

Establishment - happens at the start of the working life, ages 25-45 It includes three tasks: stabilizing, settling down in a job and meeting requirements; consolidating, showing competence in the job; and advancing, moving into a higher level/paid position (Niles and Harris-Bowlsbey, 2002).

Maintenance - is characterized by holding and maintaining a secure job, and innovating or making contributions to the field at ages 45 – 65 (Niles and Harris-Bowlsbey, 2002).

Disengagement - individuals receive less new information or have a decline in health during this stage, and their physical capacities begin to decline. As a result, they spend less time doing work and more time being concerned about their lifestyle and activities in retirement at ages 65+. (Niles and Harris-Bowlsbey, 2002)

Chapter 2

REVIEW OF RELATED LITERATURE

The purpose of the study is to determine to what degree technology education teachers feel their courses relate to the programs of study available at the career and technology center their school sends students to. If the courses do relate, how many of the students from the technology education classes go on to pursue career and technical education and what influence does the technology education teacher have on getting those students to pursue career and technical education? Literature was reviewed in the following topical areas: Career Development Theory; the Mission Statement of the International Technology Education Association (ITEA), "This we Believe"; the Mission Statement of the National Association of State Directors of Career Technical Education Consortium, "An Essential Component of the Total Educational System"; and the Standards for Technological Literacy from the ITEA. These reviews are necessary to determine what should be taught in technology education and career and technical education and to determine how the two subjects should interact with each other.

Career Development Theory

Parson (1909), the first person to propose a career development theory, stated that "a person should have (a) a clear understanding of him or herself-attitudes, abilities, interests, ambitions, resource limitations and their causes; (b) a knowledge of the requirements and conditions of success, advantages and disadvantages, compensation, opportunities, and prospects of work; and (c) true reasoning on the relations of these two groups of facts" (Ireh, 1999, p. 3). Parson's theory became known as a "trait-and-factor"

theory because Parson assessed the characteristics of the person and the job together (Ireh, 1999). Parson defined “traits” as characteristics of an individual that can be measured through testing and “factors” as characteristics required for successful job performance. “The trait-and-factor approach emphasizes the identification of a person’s relevant traits or characteristics, usually through the use of standardized tests or inventories. The same approach is used in describing occupational factors or requirements (i.e. occupations are profiled according to the degree to which they require certain traits such as aptitudes). Then the individual’s profile of traits is matched with the factors or requirements of specific occupations. The goal of this type of matching is to identify the degree of fit between the person and an occupation” (Niles and Harris-Bowlsbey, p.10, 2002).

Holland’s (1973) theory of vocational choice assumes that “when career choice is made, the individual becomes a product of the interaction between his or her specific heredity with a variety of cultural and personal forces that may include peers, parents and significant adults, social class, culture, and the physical environment” (Ireh, 1999, p. 6). Holland’s theory of vocational choice expands upon Parson’s theory in that it focuses on the individual characteristics that influence a student. However, unlike Parson, Holland considers how significant others can influence an individual’s vocational choice. Holland (1973) developed individual personality classifications that fit into the major classes of occupational environment. “The six personality types are (a). Realistic (task oriented, prefers concrete problems), (b) Investigative (task-oriented, thinks through problems), (c) Social (prefers teaching), (d) Conventional (achieves goals through conformity,

subordinate role), (e) Enterprising (leaders), (f) Artistic (self-expression)” (Ireh, 1999, p.7).

Some researchers have envisioned vocational development as a series of stages in which the individual gradually selects a career path. Ginzberg (1951) developed the General Theory of Occupational Choice, which consists of three developmental stages relating to an individual’s impulse and need for an occupational choice. The first stage is called the fantasy period (ages 6-11), and during this stage, a child will express an interest in a job and will make-believe the work roles of adults. The term “fantasy” was coined because the jobs are selected based on their perceived level of fun rather than on the individual’s ability or potential. The second stage is the tentative period (ages 11-17), which is concerned with the fact that a person is starting to recognize the problems of selecting a future career. Reality starts to affect career choice, and the person in this stage starts to focus on other facets of the career besides interests and desires. The final stage is the realist stage (ages 18 and above), which includes the sub-divisions of exploration, crystallization, and specification (Ireh, 1999).

Super (1957) used the work of other psychologists (e.g., Buehler (1933), Havighurst (1951), Miller and Form (1951), and Kelly (1955), Ginzberg (1951) as the basis for his Life-Span Theory of Career Development (Niles and Harris-Bowlsbey, 2002). Super believed that such characteristics such as needs, interests, abilities, intelligence and special aptitudes contributed to personality development and personal accomplishments, while factors such as community, school, family and peers influenced employment practices. The combination of all these factors resulted in the development of vocational self (Ireh, 1999). Super felt that a person’s self-concept (how individuals

view themselves and their situations) was a key factor in career development. The theorist believed that self-concept and all the factors that make up one's self concept can change throughout a person's lifetime (Ireh, 1999).

According to Super (1990), there are five stages of career development: Growth, Exploration, Establishment, Maintenance, and Disengagement. The Growth stage is characterized by the sub stages of fantasy, interest, and capacity. Children progress through these stages by using their curiosity to acquire information about the world of work. The Exploration stage (ages 15-25) is comprised of three sub- stages: crystallization (a person clarifies what he/she wants to do), specification (preferences are specified), and implementation (the individual makes plans to fulfill his/her career objectives). The Establishment stage happens at the start of the working life (ages 25-45). It includes three tasks: stabilizing (settling down in a job and meeting requirements), consolidating (showing competence in the job), and advancing (moving into a higher level/paid position). The Maintenance (maintaining status at work) stage (45-65) is characterized by holding and maintaining a secure job and innovating or making contributions to the field. The final stage in Super's theory is labeled Disengagement (ages 65+). In this stage, individuals receive less new information or have a decline in health stage and their physical capacities begin to decline. As a result, they spend less time doing work and more time being concerned about their lifestyle and activities in retirement. (Niles and Harris-Bowlsbey, 2002). Super developed a series of inventories that evaluated roles and values that are relevant to each stage of his theory.

To relate technology education and career and technical education to Super's Life-Span Theory of Career Development the mission statements of each subject will be

used to determine where in model they are affecting. By understanding where a student is developmentally, educators can determine what type of classes would be best suited for that student.

Mission Statements

When reviewing the mission statements of technology education and career and technical education, it is very interesting that there are many areas that are similar; however, the specific areas that are different will determine into which areas of Super's Life-Span Theory of Career Development each subject falls.

"This We Believe" from the ITEA (1995) States:

Technology Education:

- (a) Is an essential learning experience for all students at all grade levels, abilities, and backgrounds, so that they may confidently use, manage, assess, and understand technology.
- (b) Provides the basic knowledge and technical skills needed to participate in society. It increases the economic capacity of nations and allows students to understand and apply advanced technologies so they will be prepared for either post-secondary education or entering the workforce.
- (c) Enhances the opportunity for students to develop career awareness or career path preparation. It provides an exposure to a variety of technology related careers - from professional to industrial or service worker. The knowledge base learned through technology education is important to everyone as all members of society must continually learn in a changing society that is influenced by technology.

- (d) Provides for academic, technical, and social growth. It employs involvement with tools, machines, materials, and systems of technology. It enables all students to derive meaning from concrete experiences that result from the integration of mathematics, science, humanities, and engineering concepts. Through direct experience with a wide array of processes, knowledge, and contexts, it helps to develop technological literacy.
- (e) Provides a wholesome change in learners by enhancing the understanding of how technology is changing the human-made world and the natural environment. It allows learners to experience the activities and habits of a designer, scientist, technologist, engineer, architect, producer, historian, and social critic as they engage in technological problems and issues of the present and future.
- (f) Develops self-evaluation of attitudes toward constructive work and how this work can be used for health, recreation, or economic value. It helps to develop favorable attitudes toward creative thinking, and to character improvement -- knowing and making the most of one's environment.
- (g) Requires competence, compassion, a desire for excellence, and a vision from its educators. Teachers must possess creativity, ingenuity, enjoy working with people, and maintain a high degree of personal and professional integrity.

(ITEA, 1995)

Career Technical Education – An Essential Component of the Total Educational System for the NASDCTEC (2000) states:

Career Technical Education:

- (a) Draws its curricula, standards, and organizing principles from the workplace.

It is this principle that connects and defines all Career Technical Education.

Educational curricula is primarily drawn from one of two sources: (1) the academic discipline or (2) the workplace. Career Technical Education is unique because it draws its curriculum primarily from the workplace. The workplace provides the context, objectives, and organizing constructs for instruction and assessment. The workplace also defines the standards of performance necessary, including those required for academic, technical, and employability skills.

- (b) Is a critical and integral component of the total educational system, offering career-oriented benefits for all students. Career Technical Education offers benefits for all students ranging from providing a contextual environment for developing higher-level academic skills to providing specific industry certification in an occupational field. Career Technical Education offers educational benefits to students pursuing careers requiring specific technical skills as well as providing a strong foundation for those pursuing a traditional four-year (or more) degree. It is an integral component of the total education mission, contributing to the goals of high academic achievement, student retention and motivation, and the development of general workplace and life skills. Students participating in these programs are prepared to be successful at the next level in the workplace or in education. Because Career Technical Education is integral to the total educational system, partnerships with other

educators, as well as business professionals, are essential. In fact, Career Technical Educators are often the catalyst for bringing education and work together. Finally, Career Technical Education has a long and successful history of enhancing student leadership, teamwork, and citizenship skills through Career and Technical Student Organizations.

- (c) Is a critical and integral component of the workforce development system, providing the essential foundation for a thriving economy. Society's economic engine is driven by a well-prepared, qualified workforce. Preparation of that workforce requires solid academics, good work ethics, and specific technical skills as well as the ability to communicate, work with others, solve problems, and use information. Career Technical Education contributes directly to this preparation by providing a curriculum tied to specific workplace requirements. It enhances the interaction of education and work, bringing the benefits of real world problems and resources to the educational enterprise. This effort also improves the general understanding and working relationships between education and the rest of the world, thus creating synergistic benefits for both environments. In order for these benefits to accrue, working partnerships are created and maintained between business, labor, and education.
- (d) Maintains high levels of excellence supported through identification of academic and workplace standards, measurement of performance (accountability), and high expectations for participant success. Career Technical Education focuses on the standards required in the

workplace. This includes high academic standards as well as technical standards. Standards are measured through a variety of validated tools and facilitated by systems to maintain and project accountability. Career Technical Education is committed to continuous improvement, attention to industry certification, and the development of highly qualified teachers.

- (e) Is robust and flexible enough to respond to the needs of the multiple educational environments, customers, and levels of specialization.

Career Technical Education involves a large and complex delivery system that (1) integrates career exploration, (2) provides effective tools for organizing all curricula, (3) facilitates the teaching and use of technology, (4) is integrated into the total learning experience, (5) enhances the learning of academic subjects, (6) teaches broad occupational skills, (7) includes all aspects of the industry, (8) teaches how to balance family and work responsibilities, (9) provides job-specific training, (10) is offered at multiple levels of the educational continuum, and (11) is delivered through a variety of educational environments. Career Technical Education meets the needs of a wide range of customers, communities, schools, postsecondary institutions, and businesses. It also responds quickly to changes in the workplace and schools. Career Technical Education links secondary and postsecondary curricula as well as academic and technical curricula. In order for students and adults to take full advantage of the opportunities available, comprehensive career guidance is provided as an integral component of the educational experience including current, relevant information about workplace and educational requirements

and the opportunities for developing the skills to meet both. Finally, these quality educational and workplace experiences reach all students with special efforts to ensure career success for those students with additional challenges.

When comparing the Mission Statements for technology education and career and technical education many similarities can be found between the two subjects. These similarities cause many people to confuse the two subjects; as a result, technology education and career and technical education overlap. However, substantial differences which determine where both technology education and career and technical education are applied to Supers Life-Span Theory of Career Development. Technology education focuses on providing the basic knowledge and technical skills needed to participate in society, as well as on enhancing the opportunity for students to develop career awareness or career path preparation. On the other hand, career and technical education curriculum is tied to specific workplace requirements, providing job specific training in all aspects of industry.

Technology Education Standards

In 2000, the ITEA published Standards for Technological Literacy, which confirms that technology education and career and technical education are very similar subjects. Many of the standards for grades 9-12 are specific to one area of technology. For example, benchmark topics for construction in grade 9 include “infrastructure, Construction processes and procedures, Requirements, Maintenance, alterations, and renovation, and prefabricated materials.” Most of these topics would be taught by a building trades class as well, with standards outlined by the Universal Building Code, but with more focus on career rather than on technological literacy. However, the ITEA’s

Standards for Technological Literacy claims, “Most development of technologies is driven by the profit motive and the market” (ITEA, 1995). Technology education has established standards in Medical Technology, Agricultural and Related Biotechnologies, Energy and Power Technologies, Information and Communication Technologies, Transportation Technologies, and Construction Technologies; all relate to courses offered by career and technical education.

Technology Education has also developed standards for those same areas at the 6-8 grade level, giving students the opportunity to explore which area they enjoy and have the necessary talents to pursue. In Pennsylvania, every middle school student is required to have a technology education experience. If technology education is coordinated from the time it is introduced to students in middle school with the technology education available at the high school, as well as with the career and technical education, students would have a better way to make informed career choices.

Applying Mission Statement and Standards Data to Super’s Career Development Theory

If applied to Super’s career development theory, technology education is more focused on the crystallization sub-stage of Exploration, while career and technical education is more focused on the specification and implementation sub stages of Exploration. This may be why technology education and career and technical education are so closely related; in fact, technology education is considered a subdivision recognized by career and technical education. Technology educators, however, do not provide any recognition to career and technical education, considering themselves to be part of the National Science Foundation. (ITEA, 2000).

In Closing, Super's Life-Span Theory of Career Development suggests that at some point as students develop, technology education should "hand off" students to career and technical education when they are prepared to move from the crystallization sub-stage to the specification sub-stage.

CHAPTER 3

METHODOLOGY

Introduction

The purpose of this study is to determine the impact of technology education courses on the enrollment of students in related courses at career and technical education centers. The general method of the study focuses on exploring the relationship between high school/ NTCC course relations and NTCC enrollment. The study also uses the opinion of technology education teachers as they rate to what degree they feel their courses relate to course offerings at the career and technical center. Another portion of the study determines the last visit the technology education teachers made to the career and technical center as well as dissecting how related the courses of those technology education teachers who recently visited the career and technical center impact overall enrollment versus how the courses of technology education teacher who have not visited the career center impact overall enrollment.

The Problem

A student's technology education experiences in middle and high school should be coordinated with the available career and technical education creating a seamless career education system. Without the coordination of both technology education and career and technical education students must decide which courses to use to get the technical education they desired offered in courses that have similar objectives. This confuses students and causes a potential duplication of courses if left uncoordinated.

Target Audience

Population.

The population of this study is programs of study offered at NTCC. Specifically, the population is the types of programs offered as, for example, the Trade and Industrial Education programs. Information regarding the programs' relations to the courses taught in the high school was gathered from the high school technical education teachers. Every high school that sends students to a career and technical center must have at least a part-time technology education teacher. However, each school can elect to have more than one technology education teacher if their Board of Directors decides that in order to have technology education available to all students they may have multiple teachers. The study does not include technology education teachers from comprehensive high schools in which career and technical education and technology education are offered in the same school.

Sample.

The sample for this study included the seven programs of study offered in the NTCC that are classified Trade and Industrial Education. All technology education teachers who send students to the Northern Tier Career Center (NTCC) in Towanda Pennsylvania reported on the relationship of the courses offered in their schools with the programs of study offered by NTCC. This purposeful sampling technique was used to assure that the students of all the technology education teachers surveyed were able to pursue the career and technical education opportunities offered at the NTCC.

Variables

This section outlines the dependant and independent variables in this study. The independent variables used in this study are course relationship and time since career center visitation. The dependant variable is the program enrollments.

Dependent Variable.

The dependant variable for this study is the program enrollments in the Trade and Industrial courses at the career and technical center. These data are based on the previous years (2004-2005)CATS report (www.catsreports.ed.state.pa.us/SelectReporteGrants.asp). This data source indicated the total number of students enrolled in the various programs as well as completer, the number of students who drop programs for various reasons, and returning students.

Independent Variables.

The independent variables for this study are the course relationships of the corresponding high school courses with the NTCC programs as reported by the high school teachers and time since career center visitation by the high school teacher. Technology education teachers were asked to rate to what degree they felt their courses related to programs offered at career and technical education centers their school sent students to. The relations value was based on a Likert Scale where a rating of 0 indicated no relationship, 1 slightly related courses, 2 moderately related courses, 3 courses half related, 4 courses very related, and 5 99% identical courses. A total relationship “score” was calculated for each NTCC program of study by summing the ratings given by the teachers for the relationship between their courses and the NTCC courses.

In addition technology education teachers were also asked how long it had been since they last visited the career center to which their school sends students. This was also based on a Likert scale 1 being less than one year ago, 2 representing 1-2 years ago, 3 representing 2-3 years ago, 4 representing more than 3 years ago, and 5 meaning that the technology education teacher had never visited the career and technical center.

Instrumentation

A web-based survey was used to gather information on the courses each technology education teacher is offering. In addition the independent variables data was also collected concerning technology education course objectives, tools used, and projects produced. These data may possibly be analyzed in a future study by a focus group or Delphi study. The survey asks technology education teachers the time since their last visit to the career and technical center and also to rate to what degree they feel the courses they offer relate to programs of study offered at the career and technical center.

The survey was developed by this researcher for the specific purposes of the research study. It was designed to be administered online and allow participants to go through a step by step format which allowed for the gathering of information about technology education teachers. The survey was also programmed to account for flexibility – i.e., if a Tech Ed teacher was teaching 4 classes per day it would ask him to rate each of those five classes with the programs of study available at the NTCC, if the Tech Ed teacher was teaching 6 courses per day then he would be asked to rate each of those courses. The survey only asks the respondent to rate the number of courses he/she taught. The survey can be viewed at the following website: <http://www.beckersurvey.net>.

When a Technology Education teacher logged onto the website, the first page he/she encountered was the informed consent page. The participant would have to end his/her name and email address to enter the survey. On the next page titled Basic Data (see Appendix - Collection of basic data), teachers selected the school where they taught, the lowest and highest grade, number of different courses, if they were familiar with the Northern Tier Career Center, and the time of their last visit. This page determined the format and content of the rest of the survey.

The following page collected data about the courses each technology education teacher teaches. (see Appendix - Technology Education Class Information) This sample assumed that the technology education teacher was instructing four courses. If in the previous page the participant indicated that he/she was teaching 5 courses then there would be five rows requesting information about 5 courses. The number of rows on this page corresponded to the number of courses indicated in the basic data page.

The next page varied, based on the basic data input. If the participant indicated that he/she has visited the NTCC, then the next page would be NTCC programs visited, asking what programs the participant had visited.

If the participant indicated that he/she had never visited the NTCC, then the next page asked participants to rate to what extent they felt the courses they were teaching related to programs of study at the NTCC. This page possibly loaded multiple times, once for each course the participant was teaching (see Appendix, Relationship of Technology Education Courses to Career and Technical Education Programs). Once the survey was completed, the thank-you page appeared for ten seconds, followed by a

reloading of the information consent form which signified the start of the survey by a new respondent.

Pilot Study

A pilot study was conducted to validate the survey instrument. Technology education teachers that send students to Lyco CTC (Lycoming County) participated in piloting the survey. The four participants had positive feedback about the layout and design of the survey. The only negative aspect was that the survey data by default was set to expire 22 minutes after being entered. This meant that the survey had to be completed in 22 minutes or initial data would be lost. After the pilot study was completed, this researcher edited the survey to allow the data to be kept alive for 5 days; in this way teachers could exit their browsers and come back to the survey anytime during that school week to complete the form.

Reliability.

To determine the measure on internal consistency for the survey questionnaire, Cronbach's alpha was computed. Cronbach's alpha represents a more general definition of reliability. It is a test for a survey's internal consistency. A score is calculated from each item in the survey and the overall rating is the sum of these scores over all survey items. Then reliability is defined to be the square of the correlation between the measured scale and the underlying factor the scale was supposed to measure. The SPSS program was used for the calculated and resulted in a Cronbach alpha of .951 which is high.

Validity

Peers were asked to review the survey questions to determine if the content of items fit the purpose of the survey – that is, to determine if the questions asked what they were supposed to ask to collect the data necessary to answer the research questions.

Comments were solicited. As noted above, the only drawback of the test was the time interval set for completing the form. That was altered, accordingly.

Data Collection and Analysis

Data were collected from online responses to the survey questionnaire. The analyses were related to the research questions. These are now stated below, followed by an explanation of the type of analysis undertaken.

Research Question 1: What is the correlation between high school technology education course relations to NTCC offerings and enrollment in corresponding career and technical courses at NTCC?

The statistic used to test the data to answer the first research question is Pearson's correlation, one appropriate measure of correlation. In statistical terms, this is a measure of the strength of the relationship between two variables. It is used to predict the value of one variable given the value of the other (Babbie, 2003). The strongest correlations are at both extremes of a scale ranging from a value of -1.0 to +1.0 and provide the best predictions. The variables in this case are the NTCC program of study total relation with high school courses and the NTCC total enrollment in the programs of study.

Research Question 2: How recently have technology education teachers visited or toured the career and technical education center which their school sends students?

The statistic employed in this case is frequency distribution of teacher responses to the visitation item of the survey presented in a Histogram. The variable is the percent of high school technology education teachers who indicated category of how long since they last visited NTCC.

Research Question 3: To what extent do the technology education teachers visiting of career and technical education centers impact the relation ratings of HS courses with the overall enrollment in career and technical education courses?

The statistic used for the analysis in the case is the Pearson correlation again. The variables are NTCC total enrollment in the courses and the NTCC programs' total score for the relation with high school courses score. Teachers responses are split into two groups based on the time since their last visit to NTCC – total relation scores are calculated for the seven NTCC programs of instruction for each group. The responses are divided as follows: (a) Group 1 = 3 or less years since last visitation; and (b) Group 2 = more than 3 years since last visitation.

CHAPTER 4

FINDINGS AND RESULTS

Introduction

The present investigative research was based on Super's Life-Span Theory of Career Development. The five stages of this theory include Growth, Exploration, Establishment, Maintenance, and Disengagement. This study is mainly concerned with the stages of growth and exploration, however, in attempting to determine the impact of technology education courses on the enrollment of students in related courses at career and technical education centers. The purpose of this chapter is to present the findings of the study that resulted from data collection and analysis.

Sample Description

Table 1 on the following page lists the seven programs of study offered by the Trade & Industrial Education department at NTCC. As indicated, there was a total enrollment of 261 with the highest enrollments indicated for Autobody Repair Technology (n = 43) and Automotive Mechanic Technology (n = 43), followed by Diesel Mechanics Technology (n = 34).

It is also important to note that 13 teachers were surveyed. All the technology education teachers who send students to the Northern Tier Career Center (NTCC) in Towanda Pennsylvania reported on relationship of the courses offered in their schools with the programs of study offered by NTCC. Also, as indicated in the table listing, Computer Technology (n = 23) and Machine Tool Technology (n = 21) showed the smallest enrollment

Table 1: NTCC Program Enrollment totals

Program of Study	Total Enrollment
Computer Technology	23
Elec/Pwr Trans Instal	25
Construction Trades	34
Autobody Repair Tech	43
Automotive Mechanic Tech	43
Diesel Mechanics Tech	34
Machine Tool Tech	21
Total	261

Results: Testing of Research Questions

The first research question asked, “What is the correlation between high school technology education course relations to NTCC offerings and enrollment in corresponding career and technical courses at NTCC. Table 2 on the following page presents the analysis findings. The statistic used was Pearson’s correlation. The null hypothesis stated that there would be no correlation between the NTCC programs of study total relations to the high school courses with the NTCC total enrollment. The alternative form of the hypothesis stated that there would be a correlation. The variables included in this analysis consisted of NTCC programs’ total score for the relation with high school courses score and NTCC total enrollment in the courses.

As indicated in Table 2, the correlation was non-significant and failed to reject the null hypothesis ($r = -.422$, probably $= .180$, one-tailed). While the value of r ($=-.422$) is considered a low to moderate correlation, the small sample size affected the statistical test. The negative correlation indicated an inverse relation. As the relation between the high school courses and the NTCC programs of study increased, the enrollment in the NTCC programs decreased. Since the correlation was not significant, inferences cannot be made to all programs and correlations must then be examined descriptively.

The second question asked, “How recently have technology education teachers visited or toured the career and technical education center which their school sends students? The statistic used was frequency distribution of teacher responses to the visitation item of the survey and is presented in a Histogram Figure (see Figure 1 following Table 2). The variable for this analysis was percent of high school education tech teachers who indicated category of how long since they last visited NTCC.

Table 2

Total Relations of the High School Classes with the NTCC Programs of Study and the Enrollment in the NTCC Programs

Program of Study	HS Total Relation	Total Enrollment
Computer Technology	67	23
Elec/Pwr Trans Instal	49	25
Construction Trades	145	34
Autobody Repair Tech	35	43
Automotive Mechanic Tech	77	43
Diesel Mechanics Tech	62	34
Machine Tool Tech	145	21
Total	67	261

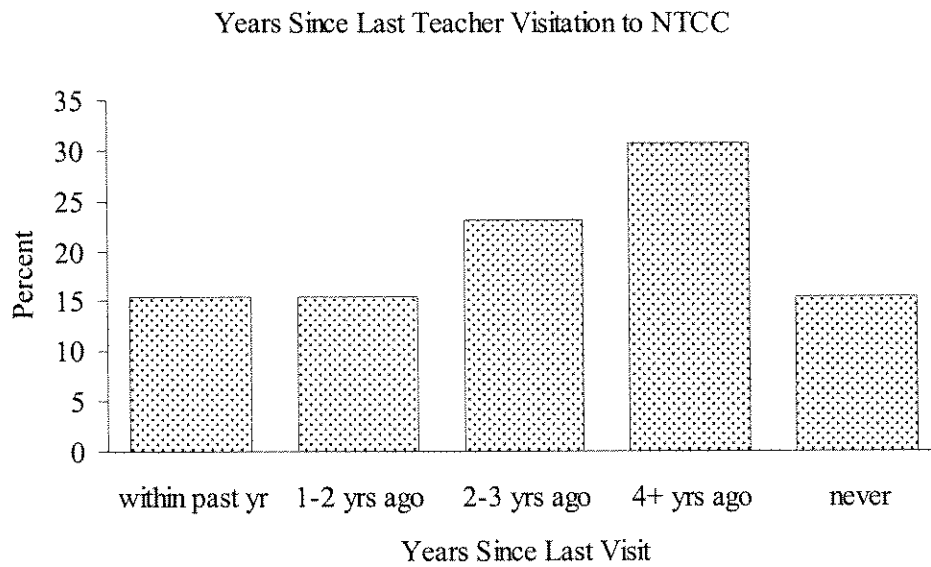


Figure 1: Percent of the 13 high school educational technology teachers who indicated the time since their last visit to NTCC

As indicated in the Histogram, the highest percent, 31% (4 teachers) , of the teachers' last visit to NTCC was four or more years ago. A total of 53% (7 teachers) of the teachers visited within the past three years, while 23% (3 teachers) visited two through three years ago. Of the total sample of teachers, 15% (2 teachers) had visited within the last year, while another 15% had visited one through two years ago.

The third question asked by this researcher was, "To what extent do the technology education teachers visiting of career and technical education centers impact the relation ratings of HS courses with the overall enrollment in career and technical education courses? The statistic in this case was a Pearson correlation. The hypotheses to be tested for both groups was: Null – There is no correlation between the NTCC programs of study total relations to the high school courses with the NTCC total enrollment.. Alternative - There is a correlation between the NTCC programs of study total relations to the high school courses with the NTCC total enrollment. The variables for this analysis included NTCC programs' total score for the relation with high school courses score and NTCC total enrollment in the courses.

Table 3 on the following page presents the results of the analysis. For the first variable, teachers' responses were split into two groups based on the time since their last visit to NTCC. Total relation scores were calculated for the seven NTCC programs of instruction for each group. The two groups were as follows: Group 1 = 3 or less years since last visitation and Group 2 = more than 3 years since last visitation. Correlations were calculated for both groups.

Table 3

Total Relations of High School Classes with the NTCC Programs of Study and the Enrollment in the NTCC Programs Grouped by Years Since Last NTCC Visitation

Program of Study	Group 1 Relation ^a	Group 2 Relation ^b	Total Enrollment
Computer Technology	27	13	23
Elec/Pwr Trans Instal	22	5	25
Construction Trades	57	31	34
Autobody Repair Tech	16	3	43
Automotive Mechanic Tech	27	23	43
Diesel Mechanics Tech	25	12	34
Machine Tool Tech	57	31	21
Total	27	13	261

^aGroup 1 consists of teachers who have visited NTCC within the past three years

^bGroup 2 consists of teachers who have visited NTCC four or more years ago

No correlations were significant. Results for Group 1 were $r = .355$, $p = .218$, one-tailed. Result for Group 2 were $r = .549$, $p = .101$, one-tailed. Again, .355 and .549 are considered low to moderate correlations. However, the small sample size affected the statistical tests. The negative correlation indicated an inverse relation.

It can thus be seen from that analysis that, as the relation between the high school courses and the NTCC programs of study increased, the enrollment in the NTCC programs decreased. For teachers who had not visited NTCC as recently, there was a stronger inverse correlation between the total score for relations of their courses with the NTCC programs and the enrollment in the NTCC programs. Again, because the correlations were not significant and results cannot be inferred to all programs, correlations were viewed descriptively

CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

Previous portions of this research presented individual parts of the study. This chapter combines these components into a unified whole. The research is summarized first and discusses the data that have been presented through answers to the hypotheses. Conclusions are then drawn from the analysis and literature review. These sections are followed by recommendations which focus on suggestions for future investigative studies of a similar nature, as well as on areas of concern deemed important in the light of the findings of this study. The following subsections provide this information.

Summary and Implications

The purpose of the present research investigation was to determine the impact of technology education courses on the enrollment of students in related courses at career and technical education centers. The general method of the study focused on exploring the relationship between high school/ NTCC course relations and NTCC enrollment. Seven programs of study offered by the Trade & Industrial Education department at NTCC were included in the study.

The present research also examined opinions of technology education teachers as they rate to what degree they feel their courses relate to course offerings at the career and technical center. A total of 13 teachers participated in the survey. All the technology education teachers who sent students to the Northern Tier Career Center (NTCC) in Towanda Pennsylvania reported on relationship of the courses offered in their schools with the programs of study offered by NTCC.

Three research questions were posited in the study. Answers to these may now be summarized as follows:

Question 1: What is the correlation between high school technology education course relations to NTCC offerings and enrollment in corresponding career and technical courses at NTCC?

Answer 1: Correlation was not significant. Descriptively, a low to moderate inverse relationship was found between technology education course offerings and enrollment in related career and technical courses. The higher the relationship between High School technology education course offerings to NTCC program offerings, the lower the enrollment in NTCC. This implies that enrollment in technology education course offerings in high school does not lead to enrollment in NTCC –in fact, quite the opposite.

Question 2: How recently have technology education teachers visited or toured the career and technical education center which their school sends students?

Answer 2: A total of 55% of the teacher sample population had visited NTCC within the past three years. This implies or suggests that teachers were less familiar with current NTCC course offerings and thus may not have recommended these courses to students because they were unaware of potentially newly updated program components and offerings.

Question 3: To what extent does the technology education teachers visiting of career and technical education centers impact the relation ratings of HS courses with the overall enrollment in career and technical education courses?

Answer 3: Correlations for both groups (visit within three years, visit four or more years) were not significant. In a descriptive context, both groups had low to moderate inverse correlations between technology education course offerings and enrollment in related career and technical courses. In fact, the inverse correlation was stronger for the group whose last visit was four or more years ago. This implies or suggests that teachers may not have not been recommending NTCC programs because they may not be aware of latest developments and improvements in these courses. This also implies that technology education course offerings and enrollment in related career and technical courses may not be compatible between NTCC and the high school.

Conclusions

On the basis of the data analysis and literature review, the present research study reached the following conclusions:

1. Enrollment in the technology education course offerings in high school – those that were included in the present study - does not lead to enrollment in NTCC – in fact, quite the opposite. This suggests that other technology education course offerings should be examined in a future study.
2. It is concluded that the technology education course offerings included in the present study and enrollment in related career and technical courses may not be compatible between NTCC and the high school or other courses at the high school or NTCC are better correlated than those selected for the present study.
3. In addition, it may be concluded that teachers should visit NTCC programs more frequently because it is possible they have not been recommending

NTCC programs to students. Perhaps they are unaware of latest developments and improvements in these courses.

4. Finally, it is possible that technology education courses have very high relationship to construction, machining, and mechanics courses, but business education would be more likely to be related to the electronics/computer service technology course (ECST or computer technology) as many business courses are now computer based. It may thus be concluded that other courses should be examined in future study.

Recommendations

On the basis of the findings and conclusions of the present research study, recommendations may now be presented as follows:

1. Future research should not be limited to trade and industrial courses at the career center. Future research should include all programs of study at the career center to determine which are and which are not correlated.
2. Also future investigations should be expanded on the high school side to include all career related courses such as technology education (used in this survey), Business Education, Marketing Education, Agricultural Education, and Home and Consumer Science Education (Home Economics). This would allow for a more expanded view of where overlaps between high school based career education and career center education occur.
3. In addition, it is recommended that future research, in an effort to support the findings of the present research study, conduct follow-up studies but on a broader scale with regard to teacher sample size and diversity of teacher

sample group. Such a study would almost certainly yield greater insight and perhaps an even closer convergence with the findings of the present research. It may also serve to further validate the findings of this study.

4. Future research might also concentrate the focus on determining why results in the present study showed an inverse correlation between time since teachers visited NTCC programs and enrollment in programs. It was concluded that teachers should visit NTCC programs more frequently because it is possible they are unaware of latest developments and improvements in these courses. The reason or reasons why this occurred was not identified in the present investigative study.
5. Finally, this researcher sees the need to conduct future studies using triangulation of methods for collecting data. Interviews and observations could supplement survey information and add to the validity of the findings. Underlying most uses of triangulation is the goal of seeking convergence of meaning from more than one direction. If the data from two or more methods seem to converge on a common explanation, the biases of the individual methods are thought to “cancel out” and validation of the claim is enhanced. It is important to note that this recommendation is supported in the statistical and methodological literature (Creswell, 2003).

Appendix A: Survey Form Examples

INFORMED CONSENT FORM FOR SOCIAL SCIENCE RESEARCH

The Pennsylvania State University

- Title of Project:** The Relationship of Technology Education Course Offerings to Career and Technical Education Programs
- Principal Investigator:** David Becker, Graduate Student
372 Lyons Ave
Williamsport PA, 17701
TELEPHONE: (570) 419-2242
EMAIL: dbecker@suscom.net
- Advisor:** Dr. Richard Walter
301C Keller Building
University Park, PA 16802
TELEPHONE: (814) 865-2133
EMAIL: raw18@psu.edu
- Purpose of the Study:** The purpose of the study is to determine to what degree technology education teachers feel their courses relate to the programs of study available at the career and technology center their school sends students to.
- Procedures to be followed:** You will be asked to complete a survey; the number of questions will vary based on the number of different courses you teach daily.
- Benefits:** You might learn more about yourself, the courses you teach and their similarities to other courses available to students. You might begin to think of ways to help students pursue technical education opportunities.
- Duration:** It will take about 20 – 40 minutes to complete the questions depending on the number of different courses you offer.
- Statement of Confidentiality:** Your confidentiality will be kept to the degree permitted by the technology used. No guarantees can be made regarding the interception of data sent via the Internet by any third parties. The data will be stored and secured on an internet server with encryption and password protected files. In the event of a publication or presentation resulting from the research, no personally identifiable information will be shared.
- Right to Ask** You can ask questions about this research. Contact David Becker at

Questions: (570) 419-2242 with questions. If you have questions about your rights as a research participant, contact The Pennsylvania State University's Office for Research Protections at (814) 865-1775.

Voluntary Participation: Your decision to be in this research is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer.

You must be a technology education teacher at a high school which sends career and technical education students to the Northern Tier Career Center in Towanda, PA to participate in this study

If you agree to this take part in this research study and understand the information outlined above please provide your name and email address and press the I UNDERSTAND Button. A copy of this agreement will be emailed to you.

Name: _____

Email Address: _____

I UNDERSTAND

Completion and return of the questionnaires implies your consent to participate in this research. You must be 18 years or older to participate in this research project.

Collection of basic data

Thank you for participating in this Survey!

I need to know some information about you and where you teach.

School where you teach: <input type="text"/>	
Lowest grade you teach: <input type="text"/>	Highest Grade you teach: <input type="text"/>
Number of different courses you teach each year: <input type="text"/> Example: If you teach 3 periods of Basic Woodworking, 2 Periods of Advanced Woodworking, and 2 Periods of Small Gas Engines; each day then you would teach 3 different courses.	
Are you familiar with the programs of study available at the Northern Tier Career Center <input type="text"/>	
The last time you visited or toured the Northern Tier Career Center was <input type="text"/>	
<input type="button" value="Continue"/>	

Technology Education Class Information

Please describe the 4 courses you teach.

Course Name	Course Objectives	Tools Used	Projects produced
Course 1 Narr			
Course 2 Narr			
Course 3 Narr			
Course 4 Narr			

Continue

The number of course openings relates to the number of courses the participant selected in the previous section.

NTCC Programs Visited

Which Programs have you visited or observed at the Northern Tier Career Center?

<input type="checkbox"/> All Programs	<input type="checkbox"/> Auto Body and Fender Repair
<input type="checkbox"/> Automotive Mechanics	<input type="checkbox"/> Building Construction
<input type="checkbox"/> Cosmetology	<input type="checkbox"/> Diesel Engine Mechanic and Repair
<input type="checkbox"/> Electrical Occupations	<input type="checkbox"/> Electronics / Computer Service Technology
<input type="checkbox"/> Food Production, Management and Service	<input type="checkbox"/> Health Assisting
<input type="checkbox"/> Medical Office Technology	<input type="checkbox"/> Precision Machining

Continue

Relationship of Technology Education Courses to Career and Technical Education Programs

Course Name	Course Objectives	Tools Used	Projects produced
<i>Course 1 Name</i>			

To what degree do you feel the Technology Education Course listed above relates to the following Career and Technical Education Programs:

Course Name	Course Objectives	Tools Used	Relationship of your <i>Course 1 Name</i> course to Program Described.
Auto Body Fender and Repair	Automotive reconstruction and restoration including: panel replacement and repair, frame repair, plastic repair, refinishing, autobody related mechanics, automotive electricity, estimating. Students study and practice all methods of autobody repair, including the use of hand tools, welding practices, body and frame repair, refinishing processes, spray painting techniques, interior trim removal, upholstery and weather-stripping.	Air Hammers, Grinders, Buffers, Paint Equipment, Welders, Drills, Dollies, Sanders, Compressors, Cutters, Torches, Specialty Tools	How closely related to you feel your <i>Course 1 Name</i> course is to the Auto Body Fender and Repair Program? <input type="checkbox"/> 0 - No Relationship <input type="checkbox"/> 1 - Slightly Related Courses <input type="checkbox"/> 2 - Courses Moderately Related <input type="checkbox"/> 3 - Course are Half Related <input type="checkbox"/> 4 - Course are Very Related <input type="checkbox"/> 5 - 99% Identical Courses
Automotive	Automotive technology including engine	Multimeters, Oscilloscopes, Engine	How closely related to you feel

<p>Mechanics</p>	<p>diagnosis, engine repairs, heating & cooling systems, power train, brake, suspension, and steering systems, computerized engine controls. Students study and practice all phases of engine repair and overhaul from diagnosis-problem solving to preventative maintenance.</p>	<p>Analyzers, Scanners, Precision Measuring Tools, Micrometers, Dial Indicators</p>	<p>your <i>Course 1 Name</i> course is to the Automotive Mechanics Program?</p> <p><input checked="" type="radio"/> 0 - No Relationship</p> <p><input type="radio"/> 1 - Slightly Related Courses</p> <p><input type="radio"/> 2 - Courses Moderately Related</p> <p><input type="radio"/> 3 - Course are Half Related</p> <p><input type="radio"/> 4 - Course are Very Related</p> <p><input type="radio"/> 5 - 99% Identical Courses</p>
<p>Building Construction</p>	<p>Construction and remodeling of buildings including carpentry, masonry, painting, drywall, cabinetry, stairs, finishes. Students study and practice all phases of building construction, from layout of site, foundation and wall construction, to roof framing and interior trim. Techniques include building partitions, subfloors, millwork (construction and installation of doors, molding and cabinetry), and application of finishing hardware.</p>	<p>Table Saw, Circular Saw, Jointer, Drill Press, Saw Buck, Drills, Finish Sander, Saber Saw, Band Saw, Planer, Power Miter Box, Router, Belt Sander, Bench Grinder</p>	<p>How closely related to you feel your <i>Course 1 Name</i> course is to the Building Construction Program?</p> <p><input checked="" type="radio"/> 0 - No Relationship</p> <p><input type="radio"/> 1 - Slightly Related Courses</p> <p><input type="radio"/> 2 - Courses Moderately Related</p> <p><input type="radio"/> 3 - Course are Half Related</p> <p><input type="radio"/> 4 - Course are Very Related</p> <p><input type="radio"/> 5 - 99% Identical Courses</p>
<p>Diesel Engine</p>	<p>Fundamentals of diesel engines with</p>	<p>Multimeters, Engine Analyzers,</p>	<p>How closely related to you feel</p>

<p>Mechanic and Repair</p>	<p>emphasis on light duty diesel equipment (tractors, light duty pick-up trucks, diesel automobiles). Students will be able to transfer and apply this learning to heavy duty diesel engines and equipment. Students study and practice all phases of diesel technology including diagnosis of malfunctions, disassembly of engines and examination of parts, reconditioning and replacement of parts, fuel injection systems, auxiliary power units, governors and transmissions.</p>	<p>Precision Measuring Tools, Micrometers, Dial Indicators, Calipers, Welders</p>	<p>your <i>Course 1 Name</i> course is to the Diesel Engine Mechanic and Repair Program?</p> <p><input checked="" type="checkbox"/> 0 - No Relationship <input type="checkbox"/> 1 - Slightly Related Courses <input type="checkbox"/> 2 - Courses Moderately Related <input type="checkbox"/> 3 - Course are Half Related <input type="checkbox"/> 4 - Course are Very Related <input type="checkbox"/> 5 - 99% Identical Courses</p>
<p>Electrical Occupations</p>	<p>Electrical systems including power, heat, light, motor controls, air conditioning, refrigeration, generators, transformers. Students study and practice all phases of residential, commercial and industrial electricity including layout, assembly, installation, testing and maintenance of electrical systems.</p>	<p>Drill Press, Electric Drill, Bench Grinder, Conduit Bender, Pipe Threader, Industrial Control Trainers, PLC Trainer</p>	<p>How closely related to you feel your <i>Course 1 Name</i> course is to the Electrical Occupations Program?</p> <p><input checked="" type="checkbox"/> 0 - No Relationship <input type="checkbox"/> 1 - Slightly Related Courses <input type="checkbox"/> 2 - Courses Moderately Related <input type="checkbox"/> 3 - Course are Half Related <input type="checkbox"/> 4 - Course are Very Related <input type="checkbox"/> 5 - 99% Identical Courses</p>
<p>Electronics /</p>	<p>Electronic and electrical systems including:</p>	<p>Variable Power Supply, Electronic</p>	<p>How closely related to you feel</p>

Computer Service Technology	capacitors, resistors, transistors, diodes, digital electronics, power supplies, AC circuitry, DC circuitry, microprocessors. Students study and practice all phases of basic electronics including parallel and series circuitry, digital and analog electronics, soldering and assembly techniques for manufacturing and repair of electronic components, with emphasis on computer repair technology. Students work toward CompTIA A+ certification.	Volt-Ohm Milliammeter, Digital Multi-Meter, Triggered Sweep Oscilloscope, Digital Logic Probe, Signature Analyzer, Soldering/Desoldering Tools	your <i>Course 1 Name</i> course is to the Electronics / Computer Service Technology Program? <input type="checkbox"/> 0 - No Relationship <input type="checkbox"/> 1 - Slightly Related Courses <input type="checkbox"/> 2 - Courses Moderately Related <input type="checkbox"/> 3 - Course are Half Related <input type="checkbox"/> 4 - Course are Very Related <input type="checkbox"/> 5 - 99% Identical Courses
Medical Office Technology	Preparation to assist physicians and other medical personnel by performing functions related to administrative of clerical duties in a medical office. Students study and practice medical terminology, computer operations, applicable laws and regulations, CPR, first aid, insurance forms, accounting, statistical reporting, medical records, medical transcription and word processing.	Computer/Network, Typewriter, Electronic Dictating/Transcribing System, Calculator, Office Machines	How closely related to you feel your <i>Course 1 Name</i> course is to the Medical Office Technology Program? <input type="checkbox"/> 0 - No Relationship <input type="checkbox"/> 1 - Slightly Related Courses <input type="checkbox"/> 2 - Courses Moderately Related <input type="checkbox"/> 3 - Course are Half Related <input type="checkbox"/> 4 - Course are Very Related <input type="checkbox"/> 5 - 99% Identical Courses
Precision	Machining Fundamentals including layout,	Hand tools, band saw, multi-spindle	How closely related to you feel

<p>Machining</p>	<p>sawing, drilling, milling, turning, grinding operations, and inspecting. Students study and practice basic machine tool operations including; milling machines to cut parallel and perpendicular surfaces, slots, pockets, and arcs; lathes to turn inside and outside diameters, tapers, grooves, threads, and contours with an emphasis on precision results. CNC (computer numerical control) programming fundamentals are also covered.</p>	<p>drillpress, vertical milling machines, engine lathes, surface grinder, surface plate, optical comparator, and personal computers.</p>	<p>your <i>Course 1 Name</i> course is to the Precision Machining Program?</p> <p><input checked="" type="checkbox"/> 0 - No Relationship</p> <p><input type="checkbox"/> 1 - Slightly Related Courses</p> <p><input type="checkbox"/> 2 - Courses Moderately Related</p> <p><input type="checkbox"/> 3 - Course are Half Related</p> <p><input type="checkbox"/> 4 - Course are Very Related</p> <p><input type="checkbox"/> 5 - 99% Identical Courses</p>
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Next Course

Thank you for participating

Thank you for completing this survey, when a report is generated you will be notified where to download a copy.

You will be forwarded back to the informed consent form in 10 seconds.

Appendix B: Unabbreviated Names of the NTCC programs.

COMPUTER TECHNOLOGY = ESCT

ELEC/PWR TRANS INSTALL Oth = ELECTRICAL

CONSTRUCTION TRADES = BUILDING CONSTRUCTION

AUTOBODY REPAIR = AUTOBODY

AUTOMOTIVE MECHANIC TECH = AUTOMECHANICS

DIESEL MECHANICS TECH = DIESEL

MACHINE TOOL TECH = MACHINING

Appendix C: Letter of Invitation

September 1, 2005

Mr./Mrs. Technology or Industrial Arts Education Teacher
Specific High School
High School Address
Town or City, PA 18848

Dear Mr./Mrs. Technology Education Teacher:

I am a technology education teacher at the Jersey Shore Area High School and a Graduate of California University of Pennsylvania. Currently, I am working to complete my Master's Degree at Penn State University in Workforce Education and Development. As part of my Master's Degree requirement, I must complete a research-based thesis. In order to accomplish this, volunteers are being sought to participate in a research project entitled "The Relationship of Technology Education Course Offerings to Career and Technical Education Programs." I am hoping that you would be willing to assist me.

Current statistics indicate that high schools are sending 80% of their students to four-year baccalaureate degree programs to fill 20% of the jobs that require such an education. Reality is that highly technical, high wage trades dominate the unfilled job market. With this in mind, it is of utmost importance that instructors who teach students these technical skills, work together to create a seamless career path that will allow students to make informed career decisions.

The goal of this online survey is to determine how the classes you offer interact with courses offered at the Northern Tier Career Center (NTCC), as this is the career and technical center that your school sends students to for technical training. This survey will try to determine what programs you have visited at the NTCC. It will also inquire about the objectives, tools, and projects of your classes, as well as see if you feel the course is related to any of the programs of study offered at the NTCC.

With this data, hopefully school administrators can better plan school in-service trainings and allow both NTCC instructors and high school technology education teachers opportunities to network, discuss and align courses objectives, and compare equipment. The ultimate beneficiaries would be the students, who would be able to explore various career fields and make informed career decisions.

The survey can be found online at www.domainname.com. I understand that your time is precious and thank you in advance for participating.

Sincerely,

David A. Becker

Technology Education Teacher
Jersey Shore Area High School
372 Lyons Ave
Williamsport, PA 17701
Telephone (570) 419-2242
Email dbecker@suscom.net

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