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Effects Of Size And Wealth On Implementation Of Tech Prep In Indiana

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by

John Robert Hutton

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The dissertation of John Robert Hutton, Contribution to the School of Graduate Studies, Indiana State University, Series III, Number 641, under the title Effects of Size and Wealth on Implementation of Tech Prep in Indiana is approved as partial fulfillment of the requirements for the Doctor of Philosophy Degree.

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ABSTRACT

In 1987, Indiana became the first state to mandate the development of a Tech Prep curriculum. Since Tech Prep was essentially an unfunded legislative mandate, this study was designed to determine whether school corporation wealth or high school size were implementing factors. A one-way and two-way analysis of variance along with a chi square statistical test were utilized to analyze the data in this study.

The following conclusions were drawn:

1. The wealth of school corporations did not affect the stages of Tech Prep implementation in Indiana high schools.

2. Differences did exist in the stages of implementing the five criteria associated with the Tech Prep legislation regardless of school corporation wealth.

3. The high school size classification was a factor in the stage of implementing an action plan for a Tech Prep program, but was not a factor for the following criteria: identification of a career cluster, development of a scope and sequence, development of core curriculum classes, and establishment of articulation agreements with post secondary institutions.

4. Ten pre-determined barriers associated with Tech Prep implementation were perceived by Indiana high school principals to be negative factors in implementing Tech Prep

with a lack of time for staff development and a lack of financial support being the major barriers. Other analyzed barriers to Tech Prep implementation were negative attitudes, staff resistance, lack of understanding, lack of post-secondary support, local flexibility, lack of business support, lack of staff development, and pressure for a quick success.

An implication of the study not statistically tested but supported by the review of literation and Indiana principal responses on the survey instrument was the need for state and federal financial support. In order to fully implement Tech Prep, the program must become a funded mandate.

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TABLE OF CONTENTS

Chapter Page

Chapter Page

LIST OF TABLES

Table Page

Table Page

Chapter 1

INTRODUCTION

While one of the failures of recent educational reform has been the inability to agree on the purpose of education, it can be reasonably argued that a major purpose of education is to develop a highly competent workforce. Educational historian, Joel Spring, joins other historians as he effectively argues this point in his book The Deculturization and the Struggle for Equality and through many of his other works. Similarly, Benjamin Franklin, in the mid 18th century, summarized what he believed to be the purpose of education with one sentence in his book Idea of the English School: "Thus instructed youth will come out of school fitted for learning any business or profession" (Bailyn, 1972, p. 35). Certainly, strong arguments can also be offered to suggest that the primary purpose of education is to enhance the values of the dominant culture, to develop an informed citizenry capable of participating in the democratic process, or to empower each citizen to maximize one's potential. From a historical perspective; however, it appears that a primary purpose of education for nearly the last two hundred years has been to establish an effective

workforce (Spring, 1994).

The primary purpose of education has changed considerably since the 17th century when the Pilgrims established schools to inculcate cultural values through Bible study. Benjamin Franklin and Henry Adams were educated in the traditions of inculcating of cultural values through Bible study. Further, both argued that the traditional education that they received from their schools and parents did not prepare them for their chosen careers. However, in spite of the strong arguments of Franklin and Adams against the traditional purpose and practice of education, change did not occur rapidly (Bailyn, 1972).

When the needs of a growing commercial economy began to surface in the beginning of the 19th century, the more universal need for vocational schooling and training for the workforce became more apparent. Education by this time had begun a metamorphoses, and the primary purpose of education was shifting from inculcation of culture to vocational preparation. The introduction of attitudes, behaviors, manners, and morals was being transferred from the family to the schools. An outcome of teaching these values was the development of a curriculum based on social adaptations as related specifically to career opportunities. These career opportunities evolved into apprenticeships which marked the first evidence of vocational education. Apprenticeships, according to Bailyn (p. 17, 1972), were "a contractual exchange of vocational training for personal service."

Apprenticeships continued to grow through the Reconstruction Era in the 1870s when schools were asked to educate the newly freed African-American slaves and to provide them with the skills necessary to enter the workforce. Likewise, at the turn of the 20th century, when massive immigration occurred in the United States, schools were asked to "Americanize" the immigrants and to prepare them for the workforce. Again, vocational education and specifically apprenticeships constituted the means by which to accomplish the goal of preparing the immigrants for the workforce. From the 17th century through the beginning of the 20th century, American schools had progressively become the training ground for the youth of America preparing to enter the workforce.

Early in the 20th century, an extensive growth in industry fostered the growth of a new working class and together ushered in a shift in American society from its agrarian roots to an industrial focus. This shift to an industrial focus created a need for management to be more concerned about worker performance. Frederick Taylor, an organizational theorist, shared that concern of worker performance. Taylor felt that the way to improve performance was "to improve the techniques and methods of the workers" (Hersey & Blanchard, 1988, p. 87). Taylor's "scientific manager" put a premium on tight scheduling and organization.

In an effort to prepare students for the Industrial

Age, schools drastically changed their structures and incorporated many of Taylor's concepts into school organization. This marked the beginning of what many educators have deemed the "factory model" of school organization; this model is still in use today (Hersey & Blanchard, 1988). Business people were satisfied with this system because students were placed into a school environment which was very similar to the one that workers encounter. The consensus was that by simulating a working environment the transition from school to work would be best served.

Although Taylor's theory is still used in schools today, scientific management is not the endorsed organizational theory of most business managers. Instead, theorist such as Mayo, McGregor, Herzberg and Deming have ushered in a more humanistic organizational theory and business appears to have moved in the direction of embracing a more humanistic organizational theory as evidenced by the growth of Total Quality Management (Law, 1994). Nevertheless, most schools continue to employ a highly bureaucratic organizational model which does not reflect the changes made in the business world. As a result, this difference in managerial approaches has created a gap between the skill expectations of the business world and the level of skill that students bring with them to the workplace (Secretary's Commission on Achieving Necessary Skills, 1991). This gap creates a perception to the

business world that the present educational system is not adequately accomplishing its primary purpose, to develop a highly competent workforce.

In April of 1983, a report entitled, A Nation at Risk, was released to the public; this report supported the concerns of the business world (National Commission of Excellence in Education, 1983). The report was very critical of the American workforce and specifically critical of the schools that were preparing the students for entry into the workforce. The report stated, "if an unfriendly foreign power had attempted to impose on America the mediocre educational performance that exists today, we might well have viewed it as an act of war" (National Commission of Excellence in Education, 1983, p. 3). According to the report's findings, American students, relative to students in other industrialized nations, ranked at or near the bottom in almost every academic category. Subsequently, several other studies have substantiated the claims of A Nation at Risk (National Commission of Excellence in Education, 1983). For Example, the Secretary's Commission of Achieving Necessary Skills (Scans) Report emphatically stated that schools must better prepare students for the workforce (1989). Further, in a poll of 800 Indiana employers taken by The Indiana Youth Poll (1992, p. 1), thirty-seven percent felt that recent Indiana high school graduates "lacked the basic skills . . . for an entry level position."

Today, American students encounter a different world than the one encountered by their parents. The United States is no longer the economic center of the world as it used to be. Products made in the United States are no longer considered the best in the world, and the value of the American dollar is now dependent on the value of other currencies. Also, the United States is presently confronted with the challenge of global economic competition (J. Dudley Herron, 1992). The Industrial Age has been replaced by the Information Age. The ability to access, manipulate, and store information is the present basis of power in the global economy. Secondary and higher learning institutions are under pressure to produce graduates who are prepared to utilize the rapidly advancing technology that is available to them. The urgency of education to produce workers who have greater levels of skills relates to this country's economic survival. Namely, if this country is going to maintain its economic position in the world, it must produce either graduates who are ready to successfully enter a workforce dominated by technology or graduates who are prepared to successfully enter a higher learning institution (National Commission of Excellence in Education, 1983, p. 2).

Nearly 100 years ago Charles Dickens started his classic A Tale of Two Cities with:

> It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of light, it

> was the season of Darkness, it was the spring of hope, it was the winter of despair, we had everything before us, we had nothing before us. . . . (1859, p. 1)

Dickens words seem to parallel present conditions. Today people have more money than ever, but the basis of our economy has been shaken. There are more high school graduates than ever before, but the number entering the workforce that are unprepared for employment is staggering (Indiana Youth Institute, 1993). There are, without question some of the greatest advances in education now taking place, but, at the same time, the amount of miseducation has reached epidemic proportions (National Education of Excellence in Education, 1983). For education, it truly is the best of times and the worst of times.

The traditional high school diploma no longer has the impact it once had because knowledge is increasing at an exponential rate, making traditional employment and job skills obsolete. Furthermore, businesses are demanding highly skilled employees in technology so that they can perform the new jobs dictated by global competition. Moreover, students with a diploma but no marketable skills will be placed at an extreme disadvantage as they enter today's workforce.

In recognition of this disadvantage, the Indiana General Assembly passed Public Law 217-1987 and established Indiana's Tech Prep initiative in 1987. The purpose of the Tech Prep initiative was to develop a curriculum that bridges the gap between what the students are now learning

and what they need to learn to successfully enter the workforce.

The legislation established five goals to be accomplished by June 30, 1994. A school district would have complied with the Tech Prep legislative state mandate by meeting the criteria set forth in the following goals:

1. Each school will have an action plan for the implementation of the Tech Prep program until all components are fully implemented.
2. Each school will have identified at least one career cluster for targeting their Tech Prep program.
3. Each school will have identified a sequence of courses in each targeted career cluster for students to follow in a secondary/post-secondary Tech Prep program.
4. Each school will be ready to implement the first level of Tech Prep core courses for the fall of 1994.
5. Each school will have an articulation agreement in place by the end of the 1994-1995 school year.

Statement of the Problem

The state of Indiana has mandated that each school district must make substantial curricular changes by June of 1994 in order to comply with P. L. 217-1987. Since this mandate was accompanied by a one dollar appropriation or essentially no financial support from the state, it is important to determine the extent to which the wealth of a school corporation and the size classification of a high school have upon the implementation of P. L. 217-1987. The

purpose of this study was three-fold: 1) to investigate whether a relationship exists between school corporation's stage of implementation of the Tech Prep program and a school corporation's wealth, 2) to investigate whether a relationship exists between a school corporation's stage of implementation of the Tech Prep program and the size classification of the school corporation's high school, and 3) to identify barriers other than corporation wealth and high school size classification that exist with regard to the implementation of a Tech Prep program.

Corporation wealth was determined by computing the assessed valuation per average daily membership as referenced by the Indiana Department of Education and then dividing the corporations into three groups: high, medium, and low. High school size classification was determined by the Indiana Department of Education's seven school corporation groups: large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural. This classification was determined by using information provided by the Indiana Department of Education. The barriers were determined by selecting barriers from a list developed by Debra Bragg (1994) or solicited responses from principals.

The focus of this study was to determine what, if any, difference exists between the stage in which a high school is implementing Tech Prep as outlined by the goals associated with Public Law 217-1987 with respect to the

wealth of a school corporation and the size classification of the high school. The following research questions provided the basis for the research:

1. Is there a difference in the stage of implementing a Tech Prep action plan with regard to the wealth of a school corporation as identified by high, medium, or low?

2. Is there a difference in the stage of implementing the most advanced implemented career cluster with regard to the wealth of a school corporation as identified by high, medium, or low?

3. Is there a difference in the stage of implementing the most advanced scope and sequence of courses for a targeted career cluster with regard to the wealth of a school corporation as identified by high, medium, or low?

4. Is there a difference in the stage of implementing first level Tech Prep core curriculum courses with regard to the wealth of a school corporation as identified by high, medium, or low?

5. Is there a difference in the stage of implementing an articulation agreement with a post secondary educational institution with regard to the wealth of a school corporation as identified by high, medium, or low?

6. Is there a difference in the stage of implementing an action plan with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classifications?

7. Is there a difference in the stage of implementing the most advanced implemented career cluster with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classifications?

8. Is there a difference in the stage of implementing the most advanced scope and sequence of courses for a targeted career cluster with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classifications?

9. Is there a difference in the stage of implementing first level Tech Prep core curriculum courses with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classifications?

10. Is there a difference in the stage of implementing an articulation agreement with a post secondary educational institution with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classifications?

11. What, if any, are the barriers associated with the implementation of a Tech Prep program?

Significance of the Study

The Lilly Endowment Incorporated recently funded a research project conducted by Dr. Gary Orfield of Harvard

University and Dr. Faith Paul from The Public Policy Research Consortium. The purpose of the project was to interview teenage students in Indiana in order to evaluate their future opportunities as they perceived them. The project defined opportunity as "a favorable juncture of circumstances; a good chance for advancement" (p. 1). The conclusion of the researchers was that a gap exists between the expectations of the students and the opportunities available to the students. The project report was called "High Hopes and Long Odds" and was disseminated by the Indiana Youth Institute (1993).

The report warns students that "just as travelers would not rely on a Model T to carry them to an important destination, neither should today's students have to trust an out-of-date education vehicle to deliver them to their future" (Indiana Youth Institute, 1993, p. 1). As many as 50% of the Indiana teenagers who were surveyed indicated that they left high school undereducated and underprepared for the world that they were entering (Indiana Youth Institute, 1993, p. 1). Students often cited a gap between where they are career-wise and where they would like to be. The state-mandated Tech Prep initiative is an attempt to bridge that gap.

This research attempted to analyze the stage of implementation of Tech Prep programs in the state of Indiana. Further, the research attempted to discover whether the stage of implementation is related to the wealth

of a school corporation or to the size classification of a high school. Thirdly, the research attempted to discover whether a restructuring effort of this magnitude can be implemented with very limited state funding. The findings should be particularly valuable to the state legislature, the Department of Workforce Development, the State Department of Education, and the executive branch of state government. In other words, can significant curriculum restructuring occur with limited funding? Finally, since by state statute, school implementation is to be completed in the 1994-1995 school year, little or no research exists on the topic. Therefore, this study took on added significance because the results provided timely information on a much needed reform initiative.

Operational Definition of Terms

Action Plan. An action plan is a three year plan developed by a school corporation for the purpose of developing and implementing a Tech prep program (IC 20-10.1-4-12).

Articulation Agreement. An articulation agreement means a commitment to a program designed to provide students with a non-duplicative sequence of progressive achievement leading to competencies in a Tech Prep education program (IC 20-10.1-4-12).

Average Wealth School Corporation. A school corporation in Indiana which ranks in the middle one third of all corporations in wealth as measured by the ratio of the corporation's assessed valuation (AV) to its average daily

membership (ADM).

Career Cluster. A career cluster is a sequential plan of study in one of the following areas: engineering technology, applied science, mechanical, industrial, or practical art or trade, or agriculture, health, or business (IC 20-10.1-4-12).

Community College. Community college is an institution which provides not less than a 2-year program which is acceptable for full credit toward a bachelor's degree (Section 1201[a] Higher Education Act of 1965)

First Level Tech Prep Core Courses. First level Tech Prep core courses are courses in mathematics, science, and communications which are taught using applied methodologies (IC 20-10.1-4-12).

High School. A high school is a school in which student enrollment which includes all combinations of grades 9-12.

High School Principal. A high school principal is the chief administrator of a high school.

High Wealth School Corporation. A school corporation in Indiana which ranks in the upper one third of all corporations in wealth as measured by the ratio of the corporation's assessed valuation (AV) to its average daily membership (ADM).

Implementation. A high school has successfully implemented the Tech Prep program if it satisfies the following criteria:

1. Each school has an action plan for implementation of

the Tech Prep program until all components are fully implemented.

2. Each school has identified at least one career cluster for targeting their Tech Prep program.

3. Each school has identified a sequence of courses in each targeted career cluster for students to follow in a secondary/post secondary Tech Prep program.

4. Each school was ready to implement the first level of Tech Prep core courses for the fall of 1994.

5. Each school has an articulation agreement in place by the end of the 1994-1995 school year (IC 20-10.1-4-12).

Institutions of Higher Education. Institutions of higher education are institutions offering apprenticeship programs of at least 2 years beyond the completion of secondary school (IC 20-10.1-4-12).

Large City. A large city is a central city of a metropolitan statistical area with a population greater than or equal to 400,000 or a population density greater than or equal to 6,000 people per square mile (Indiana Department of Education, 1994).

Large Town. A large town is a town within a metropolitan statistical area, with a population greater than or equal to 25,000 people (Indiana Department of Education, 1994).

Low Wealth School Corporation. A school corporation in Indiana which ranks in the lower one third of all corporations in wealth as measured by the ratio of the corporation's assessed valuation (AV) to its average daily

membership (ADM).

Metropolitan Statistical Area. 1) A metropolitan statistical area is an urbanized area of at least 50,000 with a total metropolitan population of at least 100,000. 2) An area may be a metropolitan statistical area if it is the only metropolitan statistical area and it has a city of at least 50,000 (Indiana Department of Education, 1994).

Mid-size City. A mid-size city is a central city of a metropolitan statistical area with a population less than 400,000 and has a population density less than 6,000 people per square mile (Indiana Department of Education, 1994).

Rural. A school corporation containing less than 2,500 students and is coded rural by the Census Bureau (Indiana Department of Education, 1994).

Small Town. A small town is a town not within a metropolitan statistical area, with a population greater than or equal to 25,000 people (Indiana Department of Education, 1994).

Tech Prep Education Program. A Tech Prep education program means a combined secondary and post-secondary program which leads to an associate degree, provides technical preparation in at least one career cluster, builds student competence in mathematics, science, and communications through applied academics, and leads to placement in employment (IC 20-10.1-4-12).

Urban Fringe of a Large City. Urban fringe of a large city is a place within a metropolitan statistical area of a large

central city and is defined as urban by the Census Bureau (Indiana Department of Education, 1994).

Urban Fringe of a Mid-Size City. Urban fringe of a large city is a place within a metropolitan statistical area of a mid-size central city and is defined as urban by the Census Bureau (Indiana Department of Education, 1994).

Limitations

The research for this study was limited by the following:

1. The respondents understanding of the relatively new concept of Tech Prep.
2. The ambiguity associated with the definition of Tech Prep.
3. The objectivity of the respondents in completing the survey.
4. The degree to which the returned surveys represent characteristics of the population.
5. The degree to which the surveying instrument is understood by the respondents.
6. The different high school configurations (i.e. 9-12, 10-12, or 11-12).
7. The high schools surveyed are limited to the state of Indiana.

Delimitations

The research had the following delimitations:

1. The study was conducted during 1994, and responses will

be elicited from principals or their designees during the 1994-1995 school year.

2. High schools were arbitrarily divided into three equal sized categories based upon their school district's wealth.

Organization of the Study

This study is divided into five chapters. Chapter one introduces the problem and the research questions formulated in terms of the problem. Chapter two reviews the current literature on the topic and any related research associated with the research questions. Chapter three describes the design and the methodology used to statistically test the hypotheses stated in the introduction. Chapter four presents the findings and related statistical analyses. Chapter five includes a summary of the research as well as the conclusions and recommendations for future research.

Chapter 2

A REVIEW OF THE LITERATURE

The derivation of the Tech Prep initiative can be traced back to many of the principles of vocational education. Although Tech Prep is much more than vocational education, a clear understanding of vocational education is an essential component of a successful Tech Prep program. Vocational education began in the United States at the turn of the 18th century with the advent of apprenticeships which were to begin after instruction was completed in the basic themes of schools in that time period: literature, religion, and "moral indoctrination" (Bailyn, 1972, p. 31). Coincidentally, the pervasive concept about vocations, during this period in the history of American education, originated from the philosophies of the early Greek thinkers. The Greeks philosophized that learners could be categorized as either "ideal-minded" or "practical minded" with the former being superior to the latter (Law, 1994). Therefore, since vocational education is "practical minded," it has been stigmatized as a second-class education.

By 1820, apprenticeships began to move away from being entirely agricultural and more toward a combination of

agriculture and mechanical training. This mechanical training provided the manual skills necessary for entering the workforce. The trend toward manual preparation and vocational education continued to grow so that by 1890 many high schools included vocational education courses in their curriculum (Pulliam, 1987). Societal needs dictated that education transform from a mechanism to serve the individual to a mechanism to serve the newly created industries. Historian, Joel Springs (1991) noted that during this period of time the primary purpose of education shifted from a religious orientation to the development of an effective workforce. This philosophical shift continued into the 20th century and has become one of the primary arguments offered in defense of vocational education and the Tech Prep initiative.

As vocational education classes developed in high schools, the need to train teachers became apparent. As early as 1880, Columbia University established a teacher training program for developing educational experiences stressing manual labor skills. Furthermore, the Federal Government began assisting teacher training by passing the Morrill Acts, the Smith-Hughes Act, and the Hatch Act in the early 1900s. These acts were designed to establish colleges of agriculture and mechanical arts as well as to provide funding for teacher salaries and research (Pulliam, 1987). A background in agriculture and mechanical arts was believed beneficial for providing workers of the future with

the necessary skills to effectively enter the workforce during this period of time, and teacher training was necessary to ensure that future workers possessed the necessary skills.

The federal government's interest in vocational education continued to grow throughout the twentieth century. For example, the George-Reed Act, the George-Deen Act, and the Capper-Ketcham Act were all attempts to promote vocational education in the schools. Vocational education was also bolstered by the National Defense Education Act of 1958 and the Vocational Education Act of 1965 which not only extended coverage to skilled and semi-skilled workers but to potential high school dropouts as well (Pulliam, 1987).

The primary objective of early federal initiatives was to promote vocational education in order to provide the nation with an effective workforce, and that need still exists today. This philosophy was interrupted during the New Deal Acts of the 1940s when a new agenda became apparent. That is, vocational education was promoted as a way to improve social ills such as poverty and unemployment by providing jobs and job training (Pulliam, 1987).

Regardless of the motive, legislation to promote vocational education has done much to validate the theories of respected philosopher and educator, John Dewey. Dewey, in the early and middle 1900s, advocated a progressive educational system based upon two processes - socialization and psychology. Dewey viewed progressive education as a

continuous interaction with experiences. "Growth occurs when an interaction is based upon a previous learned experience, and the learner has developed a higher level of intelligence" (Dewey, 1934, p. 64). This interaction is dependent upon the social conditions at the time of the experience, the maturity of the individual and the degree of freedom which the individual is permitted. Thus, Dewey's philosophy of an active learner interacting within a structured environment, complimented the philosophy of those advocating vocational education in his era.

Dewey wrote in 1900 of an "overly-specialized" educational system that placed a premium on the accumulation of information and scorned manual training (Dewey, 1900, p. 27). He argued that workers such as mechanics, doctors, farmers, and railroad workers were dropping out of the educational system early because the schools were not teaching the practical skills necessary to earn a living. In Democracy in Education (1917), Dewey challenged the schools to become the training ground for life-long experiences through the simulation of activities and experiences useful in a democratic society. He feared a two-tier system was developing between the systematic learners and those learning from vocational experiences. Dewey argued that preparation for a democratic life required a merger between subject matter and vocational training rather than a total reliance on either.

The merger he advocated was more than training students

for industrial jobs through vocational education. Dewey's viewpoint, simply stated, was that vocational education should enhance the curriculum by allowing students to gain "insights into the complexities and value issues of an industrial society" (Law, 1994, p. 104). Frank Leavitt (1914, p. 80) continued the argument by asking, "Why should we hesitate to lay hands on industry in the name of education when we have already laid hands on the schools in the name of industry?"

Since the early 1900s, in spite of Dewey's warning, the gap between an academic education and vocational education has widened. Vocational education has fulfilled the prophecies of the ancient Greek philosophers and has evolved almost strictly into a "hands-on-approach" divorced from the academic side of education. This has created a situation that severely limits the opportunities for a vocational student to pursue post-secondary education. Consequently, the lack of a rigorous or equivalent academic background makes the transition from high school to college for vocational students nearly impossible. In a recent poll, the Indiana Youth Foundation (1993) reported that 80% of all sophomores taking vocational courses believed they had no chance to go to college.

Gene Bottoms, educational philosopher and author, believes that one way to solve this discrepancy is to change the "relationship between academic and vocational education in high schools" (Bottoms, 1991, p. 381). Dale Parnell, an

educational reformist, further suggests that recent studies indicate that comprehension is increased for a learner when "learning to know" and "learning to do" are merged (Hull & Parnell, 1991, p. 68). By combining Bottoms' and Parnell's schools of thought, the emerging philosophy would be that students learn academic material easier and retain it longer when it is learned as a real life experience. This philosophy would certainly be more in line with the educational philosophy espoused by John Dewey. Furthermore, this orientation would be more in line with what current research suggests is the best way to educate students (Parnell, 1991, p. 26).

This fundamental change in philosophy will require a shift in the current paradigms with respect to educational structures. Since these structures are so deeply rooted, the amount of time required to make such changes should not be underestimated (Bottoms, 1991).

Tech Prep as Systemic Change

Law (1994) suggests that the structural changes in education that Dewey advocated should be considered in the context of systemic improvement that he calls Total Quality Education (TQE). TQE, based on Deming's Total Quality Management (TQM) theory, advocates change as a systemic process that focuses on the total system rather than its components. Quality occurs, according to Deming (1986), when all the individuals or components in the organization work together to achieve the goals of the system.

TQE, therefore, requires all the components of the educational system to work as a "holistic unit" to improve educational quality (Law, 1994, p. 29). That is, educational reform initiatives should not be implemented as stand-alone projects but should be implemented so as to connect them to the entire system. Whether the initiative is Indiana 2000 schools, Re:Learning, SIRUS-A, or Tech Prep, the success of the reform initiative will depend upon the degree to which the initiative is connected to the entire educational program.

How does Tech Prep relate to these other reform efforts in Indiana? In 1991, the Indiana General Assembly passed legislation which enabled selected school districts to restructure. Schools that participate in this restructuring processs are called Indiana 2000 schools. In order to be designated as an Indiana 2000 school a school must be prepared to demonstrate the following:

1. a commitment to restructuring;
2. a vision with long and short term goals;
3. a staff development plan;
4. a plan for ongoing student and program evaluation;
5. a plan to address the six national goals of America 2000; and
6. the school must agree to certain administrative conditions. (Herron, 1991, Chapter 8, p. 3)

In return schools were provided the flexibility to waive any rule adopted by the State Board of Education (Herron, 1991). The requirements of the Tech Prep initiative correlate with the requirements of Indiana 2000 schools.

Re:Learning is another systemic school reform

initiative in Indiana which shares a common ground with Tech Prep. Re:Learning was developed by merging Theodore Sizer's Coalition of Essential Schools with the principles developed by the Education Commission of the State of Indiana. The principles of Re:Learning are as follows: intellectual focus; simple goals; universal goals; personalization of instruction; student centered learning; mastery learning; tone of collaboration with parents; staff as teachers first; and a reduction of some current services to provide more instruction time to students (Herron, 1991, Chapter 8, p. 4).

Although both Indiana 2000 schools and Re:Learning are more comprehensive than is Tech Prep reform, each is based on current educational research, and each is mutually compatible in a total educational program. According to Law (1994), school reform can only be successful if it is implemented as a systemic change and is implemented in connection with the entire educational program. Tech Prep, as previously illustrated, is compatible with state validated programs designed to promote effective systemic change. Hence, Tech Prep should be considered a viable systemic reform initiative.

What is Tech Prep?

In an attempt to facilitate the systemic changes needed for reform, the federal government passed Public Law 101-392, the Carl D. Perkins Vocational and Applied Technology Act Amendments of 1990. Section 343.3 of this

law states the following:

> The term "Tech Prep education program" means a combined secondary and postsecondary program, which (A) leads to an associate degree or two-year certificate; (B) provides technical preparation in at least one field of engineering technology, applied science, mechanical, industrial or practical art or trade, or agriculture, health or business; (C) builds student competence in mathematics, science, and communications (including through applied academics) through sequential course of study; and (D) leads to placement in employment. (Congressional Record, 101st Congress)

Commonly called Perkins II, this legislation created a general model for a Tech Prep program that would merge vocational education with traditional academics for high school students through at least two years of college. Perkins II provided funds for those states which were developing models that met the specifications as outlined in the legislation. Upon receipt of the money, each state was expected to award implementation grants to a consortium which was to be composed of secondary institutions and higher learning institutions. Since the total appropriation for fiscal years 1991 and 1992 from Perkins II was $153.4 million, a proliferation of Tech Prep programs began sweeping the nation (Bragg, 1994).

Although Perkins II legitimized Tech Prep programs by providing funding, the roots of Tech Prep can probably be traced back to educational reforms of the 1970s. In 1972, the National Institute of Education advocated articulated agreements between secondary and post secondary institutions in order to merge vocational education and academic education (Dornsife & Bragg 1992). Other local

visionaries, in assessing the need for more "real life" experiences in education, developed programs in the 70s which had likenesses to many of the Tech Prep approaches seen today (Law, 1994). For example, the development of career opportunities in academic courses was a student outcome in most curriculum guides in the 1970s.

It was not until the mid 1980s, however, that the Tech Prep model became more of an accepted educational philosophy. In 1984, the National Commission on Secondary Vocational Education recommended, in a report titled "The Unfinished Agenda," "a linkage between vocational and academic education and a strengthening of career guidance." In 1985, Dale Parnell, Commissioner of Oregon Community Colleges, took the ambiguous concept of Tech Prep and redefined it in such a way that a more formal model was introduced. In An Open Letter To the Leaders of Oregon High Schools and Community Colleges, Parnell states:

> (Tech Prep) outlines one of the most promising curricular changes in the new Oregon education reform effort. Implementation of this program will move Oregon a long way toward reaching our goal of producing the best educated citizens in (the) nation . . . and a workforce equal to any in the world.

Parnell's more formal model included a "2+2" structure which would begin in the junior year of high school and continue through two years of college.

The curriculum would evolve around career clusters in business, engineering, construction and manufacturing, and related health services. Each cluster would include academic courses that would be taught with applied

methodologies and integrate vocational and academic principles. An articulated agreement with post secondary institutions would allow these courses to apply toward the completion of an associate degree. Finally, the focus of the program would be to what Parnell referred to as the "neglected majority," the middle quartiles of a school population (Hull & Parnell, 1991).

Law (1994) suggests that the instructional methodologies of discovery learning through laboratory experiences and the solving of community-based problems will allow students to see the practicality of their coursework. Willard Dagget, educational reformist, challenged educators in a speech to re-examine school curricula for practicality (1992). During his speech, Dagget repeatedly asked the question, "If material does not have a practical value for students in their life, why are we teaching it?" Dagget and Law both theorize, along with Parnell, that students will learn content quicker and retain it longer when it has practicality. Practicality is an expectation for Tech Prep students, but many educators are beginning to advocate this philosophy of instruction for every student as well (Raizen, 1991).

The Approach of Selected States

Parnell's model, along with the funding possibilities provided by Perkins II, have placed Tech Prep at the forefront of educational reform. In 1991, the Bush Administration in conjunction with the governors of the

fifty states developed a platform of six national goals aimed at improving the educational systems of the nation. The initiative was referred to as America 2000 (National Education Goals Panel, 1990). In particular, the fifth goal in America 2000 stated, "Every adult American will be literate and will possess the knowledge and skills necessary to compete in a global economy." Certainly, a parallel can be drawn between this goal and the goals of the Tech Prep initiative. Therefore, Tech Prep appears to be an important component in the current political agenda.

In anticipation of America 2000, the Department of Education in Texas in 1990 issued the following challenge to its citizenry:

> The economic strength and vitality of Texas in the year 2000 will depend on the state's capacity to educate and train a quality work force. . . . With the continued growth of international competition and impact of technology, Texas employers mustrequire a more highly skilled workforce.

In response to this challenge, the State Board of Education adopted the Quality Workforce Planning Act Rules. In Section D of these rules, the secondary schools of Texas were required to establish a program articulation that would create a "2+2" TPAD (Tech Prep Associate Degree) model similar to Parnell's model and expand it to include 2 additional years of work. The Texas program was known as a "2+2+2" model.

In November of 1990, The Governor's Commission on Workforce Preparedness of North Carolina issued The Skills Crisis In The Workplace: A Strategic Response For Economic

Development report. Goal #1 of this report was to improve the academic thinking and employability skills of the future workforce. The goal strategy associated with Goal #1 required the elimination of the general education curriculum and the establishment of a Technical Preparatory (Tech Prep) track. Further, the report required every high school to develop "a comprehensive career development and guidance program by the 1994-1995 school year." Like Texas, the North Carolina rules required mandatory attendance through age eighteen and denied a license to drive to any sixteen to eighteen-year-old who failed to comply with the attendance stipulation.

In April of 1991, Governor Tommy Thompson of Wisconsin issued an open letter to his citizens. Governor Thompson presented the following concern: "The growing demands of new technology in the workplace and reports of labor shortages due to rapidly changing skill needs indicate challenges to (the) productive momentum (of the past)." In answer to this challenge, Thompson established The Governor's Commission for a Quality Workforce. In its report to the Governor, the commission states the following:

> Tech Prep programs offer high school juniors and seniors a curriculum of applied academic and technical course work in broad occupational areas. After a Certificate of Initial Mastery, interested high obtaining school students would be eligible to enroll in one of several kinds of Tech prep programs offered through their school district in conjunction with their local technical college. The commission strongly believes, however, that the high school curricula should provide . . . clear pathways to enrollment in technical college programs.

As the above passage and prior passages clearly indicate, the need for addressing curriculum reform with "the neglected majority" (Parnell, 1991) was a priority of many states including Indiana.

Indiana's Approach

In 1987, the Indiana legislature passed and Governor Robert Orr signed Public Law 217-1987. This law, which established the first Tech Prep program in the nation, was defined very similarly to Parnell's Oregon model and closely paralleled the programs that followed in Texas, North Carolina, and Wisconsin. At the time of passage, the state provided funds for the development of five secondary school prototype sites: Columbus, Ben Davis, Bloomington, Mishawaka, and North Montgomery. The legislature funded these sites for the 1988-1989 and the 1989-1990 school years. No other additional funding was provided for the program.

The 101st Congress passed the Perkins II Act in 1990. The passage of this bill provided additional funds for the five Indiana pilot sites and also allocated $1.25 million for the establishment of the fourteen regional consortia composed of secondary and post-secondary schools throughout the state (Herron, 1991). Each consortium selected a coordinator whose task was to assist each school district in the implementation of the Indiana Tech Prep program.

Each consortium coordinator was provided a modest budget of $5,000 per school from Perkins II monies to

provide current information, staff development training using applied methodologies, and curriculum development stressing mastery learning and competency based instruction (Herron, 1991). The funding for the fourteen consortia expired on June 1, 1994 when implementation was expected to be in place.

Because Public Law 217-1987 clearly states that the Tech Prep initiative should be in place by the 1994-1995 school year, effectiveness of the implementation has not been documented. Some information, however, has been collected on the status of Tech Prep implementation in other states which may suggest some points of consideration for Indiana.

Implementation at the State Level

Although some Tech Prep programs actually began in the middle 1980s after the passage of the Perkins I Act in 1984, the proliferation of Tech Prep programs actually began after the Perkins II Act in 1990. This is the case in Indiana, Texas, Wisconsin, and North Carolina. Layton and Bragg (1992) have conducted some research via mail and telephone interviews to determine the extent to which states have successfully implemented Tech Prep.

Layton and Bragg found that Ohio, Oregon, and New York have been committed to the integration of academic and vocational education for many years and that California, Washington, Idaho, and Florida have established pilot sites to test the integration of academic and vocational education

in their states. This integration of coursework would be comparable to the development of core curriculum courses which coincides with the fourth criterion for implementation as defined by Indiana State Statute.

In 1986, the Chancellor's Office of the California Community Colleges and the State Department of Education funded "2+2" articulation agreements. In addition to the articulation agreement, funded proposals were required to demonstrate curricula which reflected applied methodologies and partnerships between schools and business (Layton & Bragg, 1992). By meeting these stipulations, these states would have satisfactorily completed the fifth criterion for implementation in Indiana's Tech Prep program.

In assessing the implementation of Tech Prep programs at the state level, it is important to understand that the programs of each state differ considerably. The Perkins II Act, along with Parnell's TPAD model, certainly specify a broad set of goals; however, the points that are emphasized in each program differ because each program reflects the specific needs of each state and each local district. The National Center for Research in Vocational Education (1992) states that "every state has different approaches to Tech Prep, depending on the levels of resources, and their specific economic and educational climates." Indiana shares this philosophy and requires each high school to develop a local action plan as its first step toward implementation.

Local Implementation of Tech Prep in Indiana

As stated earlier, Indiana Public Law 217-1987 established five goals that high schools need to accomplish in order to implement Tech Prep:

1. Each school will have an action plan for implementation of the Tech Prep program until all components are fully implemented.
2. Each school will have identified at least one career cluster for targeting its Tech Prep program.
3. Each school will have identified a sequence of courses in each targeted career cluster for students to follow in a secondary/post secondary Tech Prep program.
4. Each school will be ready to implement the first level of Tech Prep core courses for the fall of 1994.
5. Each school will have an articulation agreement in place by the end of the 1994-1995 school year.

The aforementioned goals represent the criteria by which implementation in Indiana will be measured. The level of compliance with the five criteria is directly related to the stage of implementation.

In reviewing the literature on implementation of Tech Prep, Layton and Bragg (1992), based upon the Perkins I and II Acts, state mandated programs, and other pertinent literature, developed a system of 30 components from which every Tech Prep initiative is a subsystem. Using this system as the basis of every Tech Prep initiative, Layton and Bragg surveyed local consortia from all fifty states to

determine the stage of implementation for each of the components. The results of the Layton and Bragg study provides researchers with national trends on the level of Tech Prep implementation. These trends are often used as a basis for reviewing the stage of local implementation for the criteria developed from P. L. 217-1987.

The first criterion of P. L. 217-1987 involves the development of an action plan to implement a Tech Prep program. According to Layton and Bragg's national study (1992), 91.9% indicated that a formally stated written plan had been developed in order to implement core curriculum classes in math, science, and English. Additionally, 96.4% of the respondents stated that this formal plan included a procedure for establishing an articulation agreement with a post-secondary institution.

The second criterion focuses upon the identification of career clusters. These career clusters may be in business, manufacturing and construction, health and medical, or engineering. Indiana's Tech Prep legislation requires that high schools identify at least one career cluster. Layton and Bragg (1992) found that only 68.9% of the surveyed high schools had identified a career cluster, and only 51.6% of the post secondary institutions had identified a career cluster.

The third criterion follows logically from the second. That is, after identifying the career cluster, schools are expected to develop a scope and sequence of vocational and

academic courses intended to prepare students with the skills necessary to purse a career in the identified cluster. The Layton and Bragg research (1993) revealed that 56.5% of the secondary schools and only 32% of the post secondary schools surveyed had developed an associated scope and sequence for an identified career cluster.

The fourth criterion involves the development of core curriculum classes in math, science, and English. These courses should combine skills from vocational courses and academic courses (Hull & Parnell, 1991, p. 67). Applied methodologies, cooperative learning, and alternative assessments are examples of teacher-learner strategies present in the core curriculum classes (Hull & Parnell, 1991, p. 70). The research from Layton and Bragg indicated that 39.9% of the high schools surveyed and 23.3% of the surveyed post secondary institutions had developed such courses (1992).

The final criterion involves an articulation agreement between high schools and post secondary institutions. The goal of the agreement will be to encourage education beyond high school through dual credit and/or advanced placement courses (Hull & Parnell, 1991, p. 43). As previously indicated, more than 96% of the schools surveyed did have an action plan for implementing an articulation agreement (Layton & Bragg, 1992). Layton and Bragg (1992) also found that 21% of the schools surveyed were in the process of planning and negotiating an agreement while 75% of the

schools were at some level of implementation either initial or advanced.

In October of 1992, the U.S. Department of Education awarded a contract to Mathematica Policy Research, Inc. (MPR) to evaluate Tech Prep programs throughout the nation. Specifically, MPR studied the implementation level of the fourteen consortia in Indiana with respect to Tech Prep during fiscal year 1993. The material that follows will outline the level of implementation of only thirteen consortium members with respect to the five criteria as developed from Indiana statute. One consortium did not respond to the survey.

According to MPR (1993), only three or 23% of the consortia had developed an action plan in 1993. In order for a consortium to be considered in compliance with an action plan, each high school in the consortium must have developed an action plan. No information was given with respect to partial compliance with this criteria.

MPR (1993) reported that nine consortia or 69% were in compliance with criterion number two, the identification of a career cluster. Manufacturing and construction was identified as a career cluster by six consortia while four identified a business career cluster and a health and related services career cluster. Additionally, agriculture and engineering were two other identified career clusters. To be in compliance, each high school within the consortium must have identified at least one career cluster.

The information on criterion number three parallels the information given for criterion number two. Eight or 62% of the consortia had developed a scope and sequence as related to the identified career clusters (MPR, 1993). Two of the consortia required workplace exposure, apprenticeships, and a workplace mentor as part of their scope and sequence. As with criterion number two, to be in compliance every high school in the consortium was required to have developed a scope and sequence for at least one identified career cluster to be in compliance.

MPR (1993) provided a more detailed sketch with respect to the development of core curriculum classes, criterion number four. Twelve of the thirteen reporting consortia (92%) indicated that each school district had developed both an applied communication course and an applied mathematics course. An applied biology/chemistry class and a principles of technology class followed with nine (69%) and eight (62%) consortia reporting implementation respectively. A large number of consortia (54%) also reported the implementation of an applied economics class.

Finally, five consortia or 38% had an articulation agreement with a post-secondary learning institution. A consortium was said to be in compliance with this criterion if the consortium had a signed agreement applicable to each high school in the consortium (MPR, 1993).

Factors Effecting Tech Prep Implementation: Size and Wealth

The primary purpose of this study is to determine

whether the wealth of a school corporation or the size classification of a high school affect the local level of Tech Prep implementation. P. L. 217-1987 provided one dollar of state support for the implementation of Tech Prep, and at that time the federal government had not provided Perkins II funds. Therefore, financial support for the program was delegated to the local level. Did this delegation of support to the local level place small schools and less affluent schools at a disadvantage with respect to Tech Prep implementation?

David Berliner (1992) argues "a relationship exists between the amount of money spent on education and the productivity of schools" (p. 21). Berliner studied the seven highest spending states and the seven lowest spending states as determined by expenditure per student. He found that the seven highest spending states had 1150% more students thinking about college by taking the SAT than did the seven lowest spending states. Since a primary function of high schools is to establish a base for future learning, Berliner uses these data on college interest to suggest that the wealth of a school corporation may influence educational programs and student productivity.

Card and Krueger (1990) found that teachers' salaries, class size, and length of school year were significant factors in student future success as predicted by future earnings. Similarly, Manski (1987) and Morane and Olsen (1989) reported that higher teaching salaries attracted

"candidates with higher academic ability and more experience in the profession" (p. 22). Therefore, high wealth school corporations that are able to pay higher teacher salaries attract the more highly productive teaching candidates as measured by student achievement.

Ferguson's study (1991) supports Berliner's position. Ferguson reported in the Harvard Journal on Legislation that "teachers' academic proficiency accounts for a twenty to twenty-five percent variation in the average student's achievement test score across districts" (p. 24). Secondly, he reported that teachers' experience accounts for a ten percent variation in the average student's achievement test scores. Ferguson's findings suggest that high wealth school corporations have an advantage over school corporations with less wealth because they can attract brighter and more experienced teaching candidates who in turn produce higher achieving students. Those high wealth school corporations can spend more money on instructional programs and improve academic performance (Berliner, 1992). However, those school corporations that are unable to pay the same price often see a stagnant academic growth pattern (Kozol, 1991). The studies of Ferguson and others seem to indicate that the wealth of a school corporation does effect educational programs and student productivity.

In another study, The National Association of Secondary Schools established a committee chaired by James Bryant Conant in 1967 to study systemic school reform. Conant

(1967) saw the failure of government to commit appropriate resources for education as a significant factor against school productivity. He further stated that "the money available appears to be the limiting factors in providing a (competitive) academic program for the nation's youth (p. 2). Hence, the wealth of a school corporation, according to Conant, is a significant factor in school reform.

Additionally, Conant saw small schools in rural communities as inadequate. Small schools could "neither provide the opportunity for students to develop necessary skills or the equality of opportunity that larger schools could provide" (Stuber, 1991, p. 33). Conant argued that schools needed to be sufficiently large in order to provide programs that directly related to the workforce or to training for college. He defined schools as sufficiently large if the school population was at least 750 and the school offered curricular options in calculus, fourth year foreign languages, advanced placement, and fine arts. Therefore, Conant's arguments suggest that both high school size and district wealth would affect the implementation of a reform movement such as Tech Prep.

Cynthia Hicks, coordinator of the district one consortium in Indiana, has provided additional information on the affect high school size and corporation wealth has had on Tech Prep implementation. As identified in the preceding section with respect to the national level of Tech Prep implementation, a considerable amount of variance

exists in the level of implementation with respect to the five criteria areas as established by Indiana statute. Hicks released the following raw data associated with high school size classification and corporation wealth which she collected from a self-evaluation survey that each high school completed. Even though this information is limited by its size (n=30) and scope, the information does offer some insight into the question of the affect of size and wealth on the stage of local implementation.

With respect to wealth of a school corporation, the more affluent corporations and the less affluent corporations were both at the 50% implementation level with respect to the development of an action plan. However, nearly 65% of the average wealth corporations indicated that they had developed an action plan for implementation.

Similarly, high school size classification produced sporadic results. According to Hicks, size was a factor only in urban fringe high schools of mid-size cities and small towns. In high schools falling within these two categories, by a two-to-one margin, an action plan had been developed for implementation. All other high schools were at a 50% implementation level.

With respect to criterion number two, the identification of a career cluster, high school size classification and the wealth of a school corporation were not factors. Of the thirty districts that responded to the survey, 90% of them indicated that a career cluster had been

identified for the purpose of developing a scope and sequence course of study. The 10% who responded negatively to that criteria were spread evenly across the defined categories.

Criterion number three produced a more diverse response according to the survey by Hicks. The more affluent school corporations again, by a two-to-one margin, stated that they had developed a scope sequence for the identified career cluster in criterion number two. Both average and low wealth school corporations were split evenly on the implementation of criterion number three. With respect to size, only urban fringe high schools of mid-size cities and rural area high schools indicated that a difference may exist. In each of the above high school types, approximately 70% of the respondents indicated fulfillment of criterion three.

Criterion number four, the development of core curriculum classes in mathematics, science, and English, has been implemented and unaffected by either corporation wealth or high school size. Hicks stated she was not surprised by this finding because over 85% of the monies available to the consortium was allocated for the attainment of this criterion which may explain why the wealth of a school corporation is not a factor. Mathematica Policy Research, Inc. found in their 1993 study that approximately 60% of the allocated funds to Tech Prep consortia in Indiana were targeted for the development of core curriculum classes.

The wealth of a school corporation and high school size classification do not appear to be factors to criterion number five. According to the information provided by Hicks, almost 85% of the high schools do not have an articulation agreement with a post secondary institution. The only difference in implementation in this category appears to be when a high school has a commuter college campus located within the school district. Commuter campuses seem to provide an advantage for high schools with respect to establishing an articulation agreement as compared to high schools that do not have a commuter college campus in their school district.

Since the sample size is small, caution should be used in drawing any conclusion based upon the data released by Hicks. This information represents the opinions of high schools in one consortium and should be viewed from that perspective. No information exists to suggest that the views of this consortium represent the views of the entire State of Indiana. However, since a high percentage of schools in consortium number one did respond to the survey, the aforementioned information probably does reflect the opinions of schools in northwest Indiana.

Wentling (1991) studied the five prototype Tech Prep programs established by Indiana P. L. 217-87: Bloomington, Columbus, Ben Davis, North Montgomery, and Mishawaka. Each of these sites was fully funded from 1988 through 1990 for the purpose of developing state demonstration sites.

According to Wentling's study, with full funding, each site had fully implemented many of the criteria established by Indiana statute.

With respect to an action plan and the core curriculum classes in math, science, and English, Wentling (1991) found all five sites had fully implemented each criterion (number one and number four). Additionally, he found that Bloomington and Ben Davis were in the planning stages of an identified career cluster and an associated scope and sequence of courses (criteria two and three) while Columbus, North Montgomery, and Mishawaka had fully implemented each criterion. Finally, Wentling reported that with respect to an articulation agreement, Bloomington was in the planning stage; North Montgomery was in the developmental stage; and Columbus, Ben Davis, and Mishawaka had fully implemented criterion number five. This study is limited because it provides data only on the relationship between stage of implementation and wealth and does not address the relationship between stage of implementation and high school size. However, the study does suggest that when a Tech Prep program is fully funded, the stage of implementation may be more advanced as compared to a program provided with little or no funding.

Although the information in the aforementioned studies with respect to size and wealth as factors for Tech Prep implementation in Indiana is sporadic and inconclusive, even less is known about local implementation across the United

States as related to size and wealth. Of the 864 consortia documented by Layton and Bragg in 1993, all of them were funded from Perkins II monies. However, it is conceivable that some local school districts developed a Tech Prep program from local monies in the mid 1980s. Hoerner (1991) suggests that as many as 380 Tech Prep programs or reasonable facsimiles were developed before July 1, 1991 which suggests that the true number of schools involved in Tech Prep far exceeds the Federal Government's figures.

Hoerner did not conduct research on the type of schools that pioneered the Tech Prep initiative in the late 1980s and the very early 1990s. Indiana developed five pilot sites in the late 1980s. Clearly, research has just begun at the local level. As the 1994-1995 school year approaches, any information collected to this point must be examined with care for the reasons listed above.

Size and Wealth as Factors in Other Reform Efforts

Law (1994) concluded that the reform necessary to implement Tech Prep should be considered in the context of systemic change. Earlier in this chapter, an argument was developed suggesting that Tech Prep reform principles closely paralleled reform initiatives such as Indiana 2000 Schools and Re:Learning Schools. Since all three reform efforts have common principles and require systemic change, a deductive argument may be offered suggesting that the barriers associated with the implementation of Indiana 2000 Schools and Re:Learning Schools are also barriers to

implementing Tech Prep programs. Specifically, if size and wealth are factors in implementing Indiana 2000 Schools and Re:Learning Schools, then perhaps size and wealth are factors in implementing Tech Prep programs.

From information provided by the Indiana Department of Education (1994), forty-three high schools have applied for and have been accepted as Indiana 2000 Schools. Of those high schools, twenty-two (51%) were from high wealth school corporations. Sixteen (37%) of the remaining twenty-one high schools were from average wealth school corporations while low wealth school corporations comprised the remaining 12% of the high schools. With respect to size classification, twelve (28%) mid-size city high schools, nine (21%) small town high schools, seven (16%) rural high schools, and six (14%) urban fringe high schools of both large and mid-size cities were Indiana 2000 Schools. Based upon this limited information, corporation wealth may be a factor in implementing the Indiana 2000 reform initiative.

Again, from information provided by the Indiana Department of Education (1994), forty-seven schools have been accepted as Re:Learning Schools. Of those forty-seven high schools, twenty-eight (60%) were from high wealth school corporations. Twelve (26%) of the remaining nineteen Re:Learning Schools were from average wealth school corporations while seven (14%) were from low wealth corporations. With respect to size classification, fourteen (30%) of both mid-size city high schools and small town high

schools, seven (16%) rural high schools, and five (11%) of both urban fringe large city and mid-size city high schools, were Re:Learning Schools. The data developed in this small scale study on Re:Learning Schools certainly parallels the data developed on Indiana 2000 Schools. Although definitive conclusions can not be drawn, the data do suggest that perhaps wealth may be a factor in the implementation of these reform initiatives.

Financing Local Tech Prep Programs

Layton and Bragg (1992) found that across the United States, 81% of the districts surveyed said that a lack of time and money at least moderately impact their stage of implementation. In their research on financing Tech Prep, they found that agencies from all fifty states and the District of Columbia were awarded Tech Prep grants from the Perkins II Act for fiscal year 1992. They further found that 724 local consortia were funded during that fiscal year; and, of those, 82 per cent were funded for Tech Prep planning programs while 18 percent were funded for the purpose of implementation.

For fiscal year 1993, Layton and Bragg (1992) found that 56 percent of the funded proposals were for implementation purposes. Planning grants fell from 82 percent in 1992 to 42 percent for fiscal year 1993. The number of grants awarded in 1993 also rose from 724 to 864 with approximately 75 percent of them being repeats from 1992 (Layton & Bragg, 1992). According to Hicks, these

numbers parallel the numbers related to programs developed in Indiana.

State monitoring of the Tech Prep initiative at the time that Layton and Bragg (1992) conducted their research was very sporadic which has lead to a lack of accountability. In fact, their research indicated that 39 states including Indiana had the equivalency of one person or less overseeing the progress of the Tech Prep program for their state. In fiscal year 1993, only 19 states had identified the achievement of at least one of the five identified criterion for implementation as defined by Indiana code, and Indiana was not one of them. Subsequent data has revealed a much higher level of implementation in 1994 (Bragg, 1994).

Other Barriers to Implementation

The immaturity of the local programs establishes barriers that make the evaluation of Tech Prep very difficult (Layton & Bragg, 1992). As referenced earlier, approximately one half of all consortia applying for grant money did so with the expressed intent of beginning the planning process. Walter (1991) suggested that planning should take place at least one year prior to any steps being taken toward implementation. Other researchers have suggested that, on the average, three to five years may be required for planning and implementation (Dutton, 1991, p. 4; Key, 1991). If this is the case, as suggested earlier, solid data will probably not be available until fiscal year

1995.

As researchers continue to examine the stage of Tech Prep implementation at the state and local area, several issues have emerged as barriers to implementation. The first barrier relates to the lack of agreement upon the precise definition of Tech Prep. Certainly, Perkins II and the models of Parnell and Hull are specific as to what constitutes an implemented Tech Prep program. Some states, however, have opted to omit certain aspects of Parnell's and Hull's model from their models. The argument offered for progressing in this manner is that local districts require a degree of autonomy in order to develop a program that adequately reflects community values and standards. Dornsife (1992) argues that it is precisely this lack of agreement on a definition that "impedes substantive changes."

Layton and Bragg (1992) suggest that "turf issues" may also create barriers to implementation. For example, a vocational education teacher may focus on the aspects that relate specifically to vocational education while academic teachers may focus on aspects of the program that are directed toward academic endeavors. This lack of continuity across the curriculum could lead to "turf issues and/or imbalances in funding" (Layton & Bragg, 1992, p. 46).

The ancient Greek historian Thucydides once said, "A nation that draws too broad a difference between its scholars and its warriors will have its thinking being done

by cowards and its fighting done by fools." Parnell (1991, p. 1) uses this quotation as an introduction to his book The Neglected Majority, in which he passionately argues the benefits of TPAD. One of the more forceful arguments he presents is that it is imperative that students entering the workforce be better prepared if the United States is going to maintain its present status in the new global economy.

The third barrier to implementation involves those students in the lowest quartile. How will these students fit into Tech Prep? If they do not fit in, then could it be logically argued that a sizable number of students remain neglected? If those students should be included in a Tech Prep program as Thucydides might argue, then it could be argued that the standards of the program might have to be lowered to include them. The needs of these students must be addressed either by Tech Prep or some other initiative. This lack of clarity as to who benefits from the program creates a barrier to implementation.

The negative attitudes of parents, students, teachers, and counselors toward vocational education tend to also reflect in the direction of Tech Prep (National Center for Research in Vocational Education, 1992). For at least the last two generations, students have been inundated with the virtues of a college education. This systematic brainwashing has been so successful that currently American society has more college graduates than it has appropriate jobs commensurate with the degree (Indiana Youth Foundation,

1993). Tech Prep's philosophy is somewhat of a contradiction to this point-of-view because the Tech Prep philosophy suggests that an associate degree may be far more beneficial than a baccalaureate degree. This shift in philosophy may create an adversarial relationship between parents advocating a four year degree and school personnel suggesting Tech Prep alternatives. Unfortunately, this increased potential for conflict may lead to some negative attitudes toward Tech Prep which is a program that requires cooperation and goodwill to be successfully implemented.

Another concern which has lead to negative attitudes is the lack of agreement between high schools and post-secondary institutions on awarding credit for Tech Prep classes. Layton and Bragg (1994) found that over 22% of the consortia in the United States indicated that "the failure of four-year colleges and universities to award college credit for applied Tech Prep courses was a very major concern." This strong feeling of concern may elicit strong negative attitudes and create a barrier toward implementation because "attitudes are a very important element in the successful implementation of a Tech Prep program" (Kershaw, 1994, p. 102).

Perhaps the biggest barrier facing Tech Prep, is the a lack of adequate funding. Kershaw (1994), in his Tech Prep study in California, found that a lack of funding was the only item that was rated a strong deterrent to implementation. In Indiana, P. L. 217-1987 allocated one

dollar for funding. Governors Orr and Evan Bayh have argued that the changes necessary to implement a Tech prep program do not require dollars but changes in attitudes. Former Superintendent of Public Instruction, H. Dean Evans, does not agree:

> The Tech Prep initiative will only be effective if it receives state funding. Our belief is it would cost as much as $270 million over five years, and I do not see anywhere in the crystal ball where $270 million is going to become available for the legislation. (Indianapolis Star, 1987)

The history of Tech Prep in Indiana appears to substantiate the argument presented by H. Dean Evans. In the late 80s, except for the five prototype sites, Tech Prep was dormant in the state of Indiana. However, even in the prototype sites, teachers and school personnel indicated that the uncertainty of funding made the recruitment of students to maintain or to expand the Tech Prep curriculum very difficult (Wentling, 1991). The passage of Perkins II in 1990, provided funds that were greatly needed in order to establish the fourteen consortia in Indiana. During fiscal years 1992 and 1993, Indiana saw a proliferation of Tech Prep programs which emanated from Perkins II funding. Since the grant cycle ended June 1, 1994 and funding appears to be a factor in implementation, new funding sources must be sought or the future of the program may be in jeopardy (Layton & Bragg, 1994).

Past history suggests that Indiana may be unwilling to supplement the Perkins II monies, although Governor Bayh and State Superintendent Reed have recommend $6 million to be

appropriated for Tech Prep through new grant monies. The financial pressures placed on school districts to implement such a dynamic program as Tech Prep may be too great to overcome without funding near the aforementioned $6 million level (Layton & Bragg, 1992). Law (1994, p. 10) further states, "the Tech prep initiative is doomed for failure unless enough financial support is provided to support the massive systemic changes required by the educational establishment."

Summary

The basic concepts associated with Tech Prep are not new. However, the timing necessary to implement a significant systemic change of this magnitude may never be better. This timing has permitted both education and specifically Tech Prep to become part of the political agenda which may be construed as either positive or negative. One of the negative aspects with respect to politics is the ever increasing strategy of mandating programs without funding, and this is certainly true with the Tech Prep mandate in Indiana. The review of the literature in this chapter suggests that educational reform of the magnitude of Tech Prep will not be fully implemented without appropriate state funding to support it which again is the case in Indiana. The purpose of this research was to determine whether the wealth of a school corporation or high school size classification were factors in the implementation of a Tech Prep program. Further, this

research attempted to identify other variables which may be classified as barriers to implementing Tech Prep.

Chapter 3

METHODS AND PROCEDURES

The study was conducted to determine through the use of a survey instrument how well high schools in Indiana have complied with Indiana's Tech Prep initiative. In particular, the study examined the five criteria for implementation as developed from Public Law 217-1987:

1. Each school will have an action plan for implementation of the Tech Prep program until all components are fully implemented.
2. Each school will have identified at least one career cluster for targeting its Tech Prep program.
3. Each school will have identified a sequence of courses in each targeted career cluster for students to follow in a secondary/post secondary Tech Prep program.
4. Each school will be ready to implement the first level of Tech Prep core courses for the fall of 1994.
5. Each school will have an articulation agreement in place by the end of the 1994-1995 school year (IC 20-10.1-4-12).

Principals of every high school in the state of Indiana were asked to assess their schools' stage of implementation

in the five aforementioned criteria. The study determined if there was a difference in the stages of implementation in the five criteria with regard to the wealth of a school corporation as identified by high, medium, or low wealth. The data from the survey were then analyzed to determine if there was a difference between the stages of implementation in the five criteria and a high school's size classification as identified by large city, mid-size city, urban, urban fringe of large city, urban fringe of mid-size city, large town, small town, or rural.

The Survey Instrument

The instrument (See Appendix C) also was reviewed by the doctoral committee. To assist with the clarity of the instrument, a committee of five practicing administrators, who were formerly high school principals but none of whom are presently employed at the high school level in Indiana, piloted each item. Practicing high school principals were not included so that all high schools were able to participate in the study.

Items identified by three committee members as being unclear were eliminated. This process shortened the original survey and forced the investigator to develop new survey items.

The survey instrument was used to determine the stage of implementation of each high school with respect to the five criteria developed from Indiana Tech Prep legislation. This was accomplished by developing a statement or set of

statements which relate to each criteria. At least one item was constructed for each criteria.

The survey was divided into two parts. The first part attempted to determine the stage of implementation of the respondent's high school with respect to the five criteria developed from state statutes. The second part of the survey attempted to determine the respondent's opinion regarding the potential barriers to Tech Prep implementation. The purpose of the first section was to extract sufficient information to determine the stage of implementation of each respondent's high school with regard to the five criteria developed from Tech Prep legislation while the purpose of the second part of the survey was to determine barriers to Tech Prep implementation "across the board."

In the first part of the survey, the first Likert statement related to an action plan associated with the implementation of a Tech Prep program. A series of Likert statements followed involving the stage of implementation of any and all career clusters that are presently in place at the respondents' high schools. A third set of Likert statements followed attempting to discover the stage of implementation of the most advanced implemented scope and sequence of courses for one of the career clusters identified in the previous statements. The next group of statements involved the stage of implementation of the core curriculum classes in English, math, and science that have

been developed and are being offered at the respondents' high school. A final statement attempted to determine the stage of implementation of an articulation agreement between the respondents' high school and higher learning institutions.

Using a five-point Likert scale, each principal assessed the stage of implementation of his/her high school in implementing each criterion. The first criterion involving an action plan and the fifth criterion involving an articulation agreement had only one statement; hence, the researcher recorded the reported scores for those two areas. In assessing the statements associated with the identification of a career cluster and the corresponding scope and sequence, the researcher recorded the score of the career cluster with the most advanced implementation since both criteria required only one identified career cluster for the 1994-1995 school year. The fourth criterion which requires high schools to develop core curriculum classes in math, science, and English clearly states that all three classes must be developed. Therefore, the score that was recorded will represent the mean of all three statements. A summary table was developed for each respondent's high school similar to the table presented below. Since the statements were specific to the five criteria developed from state statute, the researcher makes the assumption of homogeneity of variance between and among the likert statements associated with each criteria.

Great High School

1.	Action Plan	3.0
2.	Career Cluster	3.0
3.	Course and Sequence	2.0
4.	Core Courses	4.3
5.	Articulation	3.0

Source of Data

The study was conducted in the state of Indiana and involved high school principals or their designees. All public high schools were asked to participate in the study.

Collection of Data

On November 28, 1994, each high school principal was mailed a cover letter stating the purpose of the research, a survey instrument, and a stamped return envelope. On December 28, 1994, a second mailing was sent to high school principals who did not return the initial request.

Since the research questions involve information about each high school's size classification and corporation wealth, the surveys were coded in such a manner so as to provide the researcher an opportunity to retrieve the information using Indiana Department of Education data.

The investigator assured confidentiality to individual principals and schools. The cover letter provided this information to insure the instrument's credibility.

Population

All public high school principals were asked to

participate in this study. High school principals or their appointed designee were asked to complete the survey. Upon completion and return, the surveys were sorted into the seven classifications based upon the information from the Department of Education's Educational Information System. These classifications are as stated earlier: large city, mid-size city, urban fringe or large city, urban fringe of mid-size city, large town, small town, and rural

The definition of each size classification and associated terms is as follows:

Large City. A large city is a central city of a metropolitan statistical area with a population greater than or equal to 400,000 or a population density greater than or equal to 6,000 people per square mile (Indiana Department of Education, 1994).

Large Town. A large town is a town within a metropolitan statistical area, with a population greater than or equal to 25,000 people (Indiana Department of Education, 1994).

Metropolitan Statistical Area. 1) A metropolitan statistical area is an urbanized area of at least 50,000 with a total metropolitan population of at least 100,000. 2) An area may be a metropolitan statistical area if it is the only metropolitan statistical area and it has a city of at least 50,000 (Indiana Department of Education, 1994).

Mid-size City. A mid-size city is a central city of a metropolitan statistical area with a population less than 400,000 and has a population density less than 6,000 people

per square mile (Indiana Department of Education, 1994).

Rural. A school corporation containing less than 2,500 students and is coded rural by the Census Bureau (Indiana Department of Education, 1994).

Small Town. A small town is a town not within a metropolitan statistical area, with a population greater than or equal to 25,000 people (Indiana Department of Education, 1994).

Urban Fringe of a Large City. Urban fringe of a large city is a place within a metropolitan statistical area of a large central city and is defined as urban by the Census Bureau (Indiana Department of Education, 1994)

Urban Fringe of a Mid-size City. Urban fringe of a large city is a place within a metropolitan statistical area of a mid-size central city and is defined as urban by the Census Bureau (Indiana Department of Education, 1994).

After analyzing the data with respect to high school size, the data was re-sorted by wealth. Each high school was classified by its school corporation's wealth as follows: a high wealth school corporation, an average wealth school corporation, or a low wealth school corporation. The definition of each wealth classification is as follows:

High Wealth School Corporation. A school corporation in Indiana which ranks in the upper one third of all corporations in wealth as measured by the ratio of the corporation's assessed valuation (AV) to its average daily

membership (ADM).

Average Wealth School Corporation. A school corporation in Indiana which ranks in the middle one third of all corporations in wealth as measured by the ratio of the corporation's assessed valuation (AV) to its average daily membership (ADM).

Low Wealth School Corporation. A school corporation in Indiana which ranks in the lower one third of all corporations in wealth as measured by the ratio of the corporation's assessed valuation (AV) to its average daily membership (ADM).

Treatment of the Data and Statistical Analysis

The data in this study were analyzed using a one-way analysis of variance, a two-way analysis of variance, and a chi square test. A three-way analysis of variance was considered but the anticipation of a lack of sample size between school corporation wealth and high school size classification discouraged the investigator from pursuing that statistical procedure.

The following research questions provided the basis for the research:

1. Is there a difference in the stage of implementing a Tech Prep action plan with regard to the wealth of a school corporation as identified by high, medium, or low?
2. Is there a difference in the stage of implementing the most advanced implemented career cluster with regard to the wealth of a school corporation as identified by high,

medium, or low?

3. Is there a difference in the stage of implementing the most advanced scope and sequence of courses for a targeted career cluster with regard to the wealth of a school corporation as identified by high, medium, or low?

4. Is there a difference in the stage of implementing first level Tech Prep core curriculum courses with regard to the wealth of a school corporation as identified by high, medium, or low?

5. Is there a difference in the stage of implementing an articulation agreement with a post secondary educational institution with regard to the wealth of a school corporation as identified by high, medium, or low?

6. Is there a difference in the stage of implementing an action plan with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classifications?

7. Is there a difference in the stage of implementing the most advanced implemented career cluster with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classifications?

8. Is there a difference in the stage of implementing the most advanced scope and sequence of courses for a targeted career cluster with regard to high school size as identified by large city, mid-size city, urban fringe of large city,

urban fringe of mid-size city, large town, small town, and rural classifications?

9. Is there a difference in the stage of implementing first level Tech Prep core curriculum courses with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classifications?

10. Is there a difference in the stage of implementing an articulation agreement with a post secondary educational institution with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classifications?

11. What, if any, are the barriers associated with the implementation of a Tech Prep program?

The following null hypotheses were developed from these research questions and tested using the methods previously described in this section:

H_1. There is no significant difference in the stage of implementation of a Tech Prep action plan with regard to the wealth of a school corporation as identified by high, medium, or low.

H_2. There is no significant difference in the stage of implementing the most advanced implemented career cluster with regard to the wealth of a school corporation as identified by high, medium, or low.

H_3. There is no significant difference in the stage of

implementing the most advanced implemented scope and sequence of courses for a targeted career cluster with regard to the wealth of a school corporation as identified by high, medium, or low.

H_4. There is no significant difference in the stage of implementation of first level Tech Prep core curriculum courses with regard to the wealth of a school corporation as identified by high, medium, or low.

H_5. There is no significant difference in the stage of implementation of an articulation agreement with a post secondary educational institution with regard to the wealth of a school corporation as identified by high, medium, or low.

H_6. There is no significant difference in the stage of implementation of an action plan with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classifications.

H_7. There is no significant difference in the stage of implementating the most advanced implemented career cluster with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classifications.

H_8. There is no significant difference in the stage of implementing the most advanced implemented scope and sequence of courses for a targeted career cluster with

regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classifications.

H_9. There is no significant difference in the stage of implementation of first level Tech Prep core curriculum courses with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classifications.

H_{10}. There is no significant difference in the stage of implementation of an articulation agreement with a post secondary educational institution with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classifications.

H_{11}. There is no significant difference in ten other barriers to the implementation of a Tech Prep program.

The data were tabulated and analyzed by the Indiana State University Computer Center.

Statistical Tests

A one-way and two way analysis of variance were used to test the first ten null hypotheses. A repeated measures analysis of variance design was used. An analysis of variance provides a method for "testing the significance of differences between means of different populations" (Ferguson, 1989). In this study, the researcher determined

if a significant difference existed between the five criteria developed from state statute and corporation wealth. The procedures were repeated when the researcher determined if a significant difference existed between the same five criteria and high school size classification. The .05 level of significance was used to test each hypothesis.

The first statistical tests were used for hypothesis numbers one through five and analyzed the relationship between the stage of implementation of the five Tech Prep criteria and corporation wealth. The five criteria developed from P. L. 217-1987 were the dependent variables of a two-way analysis of variance while the independent variables were the three categories of wealth: high wealth school corporations, middle wealth school corporations, and low wealth school corporations. After an analysis of the data, the investigator determined if the stage of implementation of the five criteria was related to corporation wealth.

The second statistical tests were used for hypothesis numbers six through ten and analyzed the relationship between the stage of implementation of the five Tech Prep criteria and the size classification of the school corporation. The configuration of the test was similar to the prior test. The five criteria developed from P. L. 217-1987 for Tech Prep implementation were the dependent variables while the independent variables were the seven high school size categories: large city, mid-size city,

urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural.

In the use of the two-way repeated measures analysis of variance design, the criteria summary was not included because the criteria were not part of the research design.

Through the use of the Chi Square statistic, the third statistical test excluded high school size and corporation wealth and analyzed ten other possible barriers to the implementation of a Tech Prep program as stated in the eleventh hypothesis. A chi square goodness-of-fit statistic was used to compare sets of observed and theoretical frequencies (Ferguson, 1989). The observed frequencies in this study were obtained from the survey as reported by the Indiana high school principals in Indiana. The theoretical frequencies were computed by dividing the total number of observations by the six categories which measured the effect each barrier had on implementing Tech Prep (Ferguson, 1989). The .05 level of significance was used to test the eleventh hypothesis.

The following barriers were analyzed using a chi square statistic:

1. Negative attitudes toward vocational education;
2. Staff resistance to change;
3. Lack of financial support;
4. Lack of understanding about Tech Prep;
5. Lack of post secondary support for Tech Prep;
6. Not enough time allotted to educators for

planning;

7. Too much flexibility in local implementation of Tech Prep;
8. Lack of Business and industry support for Tech Prep;
9. Lack of staff development provided for educators;
10. And pressure for quick success.

The six categories which measured the effects each barrier had on implementing Tech Prep were as follows:

1 No effect as a barrier;
2 Very minor effect as a barrier;
3 Minor effect as a barrier;
4 Moderate effect as a barrier;
5 Major effect as a barrier; and
6 Very major effect as a barrier.

Summary

Chapter 3 described the methods that were used to answer the research questions. An outline of the source of that data, how it was collected, and how it was used followed the aforementioned introduction. The chapter concluded with an analysis of the statistical procedures that were used to test the data.

Chapter 4

DATA ANALYSIS AND FINDINGS

This study was designed to investigate the stage of implementation of the state-mandated Tech Prep initiative in Indiana high schools. Since the mandate was essentially unfunded, the focus of this study was to determine whether the stage of implementing Tech Prep in Indiana high schools was affected by the wealth of the school corporation or the size classification of the high school. Further, the study attempted to determine if barriers associated with Tech Prep implementation existed other than the wealth of the corporation and the size classification of the high school.

High school principals in Indiana were asked to take part in this study by completing a survey to determine the stage of implementation in each high school. The survey instrument was mailed to all 352 high school principals in Indiana on November 28, 1994, and 252 surveys were returned. On December 28, 1994, a follow up letter was mailed to high school principals who did not respond to the original mailing. A total of 300 high school principals responded to the survey instrument for a return rate of 85 percent (See Table 4.1).

Table 4.1

Survey Instruments Mailed and Returned

Subjects	Number Sent	Number Returned	Percent Returned
High School Principals	352	300	85.2

This chapter contains the findings of this study. The findings are presented with respect to the eleven hypotheses as stated in Chapter one. The first ten hypotheses are divided into two sections: corporation wealth and high school size classification in an effort to present the findings in an organized, systematic manner.

Analysis of First Ten Hypotheses

The data collected from Indiana high school principals in this study were used to test each of the eleven null hypotheses. A one-way analysis of variance and a two-way analysis of variance were used to test the first five null hypotheses related to the implementation of Tech Prep and corporation wealth. A second one-way analysis of variance and a two-way analysis of variance were used to test null hypotheses six through ten which related to the implementation of Tech Prep and high school size classification. A chi square statistical test was used to test each of the ten possible barriers as referenced in the eleventh hypotheses.

The first two-way analysis of variance experiment

consisted of two variables: the five criteria associated with the implementation Tech Prep as cited by P. L. 217-1987 and the three levels of corporation wealth as identified by high, average, and low. The second two-way analysis of variance experiment also consisted of two variables: the five criteria associated with implementation of Tech Prep and the seven levels of high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classifications.

In the use of the two-way repeated measures analysis of variance design, the criteria summary was not included because the criteria were not part of the research design.

Since the findings of the two experiments are classified by each hypothesis, a one-way analysis of variance was utilized to study each criteria with respect to corporation wealth and high school size classification. The statistics, as presented for the first ten hypotheses, focus on the data received from the one-way analysis of variance for each hypothesis. Also a two-way analysis of variance design was used.

Corporation Wealth

Hypothesis One

Hypothesis one (H_1), there is no significant difference in the stage of implementation of a Tech Prep action plan with regard to the wealth of a corporation relative to three

designations of wealth: high, medium, or low, was tested using a one-way analysis of variance. The stage of implementing a Tech Prep action plan was analyzed to determine if a significant difference existed (at the .05 level of significance) in the stage of implementation of this criteria between high, average, and low wealth high schools.

Table 4.2

A One-Way Analysis of Variance to Determine the Relationship Between the Wealth of a School Corporation and Stage of Implementation of a Tech Prep Action Plan

	DF	SS	MS	F Ratio	F Prob
Between Groups	2	0.58798	0.29399	0.32125*	0.7255
Within Groups	297	271.79869	0.91515		
Total	299	272.38667			

*Not significant at the .05 level

According to the analysis as illustrated in Table 4.2, the wealth of a school corporation was not a significant factor in the stage of implementation of an action plan at the .05 level of significance.

In summary, null hypothesis one was accepted at the .05 level of significance. Corporation wealth was found not to be a significant factor when comparing the various stages of implementation by Indiana high schools with respect to a Tech Prep action plan.

Hypothesis Two

Hypothesis two (H_2), there is no significant difference in the stage of implementation of the most advanced career cluster with regard to the wealth of a corporation relative to three designations of wealth: high, medium, or low, was tested using a one-way analysis of variance.

The stage of implementing the most advanced career cluster was analyzed to determine if a significant difference existed in the stage of implementation of this criteria between high, average, and low wealth high schools.

Table 4.3

A One-Way Analysis of Variance to Determine the Relationship Between the Wealth of a School Corporation and the Most Advanced Career Cluster

	DF	SS	MS	F Ratio	F Prob
Between Groups	2	0.25822	0.12911	0.12103*	0.8861
Within Groups	297	316.83845	1.06680		
Total	299	317.09667			

*Not significant at the .05 level

According to the analysis, the wealth of a school corporation was not a significant factor (at the .05 level of significance) in the stage of implementation of the most advanced career cluster. These findings were illustrated in Table 4.3.

In summary, null hypothesis two was accepted at the .05

level of significance. The wealth of a school corporation was found not to be a significant factor when comparing the various stages of implementing the most advanced implemented career cluster in Indiana high schools.

Hypothesis Three

Hypothesis three (H_3), there is no significant difference in the stage of implementing the most advanced scope and sequence of courses for a targeted career cluster with regard to the wealth of a corporation relative to three designations of wealth: high, medium, or low, was tested using a one-way analysis of variance.

The stage of implementing the most advanced scope and sequence for a targeted career cluster was analyzed to determine if a significant difference existed in the stage of implementing this criteria between high, average, and low wealth high schools.

According to the analysis, the wealth of a school corporation was not a significant factor (at the .05 level of significance) in the stage of implementing the most advanced scope and sequence for a targeted career cluster. The findings are presented in Table 4.4.

In summary, null hypothesis three was accepted at the .05 level of significance. The wealth of a school corporation was found not to be a significant factor when comparing the various stages of implementation with respect to the most advanced scope and sequence of courses for a targeted career cluster in Indiana high schools.

Table 4.4

A One-Way Analysis of Variance to Determine the Relationship Between Wealth of a School Corporation and Stage of Implementation of the Most Advanced Implemented Scope and Sequence for a Targeted Career Cluster

	DF	SS	MS	F Ratio	F Prob
Between Groups	2	0.13445	0.06723	0.05828*	0.9434
Within Groups	297	342.54555	1.15335		
Total	299	342.68000			

*Not significant at the .05 level

Hypothesis Four

Hypothesis four (H_4), there is no significant difference in the stage of implementing first level Tech Prep core curriculum courses with regard to the wealth of a school corporation relative to three designations of wealth: high, medium, or low, was tested using an analysis of variance.

The stage of implementing the first level of Tech Prep core curriculum courses was analyzed to determine if a significant difference existed in the stage of implementing this criteria between high, average, and low wealth Indiana high schools.

According to the analysis, the wealth of a school corporation was not a significant factor (at the .05 level of significance) in the stage of implementing the first level of Tech Prep core curriculum courses. The findings

appear in Table 4.5.

In summary, null hypothesis four was accepted at the .05 level of significance. The wealth of a school corporation was found not to be a significant factor when comparing the various stages of implementing core curriculum Tech Prep classes in Indiana high schools.

Table 4.5

A One-Way Analysis of Variance to Determine the Relationship Between Wealth of a School Corporation and Stage of Implementation of the First Level Tech Prep Core Curriculum Courses

	DF	SS	MS	F Ratio	F Prob
Between Groups	2	0.28260	0.14130	0.13651*	0.8725
Within Groups	297	307.42927	1.03512		
Total	299	307.71187			

*Not significant at the .05 level

Hypothesis Five

Hypothesis five (H_5), there is no significant difference in the stage of implementing an articulation agreement with a post secondary educational institution with regard to the wealth of a corporation relative to three designations of wealth: high, medium, or low, was tested using an analysis of variance.

The stage of implementing an articulation agreement was analyzed to determine if a significant difference existed in the stage of implementing this criteria between high,

average, and low wealth Indiana high schools.

According to the analysis, the wealth of a school corporation was not a significant factor (at the .05 level of significance) in the stage of implementing an articulation agreement. These findings are illustrated in Table 4.6.

Table 4.6

A One-Way Analysis of Variance to Determine the Relationship Between Wealth of a School Corporation and Stage of Implementation of an Articulation Agreement with a Post Secondary Educational Institution

	DF	SS	MS	F Ratio	F Prob
Between Groups	2	1.30920	0.65460	0.36757*	0.6927
Within Groups	297	528.91996	1.78086		
Total	299	530.22917			

*Not significant at the .05 level

In summary, null hypothesis five was accepted at .05 level of significance. The wealth of a school corporation was found not to be a significant factor when comparing the various stages of implementation with respect to an articulation agreement between Indiana high schools and institutions of higher learning.

Corporation Wealth as a Tech Prep Implementation Factor

In studying the various stages of the implementation of Tech Prep by high schools in Indiana, school corporation

wealth was not a significant factor for any of the five criterion. In order to determine whether the interaction between school corporation wealth and the five criteria was a significant factor, a two-way analysis of variance was utilized.

The five criteria and the analysis of variance summary are presented in Table 4.7.

Table 4.7

Mean Score by Classification for School Corporation Wealth with the Five Criteria and a Summary of the Two-Way Repeated Measures Analysis of Variance Comparing School Corporation Wealth and the Five Criteria Associated with Tech Prep Implementation

	Mean Score by Classification		
	High Wealth	Medium Wealth	Low Wealth
Criteria 1	4.05208	4.03061	4.13208
Criteria 2	3.82292	3.75510	3.81132
Criteria 3	3.64583	3.62245	3.59434
Criteria 4	3.75938	3.75408	3.82075
Criteria 5	2.98438	2.82143	2.91981
	(N=96)	(N=98)	(N=106)

Anova Summary

Source	SS	DF	MS	F	Prob.
Wealth	1.0974	2	0.5487	0.16*	0.850
Error (Between)	1003.0027	297	3.3771		
Interaction Crit/Wealth	1.4751	8	0.1844	.29*	0.970
Error (Within)	764.5292	1188	0.6435		

*Not significant at the .05 level

Criteria 1. Each school will have an action plan for the implementation of the Tech Prep program until all components are fully implemented.

Criteria 2. Each school will have identified at least one career cluster for targeting their Tech Prep program.

Criteria 3. Each school will have identified a sequence of courses in each targeted career cluster for students to follow in a secondary/post-secondary Tech Prep program.

Criteria 4. Each school will be ready to implement the first level of Tech Prep core courses for the fall of 1994.

Criteria 5. Each school will have an articulation agreement in place by the end of the 1994-1995 school year.

As depicted in Table 4.7, school corporation wealth and the interaction of school corporation wealth with the five criteria associated with the implementation of Tech Prep are not significant factors (at the .05 level of significance) when the various stages of implementation were compared.

The differences that exist between criteria were not analyzed or included in the summary table because the criteria were not a part of the research design.

Size Classification

Hypothesis Six

Hypothesis six (H_6), there is no significant difference in the stage of implementing a Tech Prep action plan with regard to the size of an Indiana high school as identified by large city, mid-size city, urban fringe of a large city,

urban fringe of a mid-size city, large town, small town, and rural, was tested using a one-way analysis of variance.

The stage of implementing of a Tech Prep action plan was analyzed to determine if a significant difference existed in the stage of implementing this criteria between the various size classifications of Indiana high schools described in the preceding paragraph.

According to the analysis, the size classification of Indiana high schools was a significant factor (at the .05 level of significance) in the stage of implementing an action plan. These findings appear in Table 4.8.

Table 4.8

A One-Way Analysis of Variance to Determine the Relationship Between High School Size Classification and Stage of Implementation of a Tech Prep Action Plan

	DF	SS	MS	F Ratio	F Prob
Between Groups	6	16.8589	2.8098	3.2219*	0.0044
Within Groups	293	255.5278	0.8721		
Total	299	272.3867			

*Not significant at the .05 level

In summary, null hypothesis six was rejected at the .05 level of significance. The size classification of an Indiana high school was a significant factor when the various levels of implementing a Tech Prep action plan were compared. The Duncan Multiple Range Test indicated a

significant difference (at the .05 level of significance) between the following pairs of high school size classifications: mid-size city high schools and small town high schools; rural high schools and small town high schools; and mid-size city high schools and urban fringe of large city high schools.

Hypothesis Seven

Hypothesis seven (H_7), there is no significant difference in the stage of implementing the most advanced career cluster with regard to the size of Indiana high school, identified as by large city, mid-size city, urban fringe of a large city, urban fringe of a mid-size city, large town, small town, and rural, was tested using a one-way analysis of variance.

The stage of implementing the most advanced career cluster was analyzed to determine if a significant difference existed in the stage of implementing this criteria between the various size classifications of Indiana high schools described in the preceding paragraph.

According to the analysis, the size classifications of an Indiana high school was not a significant factor (at the .05 level of significance) in the stage of implementing the most advanced career cluster. These findings are illustrated in Table 4.9.

Table 4.9

A One-Way Analysis of Variance to Determine the Relationship Between High School Size Classification and Stage of Implementation of the Most Advanced Implemented Career Cluster

	DF	SS	MS	F Ratio	F Prob
Between Groups	6	11.9549	1.9925	1.9132*	0.785
Within Groups	293	305.1418	1.0414		
Total	299	317.0967			

*Not significant at the .05 level

In summary, null hypothesis seven was accepted at .05 level of significance. The size classification of Indiana high schools was not a significant factor when the various stages of implementing the most advanced implemented career custer were compared.

Hypothesis Eight

Hypothesis eight (H_8), there is no significant difference in the stage of implementing the most advanced scope and sequence of courses for a targeted career cluster with regard to the size classification of Indiana high school size designated as: large city, mid-size city, urban fringe of a large city, urban fringe of a mid-size city, large town, small town, and rural, was tested using a one-way analysis of variance.

The stage of implementing the most advanced scope and sequence of courses for a targeted career cluster was analyzed to determine if a significant difference existed in the stage of implementing this criteria between the various high school size classifications of Indiana described in the preceding paragraph.

Table 4.10

A One-Way Analysis of Variance to Determine the Relationship Between High School Size Classification and Stage of Implementing the Most Advanced Scope and Sequence of Courses for a Targeted Career Cluster

	DF	SS	MS	F Ratio	F Prob
Between Groups	6	12.0119	2.0020	1.7739*	0.1042
Within Groups	293	330.6681	1.1286		
Total	299	342.6800			

*Not significant at the .05 level

According to the analysis, the size classification of Indiana high schools was not a significant factor (at the .05 level of significance) in the stage of implementing the most advanced implemented scope and sequence of courses for a targeted career cluster. These findings were depicted in Table 4.10.

In summary, null hypothesis eight was accepted at the .05 level of significance. The size classification of Indiana schools was found not to be a significant factor when the various stages of implementation with respect to

the most advanced scope and sequence of Tech Prep courses were compared.

Hypothesis Nine

Hypothesis nine (H_9), there is no significant difference in the stage of implementing first level Tech Prep core curriculum courses with regard to the size of Indiana high schools identified as: large city, mid-size city, urban fringe of a large city, urban fringe of a mid-size city, large town, small town, and rural, was tested using a one-way analysis of variance.

The stage of implementing first level Tech Prep core curriculum courses was analyzed to determine if a significant difference existed in the stage of implementing

Table 4.11

A One-Way Analysis of Variance to Determine the Relationship Between High School Size Classification and Stage of Implementation of First Level Tech Prep Core Curriculum Courses

	DF	SS	MS	F Ratio	F Prob
Between Groups	6	10.3983	1.7331	1.7079*	0.1188
Within Groups	293	297.3135	1.0147		
Total	299	307.7119			

*Not significant at the .05 level

this criteria between the various size classifications of Indiana high schools described in the preceding paragraph.

According to the analysis, the size classification of an Indiana high school was not a significant factor (at the .05 level of significance) in the stage of implementing first level Tech Prep core curriculum courses. These findings were presented in Table 4.11.

In summary, null hypothesis nine was accepted at the .05 level of significance. The size classification of an Indiana high school was not a significant factor when the various stages of implementing core curriculum Tech Prep classes in Indiana high schools were compared.

Hypothesis Ten

Hypothesis ten (H_{10}), there is no significant difference in the stage of implementing an articulation agreement with a post secondary educational institution with regard to high school size identified as: large city, mid-size city, urban fringe of a large city, urban fringe of a mid-size city, large town, small town, and rural, was tested using a one-way analysis of variance.

The stage of implementing an articulation agreement was analyzed to determine if a significant difference existed in the stage of implementing this criteria between the various size classifications of Indiana high schools described in the preceding paragraph.

According to the analysis, the size classification of an Indiana high school was not a significant factor (at the .05 level of significance) in the stage of implementing an articulation agreement. The findings appear in Table 4.12.

In summary, null hypothesis ten was accepted at the .05 level of significance. The size classification of an Indiana high school was found not to be a significant factor when the various stages of implementing an articulation agreement with an institution of higher learning were compared.

Table 4.12

A One-Way Analysis of Variance to Determine the Relationship Between High School Size Classification and Stage of Implementation of an Articulation Agreement with a Post Secondary Educational Institution

	DF	SS	MS	F Ratio	F Prob
Between Groups	6	18.2042	3.0340	1.7362*	0.1124
Within Groups	293	512.0250	1.7475		
Total	299	530.2292			

*Not significant at the .05 level

High School Size Classification as a Tech Prep Implementation Factor

From the data obtained in the one-way analyses of variance, the size classification of an Indiana high school was a significant factor (at the .05 level of significance) in the stage of implementing a Tech Prep action plan. However, the size classification of an Indiana high school was not a significant factor (at the .05 level of significance) when the various stages of identifying a career cluster, implementing a scope and sequence of Tech

Prep courses, implementing the core curriculum Tech Prep courses, and implementing an articulation agreement with an institution of higher learning were compared. A two-way analysis of variance revealed that the interaction effects of the seven size classifications of Indiana high schools and the five Tech Prep criteria were also significant factors when the various stages of Tech Prep implementation were compared. These findings appear in Table 4.13.

Table 4.13

Mean Score by Classification for School Corporation Size with the Five Criteria and a Summary of the Two-Way Repeated Measures Analysis of Variance Comparing Seven Size Classifications with the Five Criteria Associated with Tech Prep Implementation

	S1	S2	S3	S4	S5	S6	S7
C1	4.000	3.618	4.400	3.893	4.000	4.311	3.981
C2	4.000	3.559	3.650	3.464	4.250	4.005	3.745
C3	4.333	3.559	3.300	3.286	4.125	3.786	3.567
C4	3.533	3.532	4.100	3.411	3.663	3.924	3.770
C5	3.000	2.676	2.250	2.625	3.250	3.112	2.957
	(N=3)	(N=34)	(N=20)	(N=28)	(N=8)	(N=103)	(N=104)

Anova Summary

Source	SS	DF	MS	F	Prob.
Size	45.6088	6	7.6015	2.32*	.033
Error	958.4913	293	3.2713		
Size/Crit Interaction	23.8193	24	0.9925	1.57*	.0402
Error	742.1850	1172	0.6333		

*Not significant at the .05 level

In Table 4.13, factors S1 through S7 represented the seven size classifications of Indiana high schools: large city, mid-size city, urban fringe of a large city, urban fringe of a mid-size city, large town, small town, and rural classification. Factors C1 through C5 represented the five criteria relative to the implementation of Tech Prep as suggested by P. L. 217-1987 and are displayed below:

Criteria 1. Each school will have an action plan for the implementation of the Tech Prep program until all components are fully implemented.

Criteria 2. Each school will have identified at least one career cluster for targeting their Tech Prep program.

Criteria 3. Each school will have identified a sequence of courses in each targeted career cluster for students to follow in a secondary/post-secondary Tech Prep program.

Criteria 4. Each school will be ready to implement the first level of Tech Prep core courses for the fall of 1994.

Criteria 5. Each school will have an articulation agreement in place by the end of the 1994-1995 school year.

Analysis of the Eleventh Hypothesis

Hypothesis 11 (H_{11}), there is no significant difference in ten barriers to the implementation of a Tech Prep program, was tested using a chi square statistical treatment on each individual barrier to the implementation of a Tech Prep program.

The following descriptive data indicates whether the observed frequencies depart significantly from the expected

frequencies for each of the following barriers:

1. Negative attitudes toward vocational education;
2. Staff resistance to change;
3. Lack of financial support;
4. Lack of understanding about Tech Prep;
5. Lack of post secondary support for Tech Prep;
6. Not enough time allotted to educators for planning;
7. Too much flexibility in local implementation of Tech Prep;
8. Lack of Business and industry support for Tech Prep;
9. Lack of staff development provided for educators;
10. And pressure for quick success.

Negative Attitudes Toward Vocational Education

The information regarding negative attitudes toward vocational education was analyzed using a chi square test and negative attitudes toward vocational education was found to be statistically a significant factor at the .05 level of significance. The observed frequencies are illustrated in Table 4.14.

The column designated as category represents the level of effect that the barrier negative attitudes toward vocational education have had on the implementation of Tech Prep. The six levels of effect are as follows:

1 No effect as a barrier;

2 Very minor effect as a barrier;

3 Minor effect as a barrier;

4 Moderate effect as a barrier;

5 Major effect as a barrier; and

6 Very major effect as a barrier.

Table 4.14

A Chi Square Test to Determine Whether Negative Attitudes Toward Vocational Education is a Barrier to Tech Prep Implementation

Category	Cases Observed	Expected	Residual
1	38	49.83	-11.83
2	62	49.83	12.17
3	111	49.83	61.17
4	64	49.83	14.17
5	19	49.83	-30.83
6	5	49.83	-44.83
Total	299		

Chi Square = 144.298*
DF = 5
Level of Significance = 0.00
*Significant at the .05 level

Staff Resistance to Change

Staff resistance to change was tested using a chi square statistic and was found to be statistically significant as a barrier to the implementation of Tech Prep at .05 level of significance. Table 4.15 illustrates the observed frequencies.

The column designated as category represents the level of effect that the barrier staff resistance to change has had on the implementation of Tech Prep. The six levels of effect are as follows:

1 No effect as a barrier;

2 Very minor effect as a barrier;

3 Minor effect as a barrier;

4 Moderate effect as a barrier;

5 Major effect as a barrier; and

6 Very major effect as a barrier.

Table 4.15

A Chi Square Test to Determine Whether Staff Resistance to Change is Significant as a Barrier to Tech Prep Implementation

Category	Cases Observed	Expected	Residual
1	13	49.83	-36.83
2	39	49.83	-10.83
3	85	49.83	35.17
4	107	49.83	57.17
5	47	49.83	- 2.83
6	8	49.83	-41.83
Total	299		

Chi Square = 155.254*
DF = 5
Level of Significance = 0.00
*Significant at the .05 level

Lack of Financial Support

Lack of financial support was tested using a chi square statistic and was found to be statistically significant as a barrier to the implementation of Tech Prep at the .05 level of significance. Financial support applies to state and federal funding and is not analogous to school corporation wealth as measured by assessed valuation. Table 4.16 illustrates the observed frequencies.

Table 4.16

A Chi Square Test to Determine Whether Lack of Financial Support is a Barrier to Tech Prep Implementation

Category	Cases Observed	Expected	Residual
1	9	49.83	-40.83
2	15	49.83	-34.83
3	47	49.83	- 2.83
4	61	49.83	11.17
5	72	49.83	22.17
6	95	49.83	45.17
Total	299		

Chi Square = 111.268*
DF = 5
Level of Significance = 0.00
*Significant at the .05 level

The column designated as category represented the level of effect that the barrier lack of financial support has had on the implementation of Tech Prep. The six levels of effect were as follows:

1 No effect as a barrier;

2 Very minor effect as a barrier;

3 Minor effect as a barrier;

4 Moderate effect as a barrier;

5 Major effect as a barrier; and

6 Very major effect as a barrier.

Lack of Understanding About Tech Prep

A lack of understanding about Tech Prep was tested using a chi square statistic and was found to be statistically significant as a barrier to the implementation

of Tech Prep at the .05 level of significance. Table 4.17 illustrates the observed frequencies.

The column designated as category represents the level of effect that the barrier lack of understanding about Tech Prep has had on the implementation of Tech Prep. The six levels of effect are as follows:

1 No effect as a barrier;

2 Very minor effect as a barrier;

3 Minor effect as a barrier;

4 Moderate effect as a barrier;

5 Major effect as a barrier; and

6 Very major effect as a barrier.

Table 4.17

A Chi Square Test to Determine Whether a Lack of Understanding about Tech Prep is a Barrier to Tech Prep Implementation

Category	Cases Observed	Expected	Residual
1	8	49.83	-41.83
2	27	49.83	-22.83
3	79	49.83	29.17
4	117	49.83	67.17
5	49	49.83	- 0.83
6	19	49.83	-30.83
Total	299		

Chi Square = 172.271*
DF = 5
Level of Significance = 0.00
*Significant at the .05 level

Lack of Post Secondary Support for Tech Prep

A lack of support from post secondary educational

institutions with respect to Tech Prep was tested using a chi square statistic and was found to be statistically significant as a barrier to the implementation of Tech Prep at the .05 level of significance. The observed frequencies are illustrated in Table 4.18.

The column designated as category represents the level of effect that the barrier lack of support from post secondary institutions has had on the implementation of Tech Prep. The six levels of effect are as follows:

1 No effect as a barrier;

2 Very minor effect as a barrier;

3 Minor effect as a barrier;

4 Moderate effect as a barrier;

5 Major effect as a barrier; and

6 Very major effect as a barrier.

Table 4.18

A Chi Square Test to Determine Whether a Lack of Support from Post Secondary Institutions is a Barrier to Tech Prep Implementation

Category	Cases Observed	Expected	Residual
1	8	49.83	-40.83
2	27	49.83	-22.83
3	63	49.83	13.17
4	91	49.83	41.17
5	61	49.83	11.17
6	48	49.83	- 1.83
Total	299		

Chi Square = 83.977*
DF = 5
Level of Significance = 0.00
*Significant at the .05 level

Not Enough Time Allotted to Educators for Planning

Not enough time allotted to educators for planning was tested using a chi square statistic and was found to be statistically significant as a barrier to the implementation of Tech Prep at the .05 level of significance. The observed frequencies are illustrated in Table 4.19.

Table 4.19

A Chi Square Test to Determine Whether Not Enough Time Allotted to Educators for Planning is a Barrier to Tech Prep Implementation

Category	Cases Observed	Expected	Residual
1	3	49.83	-46.83
2	14	49.83	-35.83
3	48	49.83	- 1.83
4	89	49.83	39.17
5	80	49.83	30.17
6	65	49.83	15.17
Total	299		

Chi Square = 123.508*
DF = 5
Level of Significance = 0.00
*Significant at the .05 level

The column designated as category represented the level of effect that the barrier not enough time allotted to educators for planning has had on the implementation of Tech Prep. The six levels of effect were as follows:

1 No effect as a barrier;

2 Very minor effect as a barrier;

3 Minor effect as a barrier;

4 Moderate effect as a barrier;

5 Major effect as a barrier; and

6 Very major effect as a barrier.

Too Much Flexibility in Local Implementation of Tech Prep

Too much flexibility in local implementation of Tech Prep was tested using a chi square statistic and was found to be statistically significant as a barrier to the implementation of Tech Prep at the .05 level of significance. Table 4.20 illustrates the observed frequencies.

Table 4.20

A Chi Square Test to Determine Whether Too Much Flexibility in Local Implementation of Tech Prep is a Barrier to Tech Prep Implementation

Category	Cases Observed	Expected	Residual
1	42	49.83	- 7.83
2	69	49.83	19.17
3	92	49.83	42.17
4	57	49.83	7.17
5	25	49.83	-24.83
6	14	49.83	-35.83
Total	299		

Chi Square = 83.455*
DF = 5
Level of Significance = 0.00
*Significant at the .05 level

The column designated as category represented the level of effect that the barrier too much flexibility in local implementation has had on the implementation of Tech Prep. The six levels of effect were as follows:

1 No effect as a barrier;

2 Very minor effect as a barrier;

3 Minor effect as a barrier;

4 Moderate effect as a barrier;

5 Major effect as a barrier; and

6 Very major effect as a barrier.

Lack of Business and Industry Support of Tech Prep

A lack of support from business and industry support of Tech Prep was tested using a chi square statistic and was found to be statistically significant as a barrier to the implementation of Tech Prep at the .05 level of significance. Table 4.21 illustrates the observed frequencies.

Table 4.21

A Chi Square Test to Determine Whether a Lack of Support from Business and Industry of Tech Prep is a Barrier to Tech Prep Implementation

Category	Cases Observed	Expected	Residual
1	47	49.83	- 2.83
2	61	49.83	11.17
3	88	49.83	38.17
4	60	49.83	10.17
5	33	49.83	-16.83
6	10	49.83	-39.83
Total	299		

Chi Square = 71.495*
DF = 5
Level of Significance = 0.00
*Significant at the .05 level

The column designated as category represents the level of effect that the barrier lack of support from business and industry has had on the implementation of Tech Prep. The six levels of effect are as follows:

1 No effect as a barrier;

2 Very minor effect as a barrier;

3 Minor effect as a barrier;

4 Moderate effect as a barrier;

5 Major effect as a barrier; and

6 Very major effect as a barrier.

Lack of Staff Development Provided for Educators

A lack of staff development provided for educators was tested using a chi square statistic and was found to be statistically significant as a barrier to the implementation of Tech Prep at the .05 level of significance. The observed frequencies for each cell are illustrated in Table 4.22.

The column designated as category represents the level of effect that the barrier lack of staff development provided for educators has had on the implementation of Tech Prep. The six levels of effect are as follows:

1 No effect as a barrier;

2 Very minor effect as a barrier;

3 Minor effect as a barrier;

4 Moderate effect as a barrier;

5 Major effect as a barrier; and

6 Very major effect as a barrier.

Table 4.22

A Chi Square Test to Determine Whether a Lack of Staff Development Provided for Educators is a Barrier to Tech Prep Implementation

Category	Cases Observed	Expected	Residual
1	20	49.83	-29.83
2	52	49.83	2.17
3	62	49.83	12.17
4	72	49.83	22.17
5	56	49.83	6.17
6	37	49.83	-12.83
Total	299		

Chi Square = 34.853*
DF = 5
Level of Significance = 0.00
*Significant at the .05 level

Pressure for a Quick Success

Pressure for a quick success was tested using a chi square statistic and was found to be statistically significant as a barrier to the implementation of Tech Prep at the .05 level of significance. Table 4.23 illustrates the observed frequencies.

The column designated as category represented the level of effect that the barrier pressure for a quick success has had on the implementation of Tech Prep. The six levels of effect were as follows:

1 No effect as a barrier;

2 Very minor effect as a barrier;

3 Minor effect as a barrier;

4 Moderate effect as a barrier;

5 Major effect as a barrier; and

6 Very major effect as a barrier.

Table 4.23

A Chi Square Test to Determine Whether Pressure for a Quick Success is a Barrier to Tech Prep Implementation

Category	Cases Observed	Expected	Residual
1	26	49.83	-23.83
2	46	49.83	- 3.83
3	56	49.83	6.17
4	61	49.83	11.17
5	70	49.83	20.17
6	40	49.83	- 9.83
Total	299		

Chi Square = 25.060*
DF = 5
Level of Significance = 0.00
*Significant at the .05 level

In summary, the null hypothesis was rejected at the .05 level of significance for all ten barriers. The Chi Square statistical tests indicated that the difference between expected outcomes and observed outcomes was significant for each barrier. Therefore, each barrier was statistically significant as a factor to the stage of Tech Prep implementation.

Summary

This chapter reviewed the data that was collected in the study. A survey instrument was mailed to 352 public high school principals in Indiana, and a total of 300 principals returned the survey for a return rate in excess

of eighty-five percent (85%). Eleven research questions were translated into eleven null hypotheses. The eleven null hypotheses were statistically analyzed using a one-way analysis of variance, a two-way analysis of variance, and a chi square test. The results of these tests are summarized in Chapter 5.

Recommendations for further study are presented in Chapter 5.

Chapter 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Introduction

The nature, background, and the significance of the problem were presented in Chapter 1. A review of the pertinent literature and research was included in Chapter 2. The design of the study and the methodologies used to conduct the study appeared in Chapter 3. The findings and the analysis of the data were provided in Chapter 4. Chapter 5 was designed to review the data contained in the first four chapters, to provide conclusions based on that data, and to provide recommendations for future studies.

Summary

In 1987, Indiana became the first state to mandate a Tech Prep program; however, Tech Prep was an unfunded mandate because the legislation that created Tech Prep appropriated only one dollar for the implementation of Tech Prep. Since Tech Prep was essentially unfunded, the purpose of this study was to determine whether school corporation wealth and the size classification of a high school size were factors that influenced the stage of implementation of Tech Prep programs in Indiana public high schools.

Furthermore, ten additional barriers to the implementation of Tech Prep were analyzed to determine the extent to which each influenced the implementation of Tech Prep. This study was based upon the following research questions:

1. Is there a difference in the stage of implementing a Tech Prep action plan with regard to the wealth of a school corporation as identified by high, medium, or low?
2. Is there a difference in the stage of implementing the most advanced implemented career cluster with regard to the wealth of a school corporation as identified by high, medium, or low?
3. Is there a difference in the stage of implementing the most advanced scope and sequence of courses for a targeted career cluster with regard to the wealth of a school corporation as identified by high, medium, or low?
4. Is there a difference in the stage of implementing first level Tech Prep core curriculum courses with regard to the wealth of a school corporation as identified by high, medium, or low?
5. Is there a difference in the stage of implementing an articulation agreement with a post secondary educational institution with regard to the wealth of a school corporation as identified by high, medium, or low?
6. Is there a difference in the stage of implementing an action plan with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural

classifications?

7. Is there a difference in the stage of implementing the most advanced implemented career cluster with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classifications?

8. Is there a difference in the stage of implementing the most advanced scope and sequence of courses for a targeted career cluster with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classifications?

9. Is there a difference in the stage of implementing first level Tech Prep core curriculum courses with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classifications?

10. Is there a difference in the stage of implementing an articulation agreement with a post secondary educational institution with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classifications?

11. What, if any, are the barriers associated with the implementation of a Tech Prep program?

Three hundred fifty-two (352) public high school principals were asked to assist with this research by

completing a survey instrument designed to provide data relative to the aforementioned research questions. The survey instrument was mailed to the identified high school principals and resulted in an eighty-five (85%) percent rate of return.

The survey instrument was divided into two parts. The first part of the instrument comprised a series of differentially sealed statements designed to assess the stage in which each school had implemented Tech Prep in accordance with the five criteria developed from Public Law 217-1987; the five areas of Tech Prep implementation are presented below:

1. Each school will have an action plan which details the implementation of all components of the Tech Prep program.
2. Each school will have identified at least one career cluster for targeting their Tech Prep program.
3. Each school will have identified a sequence of courses in each targeted career cluster for students to matriculate in a secondary-post-secondary Tech Prep program.
4. Each school will be prepared to implement the first level of Tech Prep core courses for the fall of 1994.
5. Each school will have developed and implemented an articulation agreement by the end of the 1994-1995 school year.

The second part of the instrument was designed to elicit data on barriers associated with the implementation of Tech Prep. This component of the instrument was also

comprised of a series of differentially scaled statements to elicit the opinion of high school principals relative to ten possible barriers to the implementation of Tech Prep in Indiana.

The data from the survey instrument were collected and the Indiana State University Computer Center applied three statistical treatments on the data. These statistical treatments included a one-way and two-way analysis of variance and chi square tests. The .05 level of significance was employed in each of the aforementioned statistical treatments of the data.

The null hypotheses developed from the eleven research questions and their findings were as follows:

H_1. There is no significant difference in the stage of implementation Tech Prep action plan with regard to the wealth of a school corporation as identified by high, medium, or low, was determined not to be significant the .05 level. Therefore, the null hypothesis was accepted.

H_2. There is no significant difference in the stage of implementing the most advanced implemented career cluster with regard to the wealth of a school corporation as identified high, medium, or low, was determined to be not significant at the .05 level. Null hypothesis two was accepted.

H_3. There is no significant difference in the stage of implementing the most advanced implemented scope and sequence of courses for a targeted career cluster with

regard to the wealth of a school corporation as identified by high, medium, or low, was found to be not significant at the .05 level. The third null hypothesis was accepted.

H_4. There is no significant difference in the stage of implementation of first level Tech Prep core curriculum courses with regard to the wealth of a school corporation as identified by high, medium, or low, was determined to be not significant at the .05 level. Null hypothesis four was accepted.

H_5. There is no significant difference in the stage of implementation of an articulation agreement with a post-secondary educational institution with regard to the wealth of a school corporation as identified by high, medium, or low, was found not to be significant at the .05 level. Therefore, the null hypothesis was accepted.

H_6. There is no significant difference in the stage of implementation of an action plan with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classifications, was found to be significant at the .05 level. The Duncan Multiple Range Test indicated a significant difference (at the .05 level of significance) between the following pairs of high school size classifications: mid-size city high schools and small town high schools; rural high schools and small town high schools; and mid-size city high schools and urban fringe of large city high schools. Null hypothesis six was rejected.

H_7. There is no significant difference in the stage of implementing the most advanced implemented career cluster with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classification, was determined to be not significant at the .05 level. Therefore, the null hypothesis was accepted.

H_8. There is no significant difference in the stage of implementing the most advanced implemented scope and sequence of courses for a targeted career cluster with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classifications, was found not to be significant at the .05 level. Null hypothesis eight was accepted.

H_9. There is no significant difference in the stage of implementation of first level Tech Prep core curriculum courses with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city, large town, small town, and rural classifications, was found to be not significant at the .05 level. In summary, this hypothesis was accepted.

H_{10}. There is no significant difference in the stage of implementation of an articulation agreement with a post-secondary educational institution with regard to high school size as identified by large city, mid-size city, urban fringe of large city, urban fringe of mid-size city,

large town, small town, and rural classifications, was also found not significant at the .05 level. Therefore, the hypothesis was accepted.

H_{11}. There is no significant difference in ten identified barriers to the implementation of a Tech Prep program, was rejected at the .05 level of significance. All ten barriers were found to be significant factors (at the .05 level of significance) in the implementation of a Tech Prep program.

Conclusions

Based on the findings of this study, the following conclusions were presented:

1. The wealth of school corporations was not a factor in the stages of implementing Tech Prep in Indiana high schools.

2. Regardless of corporation wealth, differences existed in the stages in which the five criterion associated with the implementation of Tech Prep were developed. Specifically, the stage of an articulation agreement with a higher learning institution was the least developed criterion.

3. The high school size classification was a factor in the stage of implementing an action plan for a Tech Prep program. In particular, a difference existed in the implementation of a Tech Prep action plan between the following pairs of high schools: between mid-size city high schools and small town high schools; rural high schools and small town high schools; and mid-size city high schools and

urban fringe of large city high schools.

4. The high school size classification was not a factor in the stage in which the other four criteria associated with the implementation of Tech Prep were implemented.

5. A difference existed between the stages of implementing the five criteria associated with Tech Prep implementation, regardless of the high school size classification. The stage of an articulation agreement with a higher learning institution was again the least developed criterion.

6. The ten barriers listed below were factors in the stage of implementation of a Tech Prep program:

A. negative attitudes toward vocational education,

B. staff resistance to change,

C. lack of financial support,

D. lack of understanding about Tech Prep,

E. lack of post-secondary support for Tech Prep,

F. not enough time allotted to educators for planning,

G. too much flexibility in local implementation of Tech Prep,

H. lack of business and industry support for Tech Prep,

I. lack of staff development provided for educators,

J. and pressure for a quick success.

7. Principals were asked in the survey instrument to list other barriers to the implementation of Tech Prep. Greater than 25% of the principals indicated that a lack of time for

staff development was a major barrier to the implementation of Tech Prep. Lack of legislative funding was named by 20% of the principals, and another 17% said that a general lack of support from the state was a factor in implementing Tech Prep. Each of these barriers involve additional funding. Although the wealth of a corporation was not a factor in the stage of implementing Tech Prep, lack of state and federal funding appears to be a major barrier to full implementation of the program.

8. The stage of implementing four of the five established goals which include developing an action plan; identifying a career cluster; identifying a scope and sequence of courses for the identified career cluster; and the implementation of core curriculum classes in mathematics, science, and English, was at the initial stage of implementation. However, the stage of entering into an articulation agreement with an institution of higher learning was only at the developmental stage. The lack of post-secondary support for Tech Prep may be a limiting factor in the development of Tech Prep articulation agreements.

Implications

Wealth as defined by the assessed valuation per student was not a factor in the implementation of a Tech Prep program. However, Indiana high school principals clearly felt a lack of financial support from state and federal sources was a barrier to Tech Prep implementation. This perception was supported by Indiana principals in the free

response section of the survey instrument used in this research and Kershaw's research (1994) in California. Clearly, if the Tech Prep initiative in Indiana is going to be successful, Tech Prep must become a funded mandate.

Recommendations

The following recommendations are made for future research:

1. Since Tech Prep is a national reform initiative, the present study could be replicated in other states.
2. The present study should be replicated with a more extensive list of potential barriers to Tech Prep implementation.
3. The present study could be replicated in higher learning institutions.
4. The present study could be replicated in future years to determine if high schools' are progressing toward advanced implementation with respect to all five criteria.
5. A study should be conducted to determine if the attitudes of superintendents toward Tech Prep affect the stage of implementing Tech Prep at a high school.
6. A study should be conducted to determine the relationship between the leadership style of a principal and the stage of implementing Tech Prep in a high school.
7. Further study should be conducted to determine the relationship between unfunded educational reform initiatives and school improvement.

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APPENDIXES

Appendix A

Letter of Introduction

Dear

I am conducting a study concerning the stage of implementation of Tech Prep in Indiana high schools. The study will attempt to determine whether a relationship exists between the stage of implementation of Tech Prep program and a school corporation's wealth and/or high school size.

In order to collect the necessary data for this study, the enclosed questionnaire was developed. You are asked to participate in this study by completing the enclosed questionnaire and returning it by December 16, 1994. Each questionnaire has been coded in order to provide a level of confidentiality to you, and to provide information to calculate corporation's wealth and high school size. After your questionnaire has been completed, please return it in the self-addressed envelope provided.

Your responses will remain anonymous and all data collected will be studied as group data. Your cooperation is a crucial factor to the success of this research study, which I believe will provide significant data on the timely topic of Tech Prep.

Thank you in advance for your assistance.

Sincerely yours

John Hutton
Researcher

Dr. Alex C. Moody
Indiana State University

Enclosure

Appendix B

Follow Up Letter

Dear High School Principal:

A short time ago, I had sent you a letter requesting your input through a questionnaire on your high school's stage of implementation with respect to the state mandated Tech Prep initiative. The information that I had solicited from you will be used in a research study as a partial requirement for a Ph. D. in Educational Administration at Indiana State University.

As of this writing, I have not received your valuable input for this research study. I realize this is a very busy time for school administrators, but I sincerely would appreciate you taking a few minutes to complete the enclosed questionnaire by January 13, 1995. A self-addressed, stamped envelope has been included for your convenience.

Your responses will remain anonymous and all data collected will be studied as group data. Your cooperation is a crucial factor to the success of this research study which I believe will provide significant data on the timely topic of Tech Prep.

Thank you in advance for your assistance.

Sincerely yours,

John Hutton
Researcher

Dr. Alex C. Moody
Indiana State University

Enclosure

Appendix C

The Survey Instrument

PART I: THE STAGE OF IMPLEMENTATION

The following statements focus on the stage of implementation of components of your Tech Prep initiative. For each component, indicate the stage of implementation of your high school. The stages of implementation are:

1	Not Begun	This stage indicates the component has not been addressed.
2	Planning	This stage includes goal setting, staff orientation, the formation of committees and teams, and the development of plans for a component.
3	Development	This stage involves such activities as reviewing, designing, creating, and field testing component.
4	Initial Implementation	This stage occurs when plans and products the developmental stage begin to be carried out for a component.
5	Advanced Implementation	This stage occurs when a component is routinely carried out, regularly reviewed and evaluated, and institutionalized so that it continues even if current leaders are no longer responsible for Tech Prep.
0	Not Addressed	This category indicates that your school district does not intend to include the component in its Tech Prep initiative.

STAGE OF IMPLEMENTATION
(Circle the one best response)

	Not Begun	Plan	Dev	Initial Implem	Adv Implem	NA
An action plan has been developed outlining a procedure to Implement the Tech Prep initiative.	1	2	3	4	5	0
Business careers have been identified as a career cluster around which academic and vocational courses will evolve.	1	2	3	4	5	0
Mechanical careers have been identified as a career cluster around which academic and vocational courses will evolve.	1	2	3	4	5	0
Engineering and technology careers have been identified as career clusters around which academic and vocational courses will evolve.	1	2	3	4	5	0
Health and medicine careers have been identified as career clusters around which academic and vocational courses will evolve.	1	2	3	4	5	0
A scope and sequence of courses has been articulated around a business career cluster.	1	2	3	4	5	0
A scope and sequence of courses has been articulated around a mechanical career cluster.	1	2	3	4	5	0
A scope and sequence of courses has been articulated around engineering and technology career clusters.	1	2	3	4	5	0
A scope and sequence of courses has been articulated around health and medicine career clusters.	1	2	3	4	5	0
A mathematics course(s) has been implemented that incorporates applied instruction and learning relevant to the world of work.	1	2	3	4	5	0

	Not Begun	Plan	Dev	Initial Implem	Adv Implem	NA
An English course(s) has been implemented that incorporates applied instruction and learning relevant to the world of work.	1	2	3	4	5	0
A science course(s) has been implemented that incorporates applied instruction and learning relevant to the world of work.	1	2	3	4	5	0
A formal articulation agreement to create a 2+2 program sequence between secondary and post-secondary schools has been established.	1	2	3	4	5	0

PART II: BARRIERS TO TECH PREP IMPLEMENTATION

The following statements focus on identifying barriers to the implementation of Tech Prep. For each of the barriers below, indicate the level of effect it has had or is having on your Tech Prep initiative.

LEVEL OF EFFECT
(Circle the one best response)

BARRIER	None	Very Minor	Minor	Moderate	Major	Very Major
Negative attitudes toward vocational education	1	2	3	4	5	0
Staff resistance to change	1	2	3	4	5	0
Lack of financial support	1	2	3	4	5	0
Lack of understanding about Tech Prep	1	2	3	4	5	0
Lack of post-secondary support for Tech Prep	1	2	3	4	5	0
Not enough time allotted to educators for planning	1	2	3	4	5	0
Too much flexibility in local implementation of Tech Prep	1	2	3	4	5	0

BARRIER	None	Very Minor	Minor	Moderate	Major	Very Major
Lack of business and industry support for Tech Prep	1	2	3	4	5	0
Lack of staff development provided for educators	1	2	3	4	5	0
Pressure for quick success	1	2	3	4	5	0

List three other barriers to implementing a Tech Prep program in priority order with one being the biggest barrier and three being the smallest barrier.

1. _____

2. _____

3. _____

Appendix D

Excerpts from Public Law 217-1987 as Amended

20-10.1-5.6-1 Establishment; members; curriculum models; secondary and post-secondary articulation curriculum agreements

Section 1.

(a) The technology preparation task force is established to design and approve:

(1) technology preparation curriculum models; and

(2) teacher and staff training to implement the technology preparation models.

(b) The state superintendent, the commissioner of the Indiana commission on vocational and technical education, and executive officer of the commission for higher education shall appoint three (3) persons to the task force. The persons appointed to the task force must include representatives of local school corporations and state educational institutions.

(c) The curriculum models developed by the task force must be developed by November 1, 1990 and must:

(1) be performance based;

(2) provide students with skills necessary to gain employment or pursue further education upon graduation;

(3) relate to broad scope of occupational opportunities;

(4) include math, science, and English/language arts courses, taught through practical application and designed to meet graduation requirements for those subjects:

(5) be designed to include secondary and post-secondary models; and

(6) allow for dual credit, advanced study, and cooperative agreements.

(d) The task force shall identify certain occupations for secondary and post-secondary articulation curriculum agreements in cooperation with the standing technical committee of the Indiana commission on Vocational and technical education. As added by Public Law 217-1987, Section 11. Amended by Public Law 51-1990, Section 18.

20-10.1-5.6-2 Technology preparation curriculum
Section 2

(a) By the 1990-1991 school year, the department shall establish a schedule for school corporations to make fully available the technology preparation curriculum. By the 1991-92 school year, the state board of education shall establish a technology preparation curriculum to be phased in and made fully available to all high school students by the 1994-95 school year in accordance with the schedule and subsection (b).

(b) During the 1992-93 school year, the department shall designate one-third (1/3) of the school corporations to make available a technology preparation curriculum to high school students. During the 1993-94 school year, the department shall designate an additional (1/3) of the school corporations to make available a technology preparation curriculum to the school corporation's high school students. Beginning with the 1994-95 school year, the department shall require all school corporations to make available to the school corporation's high school students the technology preparation curriculum.

(c) The board shall implement teacher and staff training beginning with the 1990-91 school year.

Section 29. IC 20-10.15.6-1, as amended By Public Law 51-1990, Section 18, is amended to read as follows:
Section 1.

(a) The technology preparation task force is established to design and approve:

(1) technology preparation models; and

(2) teacher and staff training to implement

the technology preparation models.

(b) The state superintendent, the commissioner of the Indiana Commission on vocational and technical education, and the executive office of the commission on higher education shall each appoint three (3) persons to the task force. The persons appointed to the task force must include representatives of local school corporations and state educational institutions.

(c) The curriculum models developed by the task force must:

(1) be performance based;

(2) upon the satisfactory fulfillment of the curriculum:

(A) provide a student with the skills necessary to gain employment upon graduation from high school; and

(B) provide a student with the subject or skills areas required by a state educational institution (as defined in IC 20-12-0.5-1) to gain admittance into respective state educational institution:

(3) relate to a broad scope of occupational opportunities;

(4) include math, science, and English/language arts courses, taught through practical application and designed to meet graduation requirements for those subjects;

(5) be designed to include secondary and post-secondary sequence models; and

(6) allow for dual credit, advanced study, and cooperative agreements.

(d) The task force shall identify certain occupations for secondary and post-secondary articulation curriculum agreements in cooperation with the Indiana commission on vocational and technical education.

(e) By July 1, 1993, the state board shall adopt the technology preparation curriculum models.

Appendix E

FY 1994 Tech Prep Consortium Agreement for Secondary and Post-Secondary Institutions

Each consortium participant shall certify that it will be fully involved in the third-year regional planning grant for implementation of a four year (grades 11 and 12 and two years of post secondary education) Tech Prep education program. As of July 1, 1993, each participant has an identified, functioning local leadership team preparing for Tech Prep implementation. As a consortium member, each has agreed to achieve the following outcomes by June 30, 1994.

1. Each school will have an action plan for the implementation of the Tech Prep program until all components are fully implemented.
2. Each school will have identified at least one career cluster for targeting their Tech Prep program.
3. Each school will have identified a sequence of courses in each targeted career cluster for students to follow in a secondary/post secondary Tech Prep program.
4. Each school will be ready to implement the first level of Tech Prep core courses for the fall of 1994.
5. Each school will have an articulation agreement in place to develop an articulation agreement by the end of the 1994-1995 school year.

Appendix F

An Excerpt from The Carl Perkins Act II: Part E Tech Prep Education

Section 342.(b) Purpose. It is the purpose of this part--

(1) to provide planning and demonstration grants to consortia of local educational agencies and post-secondary educational institutions, for the development and operation of 4-year programs designed to provide a tech prep education program leading to a 2-year associate degree or a 2-year certificate; and

(2) to provide, in a systematic manner, strong, comprehensive links between secondary schools and post-secondary educational institutions.

Section 344. Tech Prep Education Programs.

(a) General Authority. Each grant recipient shall use amounts provided under the grant to develop and operate a 4-year tech prep education program.

(b) Contents of Program. Any such program shall--

(1) be carried out under an articulation agreement between the participants in the consortium;

(2) consist of the 2 years of secondary school preceding graduation and 2 years of higher education, or an apprenticeship program of at least 2 years following secondary instruction, with a common core of requied proficiency in mathematics, science, communications, and technologies designed to lead to an associate degree or certification in a specific career field;