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The Tech Prep Movement: One School's Response to Indiana Public Law 217

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David A. Cline

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James J. Gallagher
Major professor

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THE TECH PREP MOVEMENT: ONE SCHOOL'S RESPONSE TO INDIANA PUBLIC LAW 217

By

David A. Cline

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ABSTRACT

THE TECH PREP MOVEMENT: ONE SCHOOL'S RESPONSE TO INDIANA PUBLIC LAW 217

by

David Cline

The study described, analyzed, and interpreted one school's response to Indiana Public Law 217. Placed in the context of the national movement toward technology preparation for high school students, the chronology of events leading to implementation of a two-year Tech Prep program in Roosevelt High School is told through the words of the key players in its development.

Three teachers representing mathematics, science, and English were observed for eighteen months. Each teacher and the relevant administrators also were interviewed. Data sources included audio recordings and transcripts of interviews, field notes, site documents, daily logs of the researcher, curriculum documents, and legislative documents that have direct bearing on the study. Analysis of data was done in the tradition of interpretive research.

It was found that the program had a high impact on about seventy-five students and three teachers, but has had little effect on the total school population. As reported by the teachers, the students seemed to improve their overall competency level in math, science, and English through the integration of the disciplines.

The teachers in this study experienced growth in their teaching expertise. They described the change that occurred

when asked to function as part of a team using an activity-based curriculum.

The teachers were given a year to develop curriculum "by the seat of the pants" and develop a formal curriculum document after the first year of the program. This led to much experimentation on the part of the teachers, but the resulting document bore little resemblance to the exhilarating style and radical experimentation of the preceding year. It was found that these teachers had a difficult time articulating exactly what they wanted to do in written form. Curriculum guides, to the observed teachers, were not living documents, but rather paperwork done only to fulfill some school or state requirement.

Implications of this research for the discussion of school reform, curriculum development, teacher role, and teacher education are examined.

To: my father and mother; my sister, Susan; my former students; but most of all, my long-suffering wife, Teresa

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Thanks also to the State of Indiana Department of Education and the Department of Workforce Development for their expertise and blessing. Major kudos go to the schools and personalities that make up Region 9--somewhere in Indiana. I'll send one last special thank you to Robert Hoffman for that encouraging bit of advice, ". . . whatever it takes."

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THE NATIONAL TECH PREP MOVEMENT

The purpose of this study is to examine the response of the teachers and administration of Roosevelt High School (a pseudonym) to Indiana Public Law 217. This law mandated a change in the school curriculum that may lead to the demise of the general curriculum in public schools. In this study the researcher worked with three teachers to answer three questions. The key questions to be examined by this research are:

1) What has been the impact of Public Law 217 upon Roosevelt High School?
2) What changes have occurred in the teachers that were involved in Tech Prep?
3) What successes and failures have the teachers experienced as a result of Public Law 217?

The storyline of this dissertation is a "slice of time" from 1991 until early 1993, but in order for these observations and interpretations to make sense there must be background information. This information, as well as how the research was situated in prior research and how the work was conducted is contained in the first three chapters of this work.

After the findings of the research and the interpretation of those findings are reported to represent the time period of the study, the logical extension is to project what will happen next. An organizing framework of this sort requires that implications of the research and

areas for further study be included. As with most research, this study raises more questions than it answers, but given the state of change of the Indiana schools at the present time, these questions are necessary in order to understand the complexity of the problem.

Background Information

Our nation is confronted with the challenge of global economic competition. Because of the nature of advances made in technology and the impact of these changes in the workplace, secondary and tertiary educational institutions are under pressure to increase the number of technically prepared graduates. Many students emerge from high school with a diploma in hand, neither ready to enter the work force nor ready to pursue tertiary education. This dilemma comes at a time when knowledge is increasing at an exponential rate, traditional employment and job skills are diminishing, and new jobs and occupations require new abilities and experiences.

Tech Prep is an effort to address this problem. The origins of Tech Prep can be traced to federal "manpower legislation" enacted in the 1960's. It was in response to that legislation that Dale Parnell, then Superintendent of Public Instruction, Oregon State Board of Education, headed The Community College/High School Articulation Task Force II in 1968. This task force initiated several ideas for the improvement of vocational/technical education. Over the years these ideas were elaborated and refined, and in 1985

Parnell published The Neglected Majority which provided the blueprint for today's Tech Prep programs.

In 1987, based largely on The Neglected Majority, the Indiana Legislature mandated Tech Prep programs be available for all secondary students in the state by the 1994-1995 school year.

Tech Prep in Indiana

Indiana Tech Prep had its origins in the 1987 state legislature. Public Law 217 called for the establishment of a technology preparation task force to design and approve technology preparation curriculum models and teacher and staff training to implement the technology preparation models. The legislation also stipulated that the curriculum model must a) be performance based; b) provide students with the skills necessary to gain employment and/or pursue further education upon graduation; c) relate to a broad scope of occupational opportunities; d) include math, science, and English/language arts courses taught through practical application and designed to meet graduation requirements in those subjects; e) be designed to include secondary and post-secondary sequence models; and f) allow for advanced study and cooperative agreements.

Subsequent to the passage of Public Law 217, a task force was appointed to formulate a model for Tech Prep, and five school corporations (Bartholomew Consolidated School Corporation in Columbus, Ben Davis High School in Wayne Township, Indianapolis, Monroe County School Corporation in

Bloomington, and North Montgomery High School near Crawfordsville) were funded through the Indiana Department of Education to implement the model. In 1991-92 these five school corporations were designated as demonstration sites and were funded to assist others in developing and implementing Tech Prep programs. At the same time, 14 regional consortia were funded through the Indiana Department of Workforce Development to form consortia of secondary and post-secondary schools to develop and implement Tech Prep programs within each region.

Organization

Funding for Tech Prep comes from two sources. The Demonstration Sites and Teacher/Staff Training are funded by state monies through Indiana Department of Education; the regional consortia are funded by federal monies (Carl Perkins Vocational Act) through the State Department of Workforce Development.

Organization varies slightly from one region to another, but in each case several secondary school corporations in several counties and one or more post secondary institutions are involved. Each region has some kind of advisory committee and a full-time Regional Coordinator who is responsible for orchestrating Tech Prep activities within the region. Most regions also have committees charged with responsibilities such as information/promotion (marketing), curriculum development, and evaluation.

What is different from past educational reform movements is that schools went to business, industry, and labor and asked, not for resources, but for information. This is in response to years of complaining by the private sector that high school graduates lacked such vital skills as reading, math, interpreting information, oral and written communication. Partnerships were formed between schools and industry; and in some cases, schools that provided deep technical skill foundations for high school students essentially guaranteed that these students would be hired by the industry upon graduation. It almost certainly guaranteed that the student would get an associate degree in a technical field paid for by the employing industry.

This dissertation focused on a part of Indiana referred to as Region 9. Region 9 is the smallest of the 14 districts because of a peculiar set of problems. The eight high schools, four post-secondary institutions, and five counties represent the area of the state where rates of unemployment, teen pregnancy, and industrial restructuring are highest.

It was anticipated that as each school corporation within a region assumes ownership for Tech Prep, it would select a coordinator for local implementation; establish committees paralleling those at the regional level; and form development teams composed of administrators, counselors, teachers (math, science, English, and technology), and community representatives to develop the local Tech Prep program.

Goals

The goals of Tech Prep in Indiana are essentially the same as the national goals. However, the Indiana Tech Prep Model goes beyond Tech Prep Associate Degree as described by Hull and Parnell (1991). Hull indicates that "For a curriculum to qualify as TPAD [Tech Prep Associate Degree] . . . it should:

* run parallel to--not replace--college prep/baccalaureate degree programs;
* build an advanced skills technical education on a common foundation of math, science, communications, and social sciences;
* lead to an associate degree or two-year certificate;
* incorporate relevant (real-life) applications of what is being taught--in other words, be built around applied academics;
* use a competency-based core curriculum structured around a career cluster of occupations; and
* provide employable skills at the conclusion of the high school portion, so that, if circumstances require, students can work while completing their associate degree. (Hull and Parnell, p. 47)

Many schools in other states use existing courses to develop plans of study that will articulate with associate degree programs available in local community colleges, but little attention is given to the way courses are taught. Indiana's model places a great deal of emphasis on teaching

methodologies. It represents a significant school reform effort that can potentially impact the entire curriculum. In addition to the characteristics named by Hull and Parnell, Indiana Tech Prep will:

* emphasize cooperative learning and/or other teaching strategies that stress teamwork and working effectively in groups;
* employ cooperative planning, team teaching, or similar procedures to effect subject matter integration across disciplines;
* acknowledge the variety of learning styles used by students and incorporate teaching strategies that will accommodate those styles; and,
* require that each student develop an individual plan of study which reflects post high school goals and technical areas of interest.

The Indiana Tech Prep Model

Tech Prep is a national reform effort with a variety of faces, but there exists in Indiana a specific model for reform. Since there are financial implications through a weight formula that will provide additional state support for each student enrolled in a Tech Prep program, it is important to understand what the Indiana Tech Prep Model specifies. As schools begin to apply for additional state aid under the funding formula, it will be equally important to specify what constitutes a tech prep student.

At the heart of the Indiana model is a core program divided into two parts. The first part of the core consists

of mathematics, science, and English/language arts. This part of the core is intended to receive major emphasis, and the competency levels in these areas are more clearly defined: In order to satisfy the mathematics core requirement, a student must be able to use algebra to solve problems, must be able to apply principles of geometry and trigonometry, and must understand fundamental concepts of probability and statistics. The student's science background must include understanding of science at a level comparable to that expected of students who have completed a traditional two-course sequence in biology and physical science. The student's competence in English/language arts must match or exceed that acquired through the traditional four-course English sequence.

The second part of the Tech Prep core is less clearly defined. There are no benchmarks to indicate a minimum competency level. However, any school applying for additional state funding under the Tech Prep weight will need to show that Tech Prep students have acquired a basic understanding of economic principles, can demonstrate proficiency in keyboarding and computer applications, and is familiar with career opportunities.

The core portion of the Indiana Model is closely related to traditional academic courses, and it is conceivable that, in some schools, aspects of the core can be satisfied through existing course offerings. However, schools wishing to use existing courses as part of their Tech Prep Core must be prepared to pass a kind of Litmus

test implied through this appellation: "To be taught through the applications approach." The "applications approach" and the rationale used at Roosevelt High School will be discussed in Chapter 4.

Three pieces of legislation, one federal and two state, helped define Tech Prep. In 1990, the 101st Congress amended the Carl Perkins Vocational Act to include the Tech Prep Education Act. This act provided the funds under which the fourteen regional consortia are funded, and it will continue funding Tech Prep programs for four additional years. Indiana's Public Law 217 (as amended), passed in 1987, established Indiana's Tech Prep program, and Senate Enrolled Act 419, passed in 1992, contains provisions that are likely to affect its implementation.

Research for Context

In order to understand the Tech Prep programs in this part of Indiana I asked myself the "ethnographer's questions": What is going on here? What lies behind it?

First of all, what information could be obtained from nationally published sources about Tech Prep? A natural place to begin was Dale Parnell's book, The Neglected Majority, along with an examination of the Dan Hull and Dale Parnell book, Tech Prep Associate Degree. These two books are the cornerstone and foundation from which most other Tech Prep writing is based. Additional information to be used as context for Tech Prep in Indiana came from other books and articles as well as materials generated from other state projects.

In addition to writings about Tech Prep that are published nationally, what information could be obtained about the tech prep program through an analysis of federal and state documents? For example, what information could be collected from a careful examination of the Carl Perkins Vocational Act, Indiana Public Law 217, and Senate Enrolled Act 419? Documents generated from the Indiana Department of Workforce Development as well as information generated by the Tech Prep pilot sites proved helpful in getting a clear picture of Tech Prep in Indiana.

What information about change and educational reform could be collected? A theoretical framework for examining the process of change in the Indiana schools came from the philosophy of science. Thomas Kuhn's work in The Structure of Scientific Revolutions was the main framework for interpretation and understanding of the reform movement and the shift toward Tech Prep programs. This is discussed in greater detail in Chapter 2.

What information about curriculum could be collected? Chapter 2 describes the Tech Prep curriculum in greater detail, and the specific curriculum of Roosevelt High School is discussed in Chapter 4. A discussion of curriculum theory emerged from the analysis of state and federal laws as well as the local Tech Prep curriculum documents. The framework for analysis of legislative documents and curriculum materials was found in George Posner's book, Analyzing the Curriculum. More about this in subsequent chapters.

Research for Understanding

Once context at the state and national level was established, how was the tech prep scenario played out locally? What information could be collected from participant observation and interviewing about the process of implementation of tech prep in southeastern Indiana? It was expected that information concerning the reactions to change would be at the forefront of interviews conducted with teachers. From these interviews, information about progress as defined by each stakeholder was obtained. Furthermore, participants' descriptions of the change process and difficulties and resistance encountered through the implementation process is described in detail.

The key questions examined by this research were:

1) What has been the impact of Public Law 217 upon Region 9 in general and Roosevelt High School (a pseudonym) in particular?
2) What changes have occurred in the teachers that have become involved in Tech Prep?
3) What successes and failures have the teachers experienced as a result of Public Law 217?

A series of classroom observations will show the correspondence that exists between teachers' perception of Tech Prep and observed patterns of classroom interaction. This was accomplished by way of participant observation and stimulated recall during post-observation interviews.

Given context and data collected through interviews and participant observation, what sense was made of the

findings? It is through the use of The Structure of Scientific Revolutions by Thomas Kuhn as a theoretical framework that interpretations and synthesis can occur.

Limitations and Key Assumptions

I was sensitive to the fact that my own interpretation of an occurrence may be very different from the interpretation by those who are living and working in the setting. Another issue that may either help or constrain me is my position in the consortium. It wass difficult for me to draw a clear line between what was research for this dissertation and what my job is as day-to-day project coordinator. It was my job to analyze documents, to conduct interviews, to do classroom observations, and so forth, and local faculty and administration knew that. I struggled with the idea that I was serving schools, but also myself. The key issue is what I knew about certain situations. As required by the University Committee for Research on Human Subjects, I needed their permission before I could begin research. My job required that I do this type of research on a daily basis, so how can he "know" something in one context and "not know" in another? The point is: I knew much more about schools, state, Tech Prep, etc., than the University Committee for Research Involving Human Subjects allowed me to know unless I had access to his total body of field notes. This was a key concern.

Contributions to Knowledge

My work was funded through the State of Indiana. The Department of Workforce development was anxious for this

study to be completed so that the research can be put into a form that could be used by schools that were in the process of developing their own Tech Prep programs. This work was to be used in the development of a chapter in an implementation handbook to be distributed to each junior high, high, and post-secondary institution in the state. It was interesting that the State of Indiana had such a keen interest in this work but had not made any attempt to control the product. In addition to helping other schools, the resulting literature review will be shared with other coordinators for their own efforts. It expected that this work will be published in some form, and I also expect to share my findings in local, state, and national meetings. In this study, being interpretive in nature, I makes no claim to the generalizability of these findings; that is for the reader to decide. I was interested in telling a story about the process of change, since this is educational reform for an under-served student group.

CHAPTER II

REVIEW OF LITERATURE

"By our failure to change how and what our schools teach our young people . . . we have put our country on a downward path toward low skills, low productivity, and low wages. In a very real sense, we are failing our children and shortchanging their future and ours. William E. Brock, former Secretary of Labor."

The Need for Reform

As of this writing in 1992 there has been nearly ten years of continuous charges of ineptitude in our public schools. Beginning with A Nation at Risk (National Commission on Excellence in Education, 1983) the American public has heard on an almost daily basis that we are falling behind the rest of the industrialized world in quality, production, and the education of our workforce. A Nation at Risk pointed out that America was being threatened by an external, economic threat and that education was one of the causes of that problem.

Another report, Action for Excellence (Task Force on Education for Economic Growth, 1883,) suggested that many of the goals of American Education are blurred, and while many educators understand the need for change, there are no clear paths for improvement. An important finding of this report was the suggestion that schools not try to solve their problems in a vacuum. Rather, it suggested fostering creative partnerships with business, industry, and labor to create learning experiences and activities to more closely

mirror the workplace. Team teaching, cooperative learning, and hands-on methods were discussed as positive directions for education to take.

Although Mortimer Adler's Paideia Proposal (1982) differs radically from the vision of Tech Prep according to Dale Parnell, the two men share a common goal to be reached in very different ways. Adler proposes that education should allow citizens to "earn a living, to lead good lives, and to preserve and perpetuate democratic society . . . ."

Dale Parnell wrote in 1985:

> With so many educational reform reports coming so fast, it would be easy to grow cynical--to say "This too will pass." But such an attitude will result in the loss of a tremendous opportunity. Never has the public been so conditioned to think seriously about education . . . .
>
> Although the reform reports have made some important contributions, they exhibit some glaring omissions and blind spots which hold considerable significance for high schools and community, technical, and junior colleges. These deficiencies include: 1) failure to recognize that three out of four high school students will probably not earn a baccalaureate degree; 2) sparsity of discussion about how to make winners out of ordinary students; 3) little emphasis on continuity of learning; 4) limited attention given to the great range of individual differences among the school population, particularly the one out of four students who does not complete the high school program; 5) lack of participation by community, technical, and junior college personnel in these discussions despite the fact that fifty-five percent of all entering freshmen begin their college careers in one of these colleges. (Foreword to The Neglected Majority)

One of the problems that we are facing in this part of the state corresponds to an issue addressed by Jean Anyon in Social Class and School Knowledge. Anyon's research pointed

out that the type of school that a parent sends a child to will prepare the child for a career similar to that of the parent. For example, the child of a lawyer will grow up in a neighborhood with other children of professional parents. These children are in turn sent to local schools where community input guides the educational practices so that the children of professionals will be prepared to be professionals. In the case of many of the children in this part of the state, parents and schools are preparing students for a career in manufacturing--assembly line production. These jobs are ceasing to exist in this part of the state, so a problem exists. Gone are the days in which a student can earn a high school diploma in a general education track and enter the workforce in a high-paying, secure factory job. Needless to say, the students are being prepared for jobs that no longer exist, and that translates to no training at all.

In Project 2061, Science for All Americans (American Association for the Advancement of Science, 1989), it is outlined that all children need and deserve a basic education in science, mathematics, and technology that prepares them to live interesting and productive lives. The report goes further to say that world norms for what constitutes a basic education have changed radically in response to the rapid growth of scientific knowledge and technological power. This has proven to be the case in this part of Indiana. Representatives of industry have met with teachers and have stated that what they require is "a good,

solid, basic education" (Daily log, January 25, 1993). In the area of mathematics, for example, teachers understand this as basic math functions, while the industry representatives are meaning a working knowledge of algebra, geometry, and some trigonometry.

Project 2061 further states that United States schools have yet to act decisively enough in preparing young people --especially minority children, on whom the future of America is coming to depend--for a world shaped by science and technology, and that sweeping changes in the entire educational system from kindergarten through twelfth grade will have to be made if the United States is to become a nation of scientifically literate citizens. Many of the goals of Tech Prep run parallel to the goals of Project 2061. A necessary first step in achieving reform in science, mathematics, and technology education is reaching a clear understanding of what constitutes scientific and technological literacy.

The United States Department of Labor released its outlook for the fifteen year period of 1990-2005 and stated:

> Workers with the most education and training will have the best opportunities for obtaining high paying jobs in growing occupations because the changing occupational composition of the workforce and the changing structure of work within occupations. Although the projections indicate that jobs will be available for those without training beyond high school, prospects for high paying jobs will increasingly be better for those having post-secondary education and training. An important factor is that the high paying jobs for workers without education beyond high school in our nation's manufacturing establishments are declining in number for a combination of reasons, including technological

> change and changing business practices. Thus, individuals who drop out of school or complete high school without obtaining basic reading and mathematics skills will be at a great disadvantage in the workplace of 2005.
>
> Technology will continue to change the structure of employment and how work is done. Computer technology will be used to an increasing extent in a wide variety of functions. As a result, systems analyst and programmer will be among the fastest growing occupations, and more and more workers will need to be computer literate. Improved office technology will continue to limit the growth of administrative support occupations, which will be among the slower growing groups of occupations.
>
> The manner in which businesses operate is changing so that greater interpersonal skills and greater analytical skills are needed. In order for future workers to have these skills, our educational system must provide more than the basic 3 R's. (Occupational Outlook Quarterly, Fall 1991)

One of the reports that is driving the Tech Prep movement in Indiana at the time of this writing is the Secretary's Commission on Achieving Necessary Skills (SCANS) report entitled <u>What Work Requires of Schools</u>. The intent of the SCANS report is to make it clear what skills and competencies that students need in order to be successful in today's job market. The following outline lists the five skill areas that the commission identified as necessary for a student to make the transition into the workplace of the late twentieth century.

1. Resources: Identifies, organizes, plans, and allocates resources
   - A. Time - Selects time relevant activities, ranks them, allocates time, and prepares and follows schedules.
   - B. Money - Uses or prepares budgets, makes forecasts, keeps records, and makes adjustments to meet objectives.

C. Material and Facilities - Acquires, stores, allocates, and uses materials or space efficiently.
D. Human Resources - Assesses skills and distributes work accordingly, evaluates performance and provides feedback.

2. Interpersonal: Works with Others
   A. Participates as member of team - Contributes to group effort.
   B. Teaches others new skills.
   C. Serves Clients/Customers - Works to satisfy customer's expectations.
   D. Exercises Leadership - Communicates ideas to justify position; persuades and convinces others, responsibly challenges existing procedures and policies.
   E. Negotiates - Works toward agreements involving exchange of resources; resolves divergent interests.
   F. Works with Diversity - Works well with men and women from diverse backgrounds.
3. Information: Acquires and uses information.
   A. Acquires and evaluates information.
   B. Organizes and maintains information.
   C. Interprets and communicates information.
   D. Uses computers to process information.
4. Systems: Understands complex interrelationships
   A. Understands systems - Knows how social, organizational, and technological systems work and operates effectively with them.
   B. Monitors and corrects performances - Distinguishes trends, predicts impacts on system operations, diagnoses systems' performances and corrects malfunctions.
   C. Improves or designs systems - Suggests modifications to existing systems and develops new or alternative systems to improve performance.
5. Technology: Works with a variety of technologies
   A. Selects technology - Chooses procedures, tools, or equipment including computers and related technologies.
   B. Applies technologies to the task - Overall intent and proper procedures for setup and operation of equipment.
   C. Maintains and troubleshoots equipment - Prevents, identifies, or solves problems with equipment, including computers and other technologies.

Not everyone agrees with the Commission's findings. Jonathan Weisman in his article Skills in the Schools: Now It's Business' Turn (Kappan, January 1993) writes:

> A Stanford University study of four successful high technology companies in Silicon Valley found that, contrary to the rhetoric of escalating skills requirements, workers were largely isolated from tasks that were deemed too difficult or complex. Writing and computational skills were rarely if ever used by workers in the computer and telecommunication companies that are considered "the vanguard of the new, competitive American firm."
>
> The Stanford researchers concluded that "perhaps the most striking" of their findings was "the low levels of basic skills that are required for successful performance . . . . We did not observe any skill requirement that could not be achieved with a solid eighth-grade education. Although we have heard stories of how assembly workers need higher-level algebra, sampling, and probability skills to perform adequately on their jobs, we did not observe any requirements approaching this level."

In fulfilling his tasks as a regional coordinator for Tech Prep and as a member of Phi Delta Kappa, this one article, and particularly these two paragraphs, has caused me more distress and difficulty than any university research study. I had the task of addressing a monthly meeting of Phi Delta Kappa the month that this article appeared. Many of the administrators that I work with that are opposed to Tech Prep use this article as a reason not to make progress with their own programs. Elitism runs deep in the schools that I serve, but it is not recognized by that name. These administrators rationalize that they are simply putting their time and effort where it is most appreciated. As in everyday life, they want to get the best value for their money. That means college-prep programs take precedence over those programs that serve the general population. Tech Prep represents the next phase. No school that I have been

associated with would dream of fighting the state over monies that must be applied to learning disability or mentally handicapped programs; that would be unheard of. No school would consider dropping advanced placement courses for the gifted and talented. Community outrage would prevail. The middle group of students have had their options taken away by hard economic times and technological developments in manufacturing. At one time this group took care of themselves; today they have nowhere to be employed without specialized training. Federal law set up the ground rules for this change.

Legislative Documents

In the Carl D. Perkins Vocational and Applied Technology Act and the amendments of 1990, the Congress of the United States found a set of conditions facing school and work that have been restated in SCANS and other reports. The congress responded by allocating fifty million dollars to be distributed to consortia that consisted of post-secondary institutions that provided two-year programs and local high schools.

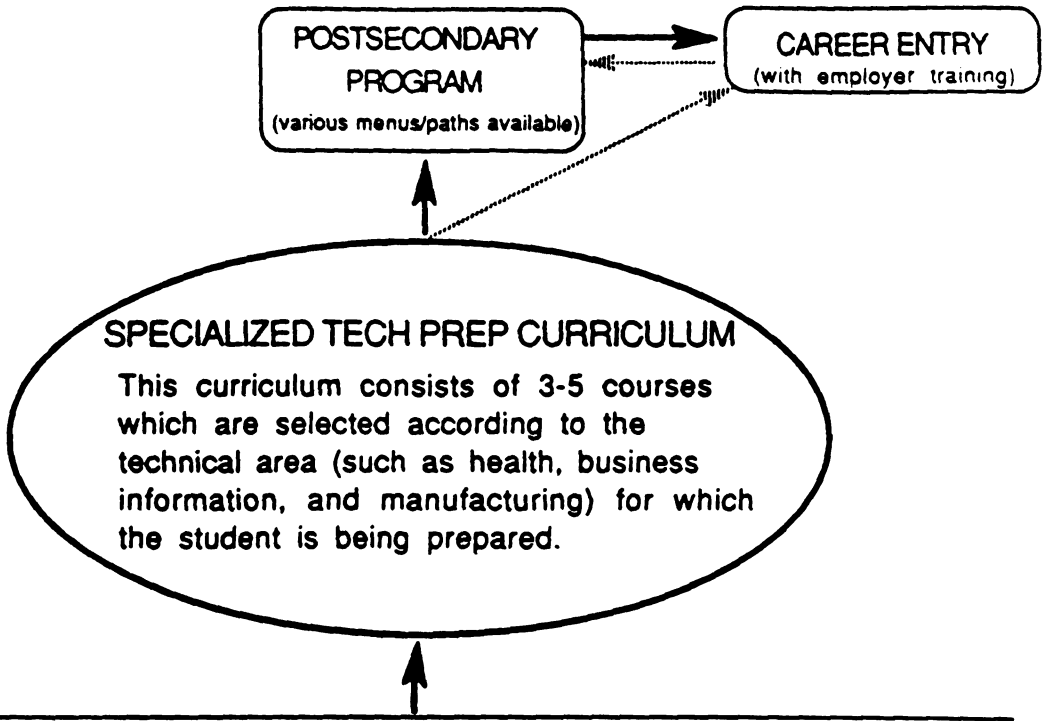
While the entire text of the Carl D. Perkins Vocational and Applied Technology Act and the amendments of 1990 is much too long to be included here, it will be included as an appendix. Some of the key findings are: 1) Congress found that rapid technological advances and global economic competition demand increased levels of skilled technical education preparation and readiness on the part of youths entering the workforce; and 2) effective strategies reaching

beyond the boundaries of traditional schooling are necessary to provide early and sustained intervention by parents, teachers, and educational institutions on the lives of the students. The law goes on to say that a combination of non-traditional school-to-work technical education programs using state-of-the-art equipment and appropriate technologies will reduce the drop-out rate for high school students in the United States. The law further states that by the year 2000 an estimated 15,000,000 manufacturing jobs will require more advanced technical skills and an equal number of service jobs will become obsolete. Finally, more than fifty percent of the jobs that are developing will require skills greater than those provided by existing educational programs.

The act then outlines how monies will be allocated to schools that are participating in Tech Prep consortia, such as the model that was described earlier in Chapter I of this work.

The law that outlines Tech Prep in Indiana is Indiana Public Law 217-1987 as amended. Based on the findings of Congress in the Carl D. Perkins Act, the state Superintendent of Public Instruction and the Commissioner of Vocational and Technical Education and the executive officer of the Commission for Higher Education set forth a task force that created the curriculum model for Indiana Tech Prep.

TECHNOLOGY PREPARATION CURRICULUM MODEL FOR INDIANA



TECH PREP CORE CURRICULUM

To be taught through applications-based instruction

- **Math** . . . . . demonstrate first year algebra competencies, first year geometry competencies, and probability and data analysis competencies
- **Science** . . . . . demonstrate first year biology and first year physical science (physics/chemistry) competencies
- **English Lang. Arts** . . demonstrate competencies reflecting four years of comprehensive English, including technical communication and technical literature competencies
- Keyboarding/Comp. App. . demonstrate basic competencies in keyboarding and computer applications
- Intro. to Careers. . . . . demonstrate an awareness of careers and an ability to examine current and evolving technical careers
- Economics. . . . . demonstrate competencies in applying economic principles

(Core competencies can be delivered through specific courses or through integration across areas of instruction.)

Begin Tech Prep Curriculum

Indiana Requirements for High School Graduation (Minimum 38 credits)

English Lang. Arts (8 credits) — *Science (4 credits)*
Social Studies (4 credits) — *Physical Education (1 credit/1 year)*
Mathematics (4 credits) — *Health & Safety (1 credit)*
Electives (16 credits)

As stated in Chapter I, Tech Prep must: be performance based; provide students with the skills necessary to gain employment to pursue further education upon graduation; relate to a broad scope of occupational opportunities; include math, science, and English language arts courses taught through practical application and designed to meet graduation requirements for those subjects; be designed to meet post-secondary and secondary sequence models; and allow for dual credit and advanced study or cooperative arrangements.

Indiana Public Law 217-1987 went further to say that these changes and this course of study would be available to all students by the 1994-95 school year.

Funding for Tech Prep was to come through the funds allocated by the federal government to each of the states. The states would then divide the money equally among local consortia by a formula that consisted of x amount of dollars for each participating high school and state funded public post-secondary institutions plus a $25,000 base grant.

As it has been described from these legislative documents, the system is in place that federal money is channeled into state government. State government makes the determinations and then distributes the money equitably among regional consortia. Regional consortia have a project coordinator, a management team, and a person responsible for working directly with the schools in order to get the implementation of Tech Prep in place. That is my job.

This system being in place sounds very straightforward on paper, but as Earing describes in an article entitled, "What the 'V' Word if Costing America's Economy," there is a description of vocational education which closely parallels what is going on in Tech Prep. Tech Prep is viewed by many teachers and administrators as another name for vocational education. This causes many problems because vocational education in the United States has a reputation as being less than desirable. Referring to Parnell (1985), Tech Prep has as its intended captured audience the middle two quartiles of students in a high school. As it is traditionally arranged, approximately the top 25 percent of high school students go on to four-year colleges. The bottom 25 percent of students are served by special programs, and in the past they have been served by vocational school programs because there is nothing left for them. Teachers and guidance counselors view vocational school as the last option for many students. If they cannot make it academically in the classroom, they can work with their hands. There has been a social stigma around vocational school that is hampering the efforts of Tech Prep. This vocational school "dumping ground" is described by Shapiro (1986) and Parnell (1986).

Preparation for Technology

Indiana is not alone in its efforts; due to the fact that federal funds are available, each state now has a Tech Prep initiative in effect. As of this writing in late 1992, Indiana is the only state that has mandated that Tech Prep

be available to all students by way of legislation. Other schools throughout the country have had successes with Tech Prep. Cantor (1992) outlines specific accomplishments with Tech Prep electrical and construction labor sponsored programs and its impact upon the maritime industry, professional firefighters, and emergency service personnel. Northwest Suburban Career Cooperative of New Palatine Illinois (1992) reported success in drafting, electronics and computer aided design. Elgin Community Schools (1991) found that they could meet the needs of business locally by tailoring their curriculum to the business' needs. They strengthened the basic skills instruction in mathematics, science, and computers, and they developed a 3+2+2 program allowing high school seniors to pursue an entry level college program during the last year of high school. These students were then prepared for either further education or employment.

Although the state of Illinois has no state Tech Prep mandate, it does have several programs that appear in the literature as successful. The Joliet schools found that administrative support secured for Tech Prep at both the secondary and post secondary-levels was necessary; key business leaders that were interested in the program were necessary to be involved; there needed to be a student attraction to get the "correct" students into Tech Prep; a committee of experts was needed to help identify the official elements of the Tech Prep program for the region; and a Tech Prep overview was given to area teachers likely

to be involved in the program. Quad City/Tri-County Vocational Region of East Moline, Illinois, worked on a Tech Prep program to be articulated with Black Hawk College and Western Illinois University. It was found that by involving all key business and industry leaders at the early stages and by going through the Developing a Curriculum approach, their model was developed and tested and appeared to be successful by meeting the needs of the local business community as well as that of the local schools. Lewis and Clark Community College (1991) discussed and published the findings of their report, talking about how they recruited, assessed, advised and monitored student participants in a Tech Prep Associate Degree program.

Many other writers describe the necessary function of meeting the needs of local business, industry, and labor community. Those authors are Haynes (1991), Council of Chief State School Officers (1991), Braman (1992), Koch and Jedlinski (1992), Key and Key (1992), Kooker and Brey (1991), Peterson, et. al. (1992), Hemmings (1991), Roanoak (Virginia) Public Schools (1990), Brand (1990), Hull and Parnell (1991), and Robertson-Smith (1990).

Across the country Tech Prep programs are springing up, and many of the states that have Tech Prep programs that are beginning to work also have community college systems in place. Indiana is different in that respect with no community college tradition. Students are forced to attend associate degree programs at many of the state institutions and smaller colleges which, traditionally, have not been as

well thought out and developed as their baccalaureate degree counterparts. Students also have the option of attending Indiana Vocational Technical College which has satellite campuses throughout the state.

Indiana Vocational Technical College has had the designation of being the school fighting for respect. Similar to the plight of the vocational schools, Indiana Vocational Technical College (with the deadly "V word" in its title) is viewed by many as being less than adequate. There seems to be much confusion among teachers, administrators, and post-secondary personnel as to who makes up the audience of Tech Prep. Who are the students that will be going through these programs? They are not the students that are traditionally channeled into four-year college programs. High schools have informally made it their only mission to prepare students for college. This definition is shamefully out of date. Most of the jobs that are projected to become available within the next fifteen years will not require a four-year college degree. These jobs will, however, require some specialized training after high school (Occupational Outlook Quarterly/Fall 1991).

The Process of Change

Along with the changes that are to be taking place with Tech Prep and the development of new curriculum, any discussion of how teachers will be retrained is sadly lacking in the available literature. There is much interest in the Tech Prep program and how it will meet student and community needs, but very little about how teachers fit into

the scheme of things. It seems as if it is taken for granted that teachers will naturally adapt to the different teaching styles and methods demanded by Tech Prep Guidelines.

> Change demands additional resources for training, for substitutes, for new materials, and for new space, and above all developing new time. Change is resource hungry because of what it represents, developing solutions to complex problems, learning new skills, arriving at new insights, all carried out in social settings already overloaded with demands. (Fullan and Miles, 1992)

Lewis and Miles (1990) surveyed suburban high schools and found that principals involved in school-wide reform spent seventy days a year on managing change. Teachers most closely engaged with the change spent twenty-three days a year. The cost to the schools was between $50,000 and $100,000 a year. They found that at least ten days a year of external assistance with more than that divided internally was essential for success. In Region 9, the local schools spend less than the equivalent of one and one half days per month working on change. That is including meeting times and after school in-service training. Fullan and Miles (1992) also point out that "resourcing" may be as important as resources. "It's what you do with what you've got," they observe.

"Tech Prep has been referred to as one of the most exciting initiatives in education in decades" (Hull and Parnell, 1991). President Bush was quoted as saying, "The days of the status quo are over" (quoted in Alexander, 1991, page 2).

> The success of Tech Prep, if not the success of our future education system, depends totally on all of our educators rethinking the purpose and mission of the educational system. The basic educational reform that must take place starts with the basic philosophical mind set within all educators. We must stop practicing and conducting education as if there were two worlds." Willard Wirtz, former secretary of labor, summed it up when he said there aren't two worlds--education and work--there is one world, life. Learning by hands-on participation should be at the heart of our educational perspective. (W. T. Grant Commission on Work, Family, and Citizenship Committee, 1988, p. 3)

Educators have kept alive the myth that first there is education and then later on, out there somewhere, is the world of work. Our present system of education is founded on the British model that is an elitist system in which education is generally not relevant or practical. Educators in America have not felt the need to facilitate learning through an applied mode. Brand (1990), who is United States Assistant Secretary for Vocational Education, stated, "We need a mindset change among educators at all levels regarding their role in the human resource development."

This research has shown the difficulties encountered in assuming that teachers will understand how to implement programs and change teaching styles with little or no support. It is a recommendation of this research that as much time and effort be spent with retraining teachers to be sensitive to differences in teaching and learning styles as well as practical techniques in classroom management through cooperative learning as it is for the development of new curriculum documents and the acquisition of materials. It is difficult to conceive that teachers would be asked to

implement new teaching styles with their training being a two-day workshop and then not having an opportunity to work with others in the school to model behavior and peer coach. That has been the situation at Roosevelt High School.

Indiana Public Law 217-1987 as amended established the ground rules for Tech Prep programs in the state of Indiana. As mentioned earlier in Chapter I, these programs were to: a) be performance based; b) provide students with the skills necessary to gain employment or pursue further education upon graduation; c) relate to a broad scope of occupational opportunities; d) include math, science, and English/language arts courses taught through practical application and designed to meet graduation requirements in those subjects; e) be designed to include secondary and post-secondary sequence models; and f) allow for dual credit, advanced study, and cooperative agreements.

That part of the law seems to be fairly straight forward. Where the difficulty begins is with an assumption made by the state and federal governments that teachers are, first of all, willing, and secondly, able to implement these changes.

When the law mandates that the program will emphasize cooperative learning and/or other teaching strategies that stress teamwork and working effectively in groups, there is a major assumption that teachers already know how to do this. Many do, but by far the vast majority of teachers do not have the skills to teach in a cooperative way, nor do they have the desire to get those skills.

Another assumption is that teachers can employ cooperative planning, team teaching, or similar procedures to effect subject matter integration across disciplines. Through the my experience in these schools I found that the mention of team planning in most schools is met with confusion and defensiveness. In a meeting with a group of science, math, and English teachers held on February 17, I ran into such a conflict.

I was meeting with the teachers from Cold Spring School. I began the discussion of team planning with Mr. Heckman, Mrs. Miller, and Mrs. Johnson by relating an experience from Mr. Heckman's classroom. "Mr. Heckman, I was in your science class observing and I noticed that on three consecutive days you taught students how to do the math associated with the lab that you were going to have. It seems to me that a better use of your time would be to have you team up with Mrs. Johnson to have her teach the math and you concentrate on the science".

Mr. Heckman (indignantly), "I can handle the math."

I interpreted this as Mr. Heckman's thinking that I thought he was incompetent in math by suggesting that he team with Mrs. Johnson. Nothing could be further from the truth: I was accustomed to thinking that "all of us are smarter than one of us," and the collaboration between and among teachers builds professional growth.

Another point of the law that makes many assumptions is that the teachers are to acknowledge the variety of learning styles used by students and incorporate teaching strategies

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that will accommodate those styles. A discussion that I had with a teacher that comes later in Chapter IV indicates that the teacher believes that students with learning styles other than those exhibited by students in college prep classes are somehow 'damaged' by drugs, or television, or preservatives in foods. It is so interesting to hear well meaning teachers try to explain differences in learning styles as aberrations. Later vignettes will show that much of the adaptation that occurs in teachers happens in the mind but not in actuality. It is interesting to see, as with misconceptions research in science, teachers attach a new concept to their old framework about teaching and think they are doing something that they really are not.

Another point that the law addresses is that it requires that each student develop an individual plan of study which reflects post-high school goals and technical areas of interest. Counselors find this piece of the law particularly distasteful. It seems that the only decision that they feel students are capable of making is that of whether or not they are going to college. Any plans in writing beyond that point "forces" or "locks a student into" something that cannot be changed later.

The Process of Change

Understanding that any educational reform issue is going to require those involved with it to do some degree of changing has opened a window for those people who do workshops professionally. Currently in education, paradigm is a buzzword. I, however, will use it the way Kuhn (1962)

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intended; that is: a group of people engaged in a common endeavor and communicating freely among other members of the same paradigm in order to accomplish some goal. Many other models of change are rearrangements and deconstructions of Kuhn's ideas.

One such model is the Concerns Based Adoption Model (Hall, 1973). This model essentially parallels Kuhn's stages of change by saying, "The organizational system moves from equilibrium through disequilibrium and finally, when the innovation is successful, accepted, and the system returns to equilibrium. According to Zajc (1987), Hall and the Concerns Based Adoption Model seem to be under the influence of logical positivism.

> The Concerns Based Adoption Model, a representation of the process by which an educational institution adopts an innovation, views adoption as a developmental process involving complex interaction between an adopting institution, a user institution, and a resource system. The resource system is usually a formal organization whose expert knowledge of the innovation is available to the user system. This interaction, called collaborative linkage, is ideally characterized by open communication, which allows the resource system to assess the individual users' needs and concerns, and to select personalized intervention strategies based on this assessment. It is hypothesized that there are different, identifiable stages of concern about, and levels of use of an innovation. The user systems advancement to higher levels of use and concern is a developmental process. The intervention strategies of the resource system are aimed at answering the users concerns, arousing higher concerns, and thereby advancing the level of use of the innovation. (Hall, 1974 quoted in Zajc, 1987)

Another model of change proposed by Michael Fullan (1972) and quoted in Zajc (1987), states that Fullan's model

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represents an organic interpretation of the change process incorporating political, social, and psychological factors of the educational setting and its environment.

> The eight organizational factors for a school to be effective are institutionally focused leadership at the school level, district support, emphasis on curriculum and instruction, clear goals and high expectations for students, a systemic monitor for performance and achievement, ongoing staff development, parental involvement and support, and orderly and secure environment. These eight factors are supported and fueled by four process factors: a feel for the improvement process from the leader, a guiding value system, intense interaction and communication, and collaborative planning and implementation. The interaction of the two sets of factors, organizational and process, will support a climate for improvement and change within schools.

Fullan's model views the whole process of change as extraordinarily "complex," "nonrational," and "interactive." Fullen also hints that, "An excessively rationalistic approach" will end in failure due to there being other factors that can have influence on schools and development.

Fullan and Miles (1992) also outlined why educational reform movements can fail. They suggest that change fails by 1) faulty maps of the change, 2) the problems being more complex than are understood, 3) symbols sometimes overshadow substance, 4) impatient and superficial solutions are put into place (here we could be speaking of the Indiana Tech Prep mandate and the 1994-95 implementation date), 5) misunderstanding resistance, 6) attrition of pockets of success can lead to failure, and 7) misuse of knowledge about the change process. Fullan and Miles further suggest that change efforts and reform efforts can be more

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successful by realizing: 1) change is learning, and uncertainty is normal; 2) change is a journey and not a blueprint; 3) problems are our friends and much can be learned by the process of working out problems, reminiscent of John Dewey's (1936) Experience and Education; 4) change is resource hungry; 5) change requires the power to manage it; 6) change is systemic; and (7) all large scale change, such as the Indiana Tech Prep initiative, is implemented at the local level.

Rogers (1962) describes change as the diffusion and acceptance of ideas:

> There are four essential elements in any analysis of the diffusion of an idea: 1) the innovation, and 2) its communication from one individual to another, 3) in a social system, 4) over time. An innovation is an idea perceived as new by the individual. Diffusion is the process by which an innovation spreads. The diffusion process is the spread of a new idea from its source of invention or creation to its ultimate users or adopters. A social system is a population of individuals who are functionally differentiated and engaged in a collective problem solving behavior. Adoption is a decision to continue full use of an innovation. The adoption process is the mental process which an individual passes from first hearing about an innovation to final adoption. Innovativeness is the degree to which an individual is relatively earlier in adopting new ideas than the other members of his/her social system. Adopter categories are the classifications of individuals within a social system on the basis of innovativeness. Five categories usually associated with change are innovators, early adopters, early majority, late majority, and laggards.

Posner (1992) suggests that the following questions should guide any examination of curriculum and educational reform. First of all, what situation resulted in the development of the curriculum? Who were the people involved

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in developing it? What institutions were they affiliated with? What were their roles? Within the project team, who represented the learners, the teachers, the subject matter, the milieu? Was there an obvious blind spot on the team? Posner also suggests that we keep in mind to what social, economic, political, or educational problem was the curriculum attempting to respond? What planning foci dominated the curriculum development process? Finally, what perspective, if any, does the curriculum represent?

What is seen from an analysis of schools and for whom the curriculum is designed to accommodate is that there is once again a mismatch. The Tech Prep program is being designed for the middle fifty percent of students, and it has become the role not to pay much attention to the middle group of students. This was asserted in the report of the Secondary Schools Science Project (Gallagher, 1986). Teachers teach to the upper ten to fifteen percent of the class and expect the others to catch up as they can.

Rogers (1962) outlines five stages in the adoption process: awareness, interest, evaluation, trial, and adoption. Along this continuum, there will be five descriptors to describe where a person is situated in time in reference to the innovation.

The first stage would be that of innovation. Innovation in the state of Indiana would represent the legislature's feeling the need to begin Tech Prep and then funding five innovative pilot schools and assigning them the task of developing a Tech Prep program.

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The next classification would be that of the early adopters. Although Roosevelt High School had an innovator--Bogan the former curriculum director--they can best be described as being very early adopters. The other stages are the early majority, the late majority, and finally, the laggards. Within the microcosm of Region 9, most of these descriptors can be found within the eight schools that this author is dealing with.

Understandably, the process of change moves at a glacier like pace in the United States. Miles (1964), in the opening chapter of his book Innovation in Education, quotes Snow as saying:

> In a society like ours, academic patterns change more slowly than any others. In my lifetime, in England, they have crystallized rather than loosened. I used to think that it would be about as hard to change, say, the Oxford and Cambridge scholarship examination as to conduct a major revolution. I now believe that I was overoptimistic.

Miles believes that education in the United States is changing at a more rapid pace, and for the time and context when this piece was written (1964) the United States was involved in a major curriculum reform movement that has been felt to the present day. However, somewhere along the continuum from 1964 to the present, reform has slowed down and, to use Snow's term, crystallized in the United States.

In discussing change as it relates to Tech Prep, several authors have written pieces of relevance. Haynes (1991) describes Tech Prep's being implemented by way of a change of thoughts of teachers by connecting with business

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and industry leaders. Braman (1992) describes Tech Prep as a way to facilitate change in schools. The Council of Chief State School Officers, Washington, D.C., (1991) states that change principles must be included for Tech Prep. These principles are: 1) schools must view preparation of youth for employment as part of their primary responsibility; 2) every student should participate in a program that guarantees access to post-secondary education, training, and employment; and 3) alliances among schools, employers, and employee associations must be formed. It is interesting to think that these items must be outlined as change. Peterson et. al. (1992) discuss implementation of Tech Prep and the fear of change. Ankard (1991) describes Tech Prep in terms of a change in curriculum to match a change in the economy and the character of the workforce.

To draw the section on change to a conclusion, many models of change exist; however, the literature is thin in outlining what changes need to be made in order to help teachers cope with change and how to adjust to the process and understand the process.

Curriculum

A fundamental issue that must be addressed early in this writing is a working definition of curriculum. Taken to simplest terms, there is a debate in the field over what it is that students have opportunity to learn. The key is structure. Tyler (1950) suggests that the curriculum consists of experiences that are intentionally designed for students to learn from. The other extreme as defined by

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Gail McCutcheon (1982) is that curriculum is what students have an opportunity to learn (planned or unplanned). Cherryholmes (1986) strikes somewhat of a compromise in these two viewpoints by saying that the discursive practice that constitutes the field of curriculum is theoretical and practical and focuses on what students have an opportunity to learn. Discursive practice as used by Cherryholmes follows a definition from Foucault (1972) that states that discursive practice is a system of rules from legal statutes to informal norms that determine for a given time and place what is said. The discursive practice in which students take part vary with age, gender, social class, ethnicity, and linguistic performance.

It has been my experience that many teachers view curriculum as a document that outlines a course of study that they refer to in order to structure experiences along a pre-defined sequence. Therefore, designing curriculum from the viewpoint of the teachers at Roosevelt High School is to create a list of objectives that follow a suggested sequence that outlines a specific course over a thirty-six week period of time.

At this point in the writing a choice must be made. As a student of curriculum I wished to undertake a deep analysis of the curriculum documents that have been generated by the teachers at Roosevelt coupled with classroom observations to understand what is happening in their classrooms from his outsider perspective. By imposing my framework and experiences upon these teachers, I would

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get an understanding of what I think is happening in their school based on my experiences. This would be interesting, but too much of that goes on in educational research these days. A more interesting approach to take is to document the teachers' experiences based on their understanding of curricular practice. While I believe that, as Eisner (1979) states, students have an opportunity to learn from that which is excluded, the null curriculum and from the way that learning opportunities are structured, the hidden curriculum, following Apple (1971) and Giroux and Penna (1979), I would not be doing a fair job to these teachers unless I tried to understand their action based on their view of the world.

Although the teachers never mentioned a specific curriculum theorist by name, their approach draws from both the Tyler Rationale (1949) and Mauritz Johnson's (1977) work. In planning curriculum for Tech Prep the teachers at Roosevelt High School asked themselves, the community at large, and local business persons what the mission of the schools was to be. Roosevelt's administration realized that the goal for most high schools has become getting students into a four-year college. Realizing that at best this mission serves only thirty to forty percent of all available students there was a need for some major curricular reform.

An interesting detail that surrounded the development of curriculum by the teachers at Roosevelt High School was their choice of a linear model (problem-curriculum change-solution) of design that didn't fit closely with what they

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articulated in conversations. When Mr. Titus, the math teacher, wrote curriculum intended to build up student skills in, for example, gauge and micrometer reading, to respond to a demand from local industry, he approached the curriculum process from need to action to solution of problem. Mr. Titus does acknowledge in "real life" that the world doesn't work as smoothly as that. Mr. Titus has spoken on many occasions of how hard it is to teach in an age of disintegrating nuclear families and a general loosening of moral values. This author once viewed these statements about declining moral standards by teachers as an excuse to explain away failure in attaining higher test scores, standardized test scores, attendance, and dropouts, as if to say that they were doing all that they could and it wasn't their fault. In working with these teachers, the author has come to understand that they have a certain model of curriculum development that they have outgrown. They have no faith that well-planned lessons and curricula will address the real problems of their students. This mismatch manifests itself in frustration because their old model doesn't work anymore and they don't have the tools to analyze the situation any differently.

Acknowledging these questions in response to community needs corresponds to Tyler (What educational purposes should the school seek to attain?) and Johnson (recognition of problems and goal setting to address the need). The local acceptance of a problem with education for a very few, high dropout rates, and a declining job market prompted the

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schools to ask how the problem could be corrected. Once again, the view of the Roosevelt corresponds clearly to Tyler. (What educational experiences can be provided that are likely to solve the problems?)

At this point the state of Indiana enters the Roosevelt scenario. Public Law 217 said that given all of the problems with dropouts, economic woes, declining worker preparation, fewer unskilled jobs, etc., there was to be in place by the 1994-95 school year a Technology Preparation (Tech Prep) curriculum which will be made available to each Indiana High School Student.

Research on Teacher Thinking

In thinking about the implementation of a Tech Prep program and trying to understand what is going on in classrooms through the eyes of the people that are teaching, it would be necessary to have a background in the research in teacher thinking.

Doyle (1977) describes classrooms as being "complex places" which are also fraught with "practical dilemmas" Lampert (1985). Teachers have also worked to make their jobs easier than they really are (Gallagher 1986), or they "try to reduce this complexity and thus increase their flexibility and effectiveness" (Yinger, 1977, p. 160). With this in mind, Shavelson (1973) reckons that the primary teaching skill is that of decision-making. Feldhusen (1985) suggests that some decisions become automatic, and others require more thought. Marx (1978) further discusses

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decision-making by stating that it depends on one's perception and making sense of the situation.

With regard to the teachers who are implementing Tech Prep, it is clear that at this time they are dealing with new material and a different type of student than they are accustomed to. They are also engaged in trying to analyze and make decisions in a world which may not make sense to them at the present time.

These decisions that the teachers are continually making "can be classified according to four dichotomies as being either immediate or reflective; with or without the teacher's conscious awareness; resulting in action or none (null); and singular or composite (Eggleston, 1979)" (Zesaguli, 1992).

Teacher Planning

While planning is defined as being necessary, and in some ways impossible to avoid before the teacher enters the classroom, Clark (1983, p. 7) defines planning as "a basic psychological process in which a person visualizes the future, inventories means and ends, and constructs a framework to guide his or her future action."

This research found, as exhibited in Chapter IV, that the teachers working in the Tech Prep program spent very little time in planning. It seems that the teachers in this study relied neither on objectives (Tyler, 1950) nor content (Taylor, 1970) but more on survival. What activities could they draw together as a group in order to insure the success of the program? In that regard, the teachers at Roosevelt

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High School seem to be concerned mostly with "procedures and activities potential appeal or management problem" to guide their work. (Clark and Yinger, 1979)

It is interesting at this point in the writing to understand that the teachers at Roosevelt High School perceive written plans, and by extension, curriculum guides, as serving a function, but not necessarily a personal function. Their function is, to quote the Tech Prep math teacher Mr. Titus, ". . . to satisfy someone somewhere." By extrapolation, the teachers are then viewing their plans as to "meet personal instructional needs; to guide instruction; and to meet administrative requirements." (Clark and Yinger, 1979)

Another fundamental piece of this problem in referring to the teaching of science, Smith and Sendlebach (1979) described that what teachers know and what teachers plan and what teachers present and what is received by the students are four very different things. Often times what teachers believe that they are doing, or rationalize that they are doing, is not apparent to one that might be observing their classroom.

Many authors describe the thought processes involved in teachers making instructional decisions: for example, Posner et. al. (1992), Hewson and Hewson (1984), Driver (1987), Niedderer (1987), and Kuhn and Aguire (1987). It appears that the teachers in Roosevelt High School have made their jobs easier than they are (Gallagher, 1986). Instead of making decisions as to what their curriculum is going to

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entail, they have let these decisions be made for them by upper-level administrators who choose certain textbooks, certain computer programs, and testing materials. That leaves certain teachers, for example Mr. Stillwell the science teacher, free to think about how work skills are going to be integrated into their curriculum. Most of his decisions seem to be made on the spur of the moment, or as Mr. Titus the math teacher said, ". . . by the seat of our pants."

Finally, the teachers that are to be involved in Tech Prep are required by the mandate to have some knowledge of the following areas: applications based instruction or applied academics, cooperative learning, interdisciplinary teaching, and a knowledge of specific curriculum models. In regard to the state of Indiana, the Tech Prep curriculum model was defined by the pilot sites.

Summary

Chapter II began with a review of several documents that outline the need for reform of schooling in the United States. The most famous of these, A Nation at Risk, set the tone for an examination of public education that continues ten years after its publication. Whether that reform comes by way of Tech Prep or by a refurbishing of existing school programs, most authors agree that the need is real. Two books, The Neglected Majority (Parnell) and The Tech Prep Associate Degree (Hull and Parnell) suggest responses to these national reports by outlining courses of study for students that are not traditional four-year college

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students. The growing need for educational reform and the writings of Hull and Parnell set the background context for this study.

An analysis of federal and state law guided the reader through the conditions that were to impact upon the teachers at Roosevelt High school. Indiana Tech Prep grew out of the Carl D. Perkins Vocational and Applied Technology Act which set aside state and federal funds for local Tech Prep consortium. Indiana Public Law 217 and Public Law 19 were outgrowths of the Perkins legislation that outline reforms that are to take place in all Indiana secondary schools by the 1994-95 school year.

Other Tech Prep programs are in place around the United States, and a sampling of those programs and the reports of their findings were discussed here. It is interesting in this review of literature that no work could be found about the process of staff development to shift the thinking of teachers from a behaviorist viewpoint to that of a constructivist thinker. This is significant in that Indiana teachers are being mandated by state legislation to teach in a different, and possibly unfamiliar, way without adequate training.

The last third of Chapter II was concerned with a brief overview of the literature of change theory. Understanding the process of change is a difficult process for many. By understanding the model of change that Rodgers proposes, one can identify that Roosevelt High School was an early adopter and that causes a specific set of problems. The main

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problems were little direction and very few precedents to follow.

A quick overview of the literature of curriculum was necessary to ground some of the assertions that are made in Chapter IV in order for them to make sense. The view of curriculum held by the teachers at Roosevelt High School more closely fits the definition of a lesson plan or outline than a curriculum document. Traditional and modern views of curriculum development were discussed in order to interpret what sort of curriculum model with which the teacher is working.

Finishing out this chapter was a brief review of the literature of teacher thinking in order for the reader to gain some insight into the quotes from the teachers as well as some insight into the basic research questions of "What's going on here?" and "What lies behind it?" Using the teacher thinking research as a foundation, and especially Smith and Sendlebach, it should become clearer to the reader why there were apparent discrepancies between teacher actions and quotes. It was sometimes true that what the teachers did and what they believed they were doing were two different things.

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CHAPTER III

RESEARCH METHODS

Methodology

The nature of the research questions in this study could best be answered using fieldwork research methods. Other terms used by ethnographers using similar methods include ethnographic, qualitative, participant observation, case study, and human science. According to Erickson (1985), fieldwork research involves: (a) intensive, long-term participation in a field setting; (b) careful recording of what happens in the setting by writing detailed field notes and collecting other kinds of documentary evidence (e.g. memos, records, examples of student work, audiotapes, videotapes); (c) subsequent analytic reflection on the documentary record obtained in the field; and (d) reporting by means of detailed description using narrative vignettes and direct quotes from interviews.

Data collection

Fieldwork research methods require the researcher to spend a lot of time in the setting to be examined due to the primary concern being that of context. The setting is the direct source of data and the researcher is the key instrument in the study (Bogdan and Biklen, 1982). The researcher, usually an outsider, can be more sensitive to the experiences and perspectives of the people in the setting than the insiders themselves who may tend to be unaware of the recurrent happenings or interactions in their setting (Schatzman and Strauss, 1973). The specific methods

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I used in this study included document collection and analysis, both from governmental agencies and the local site; participant observation; and formal and informal interviewing. Each is explained separately.

Participant observation

Participant observation is the process in which an observer participates in the daily life and interactions of a group of people under study: observing the things that happen in the setting, listening to what members of the group say, participating with them in their natural life setting, and gathering data (Becker and Geer, 1957; McCall and Simmons, 1969). The observer, therefore, comes to the social setting with two purposes: to engage in activities appropriate to the situation and to observe the activities, people, and physical aspects of the situation. Spradly (1980) spoke of six functions of a participant observer that would allow him or her to achieve those purposes. The participant observer has a heightened sense of awareness that would allow him or her to observe the familiar and very ordinary things in the setting. He or she should approach social life with a wide angle lens. The participant observer usually experiences simultaneously being both an insider and an outsider to the setting. He should learn how to use himself as a research instrument, enhance his introspectiveness, and finally, the researcher should keep a detailed record of both objective observations and subjective feelings.

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The dual nature of the role of participant observer is fundamental in this kind of research. While the observer tries to get involved into the setting in order to understand or have some feeling of the subjective experience of the people in the setting, at the same time, the researcher constantly attempts to detach himself from that setting or to objectify himself (McCall and Simmons, 1969).

This mix of involvement and observation in the role of participant observer may vary from one setting to another depending on the nature of the setting, the experience of the researcher, and the nature of the study to be carried out. Generally speaking, there is a continuum of possible roles for the researcher to play from complete participation and involvement in the site to non-participation (Gold in Bogdan and Bicklen, 1982; McCall and Simmons, 1969; Spradley, 1980; Goetz and LeCompte, 1984).

My role as a participant observer at Roosevelt High School dates back to November of 1991. I was hired as a regional coordinator for the statewide Tech Prep curriculum reform movement. It is my job to assist schools in developing curriculum materials and programs to meet state guidelines and insure school compliance by the 1994-95 school year. I have had a presence in this school since that time and my participation as a key player in the tech prep movement is well defined. It is in my job description to organize activities that coincide with the collection of data and recording of field notes in Tech Prep classrooms. During the time of the data collection for this study, I

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A friendly rapport developed between the administration of Roosevelt High School and me. The principal and the Director of Vocational Education, who is directly responsible for the Tech Prep program, were eager to ease my passage into researching the Tech Prep Program at Roosevelt. Since Roosevelt High School was not chosen as a pilot site for Tech Prep, the school administration was anxious to have an exemplary program without state funds. There was a conscious effort on the part of the school administration to assist me in any way possible to tell the Roosevelt story to the rest of the state and to the academic community at large, since this represents the first scholarly analysis of a state Tech Prep program. There was a desire to be better through outside analysis and a desire to be first in the state. This also represented a challenge. There was a thin line that existed between my role as project coordinator (advocate of Tech Prep) and educational researcher (open and objective analysis of the Tech Prep program). It was constantly at the forefront of my thoughts to be as objective as I possibly could in the interpretation and analysis of this research.

To date I have had a good relationship with Mr. Titus and Mrs. Williams. They have expressed an outward enthusiasm for the work that I am doing and did everything possible to assist me in this study. Mr. Stillwell, the science teacher, is another story. He is outgoing and

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affable with members of the staff, administration, and students, but he sometimes keeps the author at arm's length. I was viewed by him as a representative of that which is wrong with education--outside intervention.

Although in the early stages of this research, Mr. Stillwell and I did not have a close or personal relationship, his acceptance of me grew as the project progressed. I have a hunch that Mr. Stillwell's initial repulsion for the "suit and tie types" was tempered by his passion for teaching and belief that his input into this writing might allow him to reach a larger audience. Therefore, in allowing himself to be observed and interviewed, more teachers might gain an understanding of the work that he has done at Roosevelt High School.

A point of concern is that the reader may decide that my reporting of the actions of Mr. Stillwell may be colored by the tension that existed between us in the early stages of the research. It should be made clear at the outset that the realization of the tension that existed caused me to be very sensitive to my depiction of his actions and comments. I monitored my objectivity of the teachers continually, but with Mr. Stillwell I reflected carefully over each quote and vignette in light of our initial relationship.

Field Notes

In my travels around to schools, my constant companion was a grey leather binder that contained my calendar and loose-leaf notebook paper for notetaking. The calendar reminded me of where I was going and where I had been, while

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the notepaper was easily separated into folders that were appropriate for each school that I served. Seeing me enter a classroom with this binder was a common, unobtrusive sight. I tended to write only on one side of the paper, using the back of the previous page for notes, questions, and expansions of the raw text.

In each of the classrooms that I visited, I sat in the back of the room in order to face the teacher to hear clearly and to see the chalkboard or any audiovisual presentation that may have been in the front of the room. I also chose to sit in the back to afford myself the opportunity to write without distracting the teacher. I found that teachers were curious as to what triggered me to write something down as well as what I was writing.

I soon found that given the nature of Tech Prep instruction, the place to position myself in relationship to the teacher was seldom an easy task. In the case of Mr. Stillwell, I never knew during a class period where he would be. In the course of a fifty-minute period, the students often were engaged in lecture, student presentation, lab or data collection, and computer work. In each of these activities, Mr. Stillwell was constantly on the move working alternately between one-on-one or small group instruction and whole group discourse.

There were occasions in which, especially when talking with Mr. Stillwell, that I used my memory. I often found that in Mr. Stilwell's class if I took notes, Mr. Stilwell would ask, "Is that work for us or for you?"

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Tape Recording

I was fortunate enough to acquire a Sony TCM 5000 EV cassette tape recorder from my friend Ribhi before Ribhi left the United States to return to Palestine. The recorder was an excellent tool for recording interviews as well as whole class discussions due to its variable sensitivity. It was also small enough to become "invisible" during meetings, interviews, and classroom instruction.

This again was a common practice to see the author with this tool since his responsibilities required him to tape meetings and important conversations for recordkeeping. All tapes were labeled as to time, date, principal players, and topic. The author found that using the number index on the tape recorder is a guide only and gives a rough idea of where a specific instance lies. The only technology at that moment to attain instant, accurate indexing and access would have been to use a digital audio tape recorder (DAT). My budget excluded such devices.

Site Documents

In making arrangements to do this project, the author had access to all curriculum, public, and training documents that had been generated from Roosevelt High School. Once again as part of his job, and by extension as part of the study, access to these documents was taken as a given factor. During observations the teachers provided, without the author's asking, a copy of any handout, worksheet, or text that was being used in class. In the computer lab he was given a code number to examine any record or student

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document that was on line. During instruction it was not the author's intention to look at any student work; however, he did use the "peek" function of the computer network to understand how the teacher could look in on any student during computer-aided instruction. The teachers often "peeked," meaning that they could call up, unobserved, any student screen to check student progress and understand student difficulties with certain problems.

Interviewing

Interviewing is an excellent means of getting into peoples' subjective orientations or mental contents -- beliefs, perspectives, knowledge, values, etc. (Gordon, 1980). Both informal and formal interviews were used in this study.

When doing descriptive studies there are two important parts of the writing and reflection. The first part is the descriptive component. In the descriptive component there aspects that need to be discussed. First of all, in the site one might say that the researcher is mapping the site to determine who is who. What is the physical setting? How is the time organized in the classroom? What are recurrent events? What are the routines? The next thing that needs to be described are the actions and behaviors of the principal characters. What sort of routines do these players engage themselves in? What dialog exists? Who says what? At what time?

The next discussion of the descriptive component is what information can be infered about the beliefs or the

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attitudes of the people that are in the site. These players would usually be the students, the teachers, and the administrators, but for this study members of the business community and parents need also be included. It should be carefully noted that any inference should be supported by documented fact, by vignettes, or by direct quotes.

There are standards that need to be adhered to in the descriptive component and one of those is language identification. What is being said? Are there terms that have specialized meanings? It is very important that what is said is reported verbatim. Tape recordings need to be transcribed exactly as the words were said. It is very difficult in some instances to hear the words as an interviewee says them without perceiving them in the way in which the listener would speak them. Transcription of tapes, done exactly as the interviewee spoke the words, is far superior to quotes that the interviewer remembers.

It is important to a work of interpretive research that there is a very strong distinction being made between fact and inference. When describing a routine or a pattern in the setting ine must be very careful to describe exactly what is happening, and not to suggest meaning during reporting. There is much time for this type of interpretation in expansion of the field notes, but not during the initial reporting.

The reflective component of fieldwork research in the next major point of consideration in any interpretive study. The reflective component consists of hunches, ideas, and

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inferences that emerge from the study. In notes, these intuitive ideas should be clearly seperated from the exact verbatim recording of what is happening in the site. These should be written while a person is taking notes, or before a person goes into the setting, or while a person is doing the expansion of the raw notes. Reflection is good for generating questions and framing of emerging assertions. The reflective component also provides a place for notes on method, or the documentation of the observer's frame of mind. Interestingly, occurances or statements that seem to have little importance may emerge as crutial observations for the study. An intellectual autobiography may be one way to map the changes in the researcher's thinking as time in the field passes.

Proceduarally, where does one note these observations? I discussed earlier that I have a constant companion in my notebook, but reflections can be made in the notes, in analytic memos to one's self; they could be put in a journal, a final report, or included as a seperate intellectual autobiography.

Starting Out

For this study three high school teachers were needed. These teachers agreed to volunteer their participation. These teachers also agreed to be observed in their classrooms as they taught and they gave their consent to be observed through participant-observation methods as well as occasional audio tapes. In using audio tapes the focus was on the teachers' interaction with the questions being

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presented by the interviewer. Audio taping was also used to aid in the observation. In addition to the participant observation and observation by way of mechanical devices, the teachers were asked to consent to personal interviews with the researcher at several times throughout the period of study. The teachers used were recruited from a pool of teachers that had been engaged in technology preparation who had expressed an interest in further study for their personal development as a professional educator. Due to the nature of the research design, there was some interaction between the students and the researcher. This interaction was in the form of informal conversations but not structured one-on-one interviews with the researcher.

The proposed project had no risk to the subject by way of the methods to be used. Through use of the participant-observation, audio taping, and interviewing, there wass no personal contact between the teacher and the observer.

As previously stated, there was no risk to the teachers involved in this study. The collected notes and audio tapes were labeled with code numbers and/or pseudonyms of the involved teachers, so that in the event of loss of the collected material no connection could be made between the data and a specific teacher or school.

The potential benefits of this proposed study could be measured in the professional growth of the individual teachers through their involvement in a study of their presentation of technology preparation classes to students. The students of these teachers benefited through the

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teachers' increased preparation and reflection on the material presented during instruction. The education community benefited from the study through a clearer understanding of the relationship between the organization of instruction and the methods of presentation of material in class. Society in general may have benefited through a clearer understanding of the tech prep mandate in the state of Indiana and the implications of the mandate.

To obtain consent from teachers to be used in this study, the author contacted the superintendents of the concerned school districts to explain the intent of the study and discuss the issue of confidentiality of the teachers, administrators, and schools. When permission was obtained from the superintendent of schools, the appropriate building principals were contacted to explain again the intent of the study and to discuss the issue of confidentiality of the teachers, administrators, and schools. When entry into the individual schools had been negotiated, a representative of the project met individually with teachers to explain the rights and obligations of the teacher, as well as the rights and obligations of the researcher. At that time the description of the research was discussed, including a timeline for observations, the methods to be used, and an assurance of confidentiality. The teacher was asked to complete a consent form.

The research was conducted in local high schools that engage in normal educational practices. The research

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The research involved the examination of existing blank tests that the teachers provided as well as some student test information from standardized and locally developed tests. This collected information was coded in such a way that no connection could be made between the data and the school, teacher, students, administration, or staff.

All recordings of voice and image made in the classroom were of normal instruction. The recordings were kept in strictest confidence with pseudonyms used to label each piece of information so that no direct connection could be made.

Summary

Chapter III began with an overview of interpretive research. There were notes on methodology and a discussion of prominant researchers and their contributions to the field. This chapter is meant to inform the reader of the methods I used in gaining the information used in this work and how sense was made of the findings. Since this study involves participant observation, the methods of notetaking as well as the descriptive and reflective components of recording were outlined. Proceduaral points of recording, interviewing, and notetaking were included to familiarize the reader with these methods. Chapter III also introduced the reader to Roosevelt high school and the three teachers with whom the bulk of this study was concerned.

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CHAPTER IV

DATA AND ANALYSIS

Description of the Site

The portion of the state in which this research was conducted lies in the eastern portion of the state amid hills, valleys and fertile farmland. The area is rich in history in that it was one of the first parts of the state to be settled and that it lies along one of the earliest paths to the west when the country was new. This factor contributed to the cultural diversity of the region.

The area has not been exempt from the ravaging effects of recession and industrial reorganization. This county, as well as the surrounding counties that make up the region that I serve, has seen layoffs, factory closings, and the social problems that seem to follow. The area has the highest unemployment figures for the state, as well as the highest teen pregnancy and juvenile arrest records for any part of the state.

This region of the state has four post secondary institutions. One is a four-year liberal arts private college that boasts that nearly 100 percent of their baccalaureate degree holders attend graduate school. Another institution is a satellite campus of the largest public university in the state. The other two post-secondary options in this region are technology-related schools. One is a technology program offered by the second-largest state university, and the other is a campus of a state-wide technical school; so clearly, there are many

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options available in a wide variety of academic pursuits for students in this part of the state.

In 1985 after the publication of The Neglected Majority (Parnell, 1985), the man who was at that time director of curriculum at Roosevelt High School (I will refer to him as Mr. Bogan) saw that a trend was occurring in education. He read The Neglected Majority and began to do research into what types of texts and curricular materials were available to teach these applied academic courses.

It was also about that time that Mr. Bogan met Mr. Stillwell. He recalls:

> Roosevelt schools were reorganizing like a lot of schools were, and we had a junior high science teacher that needed an assignment. I heard two things about him. First of all, he was a good prospect to teach biology and physics, but the other thing was that he was a troublemaker and hard to get along with. When I hear that about a person, I immediately think about what new project to involve them with.

When pressed for clarification about what was meant by calling Mr. Stillwell a "troublemaker," Mr. Bogan replied that he was strong willed and had very definite ideas about education that sometimes clashed with the way that the junior high principal wanted to do things.

Mr. Bogan proceeded in his research about applied academic courses, and he discovered a series of curricular materials that were jointly developed by the Center for Occupational Research and Development and the Agency for Instructional Technology. Since the Agency for Instructional Technology has its home offices in Bloomington, Indiana, there were several schools in Indiana

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using their course entitled "Principals of Technology." On one of his visits to see a "Principals of Technology" demonstration school, Mr. Bogan asked Mr. Stillwell to go along. That event would later be recognized as the beginning of Mr. Stillwell's involvement with Tech Prep.

Mr. Bogan had decided that "Principals of Technology" would do two things. First, it would provide the option for another year of laboratory science for those students who once only took general science; and secondly, if the Indiana Legislature passed Public Law 217, Roosevelt High would have a head start by having an applied academic course in the curriculum guide. Gathering his information together, he presented a proposal to the Roosevelt school board for the purchase of the texts, videos, workbooks, and laboratory equipment that constituted "Principals of Technology." He got what he asked for.

This was in 1987, and before the class could be put in place, the Indiana legislature passed Public Law 217 and sent out Requests for Proposals for Technology Preparation Pilot Site Schools. Needing a teacher for "Principles," he researched Mr. Stillwell's credentials. He recalled the exchange going something like:

> I checked his license and saw that he was the man for the job of teaching [Principals of Technology], so I went and asked him. He said, "I'm not qualified," and I said, "Yes you are. I checked." Well, he didn't want to do it. He hemmed and hawed about not wanting to teach "that bunch of kids," but I think he was worried about the numbers [of students taking his other science classes], so he finally agreed.

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In an unfortunate turn of events for Roosevelt High School, Mr. Bogan was asked to become principal of Andrew Johnson High School in another part of the state. He started the technology program but never received adequate credit for making it work. It was also about that time that the superintendent of Roosevelt community schools changed, and the new superintendent, Mr. Gleason, assigned the overseeing of the new technology class to Mr. Wagner, the Vocational Director. In all of this confusion, the Requests for Proposals for Technology Preparation Pilot Site Schools were forgotten, and the pilot sites were awarded elsewhere. Through this upheaval, the once reluctant Mr. Stillwell became the instant expert on Tech Prep and found himself irreplaceable. He had found his niche.

Then the superintendent of schools, who is referred to as either visionary or not so visionary depending on who has asked the question, began to take an active interest in the program. Dr. Gleason has spoken around the country regularly as an expert in site-based management techniques, and in his travels he began to hear about Tech Prep in other parts of the United States. Remembering that he had this program in his own school, but knowing little about it, he brought himself up to date on Roosevelt's progress and became an advocate for Tech Prep.

In a move that angered many teachers, Dr. Gleason and a cadre of teachers and administrators held meetings with business, industry, and labor leaders for the region. The nature of the meetings was somewhat hat-in-hand for the

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educators who began the meetings with an apologetic tone. In a bold move, the educators admitted that for the past several years education had ignored the private sector and its charges about the poor quality of students that were emerging from public secondary and post-secondary institutions. The superintendent conceded that most educational improvement measures were generated within the fortress walls of educational establishments with little or no regard for statistics and the cries of business and industry. Mr. Stillwell remembers:

> We went in our setup when we started, six years ago actually, trying to develop our program and what we were going to do in Tech Prep we involved the community. We went to [Hammer Tool], we went to [Baker's Plastics], we went to [St. Mary's Hospital] and we said, "You are not hiring Roosevelt and Waldo county people; you're going to Dayton and hiring people and Indianapolis and hiring people in your workforce. Now, I don't mean necessarily professional people but technical people. What are we doing wrong? What aren't we doing? And communications was the very first thing that came up--being able to work in a cooperative group, learning to solve problems, and resolve conflicts. Those are the things that we weren't preparing our high school graduates in.

The result of those meetings was an influx of ideas, opportunities, and capital for Roosevelt High School. Advisory committees were formed so that the community could have input into the programs for the students that would make up the workforce for the beginning of the next century. These meetings paralleled the development of the state guidelines for Tech Prep, and the collaboration of business and industry embraced the new mandate and standards set forth by the legislature.

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Roosevelt High School is known throughout the state as an educationally impressive high school with equally impressive, some would say formidable, sports teams. The school has a rich history of turning out some of the finest students and athletes that the state has to offer. Roosevelt's average percentage of students attending four-year colleges approaches forty percent, with many of them attending fine schools throughout the state and the country.

The superintendent was not satisfied with this condition due to the fact that is own son was expressing no interest in post-secondary education. In response to business and industry, national reports, the state Tech Prep mandate, and his own son, the move toward innovative education for the middle fifty percent of Roosevelt High Schools students was given further impetus.

The director of adult and vocational education was given the task of finding two teachers from the areas of mathematics and language arts to work with Mr. Stillwell in science to form the Tech Prep core team. He found Mr. John Titus and Mrs. Nell Williams. Mrs. Williams remembers:

> When I was first hired here at Roosevelt four years ago, they needed a teacher to teach what was called CBE or Career-Based Education, and they needed an English teacher to teach that component. And through that Career-Based Education that was how they had the block of time. So that was before I came; someone else had managed to get that three-hour block of time for the students. They needed a part-time English teacher and a part-time Spanish teacher and so I was qualified for both, and they explained the career education a little bit, but not very much. That was what I interviewed for. That was how I came to Roosevelt. From that they started looking at how Tech Prep could be used here. And they started

> seeing some of the things that went wrong in the Career-Based Education program, and how they could change that and move that into Tech Prep. So I think they really basically started with the Career-Based teachers--asking us if we would be interested in doing this. John Titus was in the Career-Based Education teaching math, and I was in the English. So we were approached by Sally Peavey [Mr. Bogan's replacement] at that point wanting to know if our philosophies went along with the philosophies of Tech Prep. And I was really excited because my own personal teaching in other school corporations [districts] and in my own English classes after hearing so much that Johnny can't read then Johnny can't write and Johnny's not fit for employment. You hear about this so much in the media I thought, "I've got to do something!" I have to do something so, I was trying to do a lot of the philosophy of Tech Prep. I was trying to make those changes within my own curriculum and my own teaching of English as it was. So it seemed like then when they asked if I would be interested, it was what I was looking for. So I said okay.

These teachers were given a four-hour block of time in the school day to teach a pilot group of seventy-five students. The students were divided into three sections of twenty-five that would rotate among the teachers in a three-hour block. The remaining hour was to be used as a common preparation and planning hour. This served the purpose of allowing common evaluation and meeting time each day for the teachers in this experimental program.

By 1989 the five pilot Tech Prep schools were offering classes, and the core team from Roosevelt was given the freedom to visit and evaluate these sites. The core team was Mr. Wagner, Mr. Stillwell, Mrs. Williams, and Mr. Titus. Dr. Gleason, somewhat angered that due to a transitional snafu Roosevelt High School had not submitted a proposal to

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be considered as a Tech Prep pilot, was determined that the Roosevelt program would be second to none.

On a pilot site visit to Robert Dole High School, which is also a fierce football and basketball rival of Roosevelt, they saw much equipment purchased with state and federal funds. Mr. Titus put it this way:

> We went in this one room and there were computers everywhere--twenty-five or thirty [IBM] clones and a few Macs. I asked the woman taking us around if all of this came from grant money, and I remember her saying that it did. I guess I looked puzzled like I was trying to figure where we were going to get that kind of equipment and she said, "But you don't need all of this to do Tech Prep. It's mostly in how you teach." I felt like she was trying to put me on.

Mr. Stillwell also saw the equipment and demanded enough equipment from Mr. Wagner that the Roosevelt program would not be second to Dole's. Keep in mind that this equipment is in addition to the outrageously priced, but nearly indestructible, "Principals of Technology" equipment that he received for eight lab stations earlier. (Note: Dole High School uses "Principals of Technology," but for some reason does not use the lab equipment that goes with it.)

Mr. Wagner prepared a list of what he called "demands" from the Tech Prep team and took it to Superintendent Gleason. It is interesting how rivalries can sometimes lead to innovations as it does in this case. Dole High School regularly thrashes Roosevelt in football and basketball and it appears, though no one will go on record to either confirm or deny this allegation, that Dr. Gleason did not

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want to be outdone by Dole in this area, too. Superintendent Gleason checked the master budget for Roosevelt schools and decided that another funded teacher task committee (Indiana 2000 Schools) was not using their money fast enough to suit him. He pulled their funding and gave it to Tech Prep. When each person on the core team was asked about this incident, the exact dollar amount varied from person to person, but all put the figure in the neighborhood of a quarter of a million dollars.

Mr. Wagner worked closely with a computer network designer to outline the specifications of a computer network that his firm could provide. He then wrote specifications for the bidding process so that other vendors could have an opportunity to bid on the contract. At the end of this process, the company that Mr. Wagner had originally contacted received a contract to provide a computer network with seventy-five nodes (twenty-five each in the science, math, and English Tech Prep classrooms), a teacher terminal for each classroom, and a file server with a bank of CD-ROM's, and the software and connections to make it all work.

Mr. Wagner had seen the mistakes that many schools had made in acquiring computers in that after all the money was spent on hardware there was nothing left for software. Thinking ahead, he had set aside a substantial amount of money for instructional software. He began courting computer software companies in order to get the best deals on network software. He made a deal with a company

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(fictitiously named Teachersoft) and bought a five-figure software package that in turn demonstrated Mr. Wagner's commitment to the Tech Prep program and the Teachersoft product.

Teachersoft, delighted and encouraged that Roosevelt High School would make such a large network software purchase, offered to make Roosevelt High School into a pilot/test site for newly developed software. This would allow the Tech Prep students at Roosevelt to be on the cutting edge of educational software, while allowing Teachersoft, a somewhat small and struggling company, to gather much needed data on the effectiveness of their product. Mr. Wagner was hesitant, but he was persuaded by Mr. Stillwell and the software network is planned.

The Teachers

Mrs. Williams was chosen as the teacher of language arts and communication. She expressed a desire to be in the program as she put it, ". . . because I was tired of my husband's complaining that there is no good help out there anymore." Articulate and witty, she felt challenged to teach English and language skills for the world of work. Mrs. Williams has taught for "about fifteen years-give or take a few" and describes Tech Prep as one of the most challenging and frustrating classes that she has ever taught.

Mrs. Williams also reported that she has a stepdaughter that went through high school determined to be an artist, but upon entering college, found it to be "boring and

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constraining" and dropped out. Mrs. Williams related that she is now worried about her stepdaughter because she doesn't know how to do anything and she has no useful knowledge or skills.

Mr. Titus was chosen to teach the math component. Mr. Titus could most accurately be described as reticent and the most traditional of the three. His classroom is neat and orderly with much less cooperative learning or "confusion" as he puts it. He entered the Tech Prep program after teaching Career-Based Education for a number of years. Career-Based Education was a forerunner of Tech Prep designed for students of much lower ability than those now enrolled in Tech Prep.

Mr Stillwell is the teacher that, to me, is the most interesting for this study. His teaching career began about thirty years ago, and it wasn't until the beginning of the Tech Prep program at Roosevelt High School that he began to make major changes in his work as a teacher. In conversations he related to being a "pro kid" teacher, which did not coincide with much of what he was told to do in his other teaching assignments.

This led me to make first assertion about Tech Prep at Roosevelt High School.

<u>Assertion 1</u>: Changes in teaching are a consequence of changes in teachers' actions and beliefs, not simply the result of adopting a new program or acquiring new materials.

The Tech Prep program may not be the reason that many of the Tech Prep teachers are enjoying more success;

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instead, success may result from changes in teachers' actions and attitudes. The reason may lie in that the classes are taught in a different way.

When I asked Mr. Stillwell to describe what a Tech Prep program was like, he replied:

> What's involved in Tech Prep as far as I'm concerned is a shift of the way you present your present material. I have a physics class. If you ask me, "Do you teach physics?," I try to say no, I teach kids. My class is a kid-orientated, a student-orientated class. I use physics to teach things like cooperative learning, jigsawing. We just did a jigsaw lesson, and when you've been through some of these things--how to resolve conflicts, problem solving-- that's what Tech Prep is.

In his statements Mr. Stillwell emphasized one of the features that makes the Indiana Tech Prep legislative mandate different from other programs across the United States. Programs in other states emphasize the applied nature of preparation for technology and the connection to post-secondary education, but they fall short in describing any specific teaching style to accomplish this goal. Mr. Stillwell seemed quick to point out that the program at Roosevelt is first and foremost a change, or as he puts it, a shift in the way teachers present material. His choice of words is interesting. "Presenting material" seems to conjure up images of a didactic approach, but based on observations and interviews the reader will soon discover that Mr. Stillwell is anything but didactic with his students.

Mr. Stillwell elaborates his point in the next bit of discourse. In an interview I asked him about how Tech Prep

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was different from his academic physics and biology classes. He responded by saying:

> So, when you think in terms of, "Am I going to have to teach a Tech Prep class?" You're still teaching the same class, but you are placing the emphasis and the relevance in a different area. You're not teaching your subject anymore, you are taking your subject and using it to teach the kid how to get along with the others in class. Basically, that's what Tech Prep is.

Here is another clue to the meaning that Mr. Stillwell places on Tech Prep. In the first bit of dialogue he mentioned that Tech Prep involves a shift in teaching styles, clearly referring to the state Tech Prep mandate. In this quote he is referring to another document, possibly the Secretary's Commission on Achieving Necessary Skills (SCANS) report, in which it is stated the workforce of the coming years needs to be able to work in teams, have interpersonal skills allowing workers to function as a unit, and be logical enough to make decisions without the help of a middle management supervisor. It is clear that this shift that Mr. Stillwell repeatedly mentioned means that the subject matter, to him anyway, has become less important than the interpersonal skills that the students learn.

To further support this contention about Mr. Stillwell, I will briefly describe an observation in his classroom. As I had negotiated with Mr. Stillwell to visit his classroom, I was given permission to do so somewhat grudgingly at first.

> You just do your thesis or whatever, but don't ask us to do anything more. We work hard enough as it is, and our first priority is the kids, not your research.

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On the day of observation, Mr. Stillwell was giving the whole class instructions on doing a lab activity; but instead of talking specifically about the procedures involved in the accomplishment of the task, his remarks were aimed at the way the students worked together.

> Some of you think lab time is for socializing. I don't expect you to do the lab in total quiet, that's ridiculous, but I do expect whatever talking is being done to be related to the experiment. Out there in the factories you'll be asked to be a member of a team and if your team is more interested in talking about the ball game or your date for the weekend, you won't get the task accomplished. You don't meet your production because you're goofing off--you're out the door. Working together is just as important in here as having an understanding of what the lab is about.

This quote further supports the contention that Mr. Stillwell is concerned primarily with the students' ability to work and learn cooperatively, and secondly with their acquisition of knowledge.

Mrs. Williams, the Tech Prep English teacher relates another shift in teaching style that the teachers have tried. According to state mandate, Tech Prep classes must be competency based. In my experience many teachers have a hard time with allowing students to do an assignment over again to improve their grade. With this group of teachers the grade is not nearly as important as the demonstration of proficiency in a skill. While mentioned in the Tech Prep legislation, this is not a new concept, and again, students aren't necessarily being successful because this is a Tech Prep program as much as their teachers are developing a larger repertoire of teaching styles and concepts.

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As Mrs. Williams related to me:

> One thing that has been a lot of fun to do with the Tech Prep is the competency. I have a lot of students that balk at it because it is different. But the idea of being able to go back when you write a paper, and I say, "Well now you didn't indent your paragraph here. And you know, what do you start every sentence with? A capital letter."; so things like this. Kids will look at this and they'll go, "I can do better than this" and I'll say, "I know you can" and they'll look at me and say, "Well, can I do it over again?" "Sure, that's what the whole course is about. You can do better than this. Show me that you can." Most of the kids after, well it grows, the number grows, that first grading period, towards the end of the grading period all of the sudden it's like the light comes on and the kids are going, "I can redo this and get a better grade and you aren't going to take off anything because it's the second time?" "No, go ahead." And I have got several students that are in my foreign language class who are also my Tech Prep students and they come to me and say, "Oh Mrs. W. Can't you teach this on a competency level where we can go back and redo these things?" I'll let them do as much as I am allowed to do within the department, but they would like for the whole thing to . . . and I can't do that yet.

It is very interesting to me that Mrs. Williams will discuss Tech Prep and how successful students can become by allowing them to work in a competency-based manner, but makes a distinction between the way that she is allowed to teach academic classes and Tech Prep classes. If it is good for the Tech Prep students, one would think that it would also be good for the others. Obviously, the foreign language department heads feel otherwise. It is troubling that along with a distinction being made that since these classes are applied or less theoretical there is something inherently less rigorous about them. It also seems that there is a "second tier" of teaching strategies that are

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also viewed as less rigorous, cooperative learning and competency-based learning among them. Not only to the academic-minded teachers is the didactic approach the "best" method of instruction, but the students had better perform well the first time they are tested on the material. There is a lot to cover, and the forward progress of the academic or advanced placement class must not be impeded by another chance at improving the student's grade. In their opinion, that would not be fair.

The preceding is a gross overgeneralization of the academic classroom, but I think the reader will understand the point that is being made. These Tech Prep teachers are following a set of guidelines developed by the state of Indiana that include direction for Tech Prep classes to be rigorous as well as being taught in an applied, cooperative, and competency-based manner. Other teachers do not see these classes as rigorous because students have more than one chance to be successful.

I was pleased that the teachers involved in Tech Prep allowed me to get a glimpse of their world "warts and all." The teachers were quick to point out that Tech Prep at Roosevelt High School is very much a work-in-progress for the development of the courses. Mr. Titus, the math teacher, also pointed out that the alternative teaching styles and methods were not as successful with him as with the others. His view is that cooperative learning does not lend itself to mathematics. He described his classes:

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> Actually, there's not that much different in the math part because when you teach math, you're going to teach math. I don't think you're going to get away from that part. But besides doing that, you encourage them in the other programs, and you try to help the students when they're having trouble in other classes, too. They might come in your room, and they have twenty minutes to study. Well, maybe they have their math done, but they don't have their English or their science and so they'll ask me questions, or we'll use the computers. So you're not just a math teacher anymore--more of a team person rather than just worrying about yourself. And I think we'll get to use that more as we go along here, as we get stronger students.

Mr. Titus recognized the importance of the alternative teaching styles, but was having a hard time seeing how his subject matter fits. I would suggest that in Mr. Titus we have a teacher that has not yet fully made the transition from an older, more didactic, approach to teaching to the new model. He can see his role as a facilitator for the other students, but he is having a very hard time placing math in that same framework. This point is further illustrated in an interview that I conducted with Mr. Titus:

Mr. T. Probably the biggest training was just the cooperative learning training. We had a real good instructor in that she's utilized it in the school system for a few years, and she's taught it around different places, and I thought she did a real good job. I did not have a lot of success personally with cooperative learning. I guess I've taught too many years the other way.

Author Why do you say that?

Mr. T. Well, it bothers me. For example, let's take algebra or geometry. You put a group of three or four together . . . . I can't get away from having the smart ones carrying the others. They said there's a way around that, and I tried all the ways around it, but I still, when I go around, the ones carrying them and a couple in the group's socializing if they can get by with it until I

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> come around. You know, you can just hear them from far away. They aren't paying attention to the one that's trying to help them. I haven't gotten past that point. Whereas if everybody's working on their own, I know how to monitor that better just because I've taught that way for so long; and you also get one answer per student. It's more of a problem for me, I think, than it is for the students. But in defense of cooperative learning, another two or three years we'll have a lot of students come through that's already lived that way several years. You know, with cooperative learning techniques. So I think at that point maybe I'll be successful in it. And I will have tried it a few more times until I know more about it, too. I think sometimes when you try something, you are more critical of it than something you've used for years and years and years.

Mr. Titus may be a teacher on the verge of a paradigm shift. He sees what the other teachers are doing and being successful with, but he has yet to be successful with it himself. I feel that he is reflective and introspective about it but has yet to make the shift himself. This leads to rationalization that this new way of teaching may not lend itself to math, or when the students have more experience with cooperative learning it will be easier for him to change. Although he uses cooperative learning infrequently in his classes, he does allow students to follow a model of mastery learning for math tests and homework. Students are allowed to retake tests and resubmit homework until a concept is mastered.

Regardless of the information that teachers provide about their stock of alternative teaching styles, the teachers' repertoire of teaching models is small. Each of the teachers in formal interviews described using techniques of cooperative learning, team teaching, integration of

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subject matter, and computer aided instruction, some of which were not observed through participant observation techniques.

Mr. Titus was the most accurate in his description of his classroom procedures. When he described algebra and geometry as hard to teach in a cooperative setting and that he has not had much success in teaching that way, the observations bore him out. Mr. Titus is probably the most traditional of the teachers. In teaching algebra and geometry, he does a thorough job of explaining work and doing example problems for his students in a teacher centered chalk-and-talk fashion. He is a man who demonstrated considerable proficiency in teaching academic math in a traditional way, but has, by his own admission, trouble with different teaching methods. He is aware of his abilities.

Mrs. Williams is the experimenter of this group. On days of observation I found that the students were engaged in a variety of cooperative learning activities. For example, one day I sat in on a writing lesson that Mrs. Williams had planned. The students had written several paragraphs on the analysis of literary devices in poetry and the students were involved in a peer editing process. Students would exchange papers, read through the other student's work and make suggestions. In this I saw that the students were involved in activities that paralleled the workplace. The students were part of a team that were involved in a group task. The members of the group were

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assigned the jobs of coaching and teaching each other. This is along the lines of Tech Prep. What confused me was that on days that I was scheduled to make observations, I saw this kind of activity. On other days that I just stopped by in class for information, I got a different picture. These classes were often marked by students reading or writing on their own with no communication between students.

One afternoon when I was scheduled to visit with Mr. Titus and found that he was absent, I stopped by and asked Mrs. Williams if I could observe her instead. I noticed a marked change in her expression, but she replied, "Okay, yeah sure. You're always welcome in here."

The topic of the day was Julius Caesar. The plan for the day was for the students to read the play aloud as the characters in the book, a very traditional English literature activity. In the early part of the play, there is a scene describing the cobbler and his tools in puns. Mrs. Williams, presumedly due to my presence in her room, launched into an improvisational discussion on the technology of shoemaking in 50 BC. This lasted for a few minutes and then the class was back to reading aloud. I knew the discussion was improvised because I later asked her about the event in a formal interview.

Author Teachers across the state and across the country will want to know something about how do you integrate literature into the Tech Prep curriculum?

Mrs. W. I know, I know.

Author I know that one of the days I was in your class it was Julius Caesar and it was the little scene in

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the beginning about the cobbler and there was a lot of talk about cobbler's tools and it seemed contrived. How does one do that effectively?

Mrs. W. Well, I experiment a lot and I had a wonderful college professor who said, "You know, if you think about it, anything that's in print is literature. It doesn't have to be Shakespeare, a newspaper article is literature." And when that college professor said that to me, it just changed my whole outlook on things. Of course, I've never been one to say that if it wasn't written by Shakespeare then it's not worth reading. Or no American writer has ever been born that can equal the British writers. I've never been one to say that.

Of all the teachers, Mr. Stillwell seems to have the best knowledge of and success with alternative teaching strategies. It is his philosophy that science lends itself well to a variety of methods and he uses them. In visiting Mr. Stillwell's science classroom one is likely to see a wide variety of activities and styles in place. Although he is not by any means an encyclopedic collection of teaching strategies he does have a larger repertoire than the other teachers with whom he works. In classroom observations of Mr. Stillwell I recorded computer work, group problem solving sessions, laboratory demonstrations, laboratory student activities, peer teaching, teacher coaching, some lecture, and alternative testing strategies (computer, pencil & paper, projects, retests, homework, etc.) This clearly defines him as one of the more versatile and well-versed teachers in the school, but in doing so he provides refuting evidence for my assertion. Indeed, many of the teachers have a small repertoire of teaching strategies, but Mr. Stillwell is the exception. It is interesting to

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compare the fact that while Mr. Stillwell has this large selection of teaching strategies, he uses them to teach the underlying social skills of Tech Prep much more than science.

Assertion 1, **Changes in teaching are a consequence of changes in teachers' actions and beliefs, not simply the result of adopting a new program or acquiring new materials**, illustrates an issue with which many schools in Indiana are struggling. Given the timeline of implementation of Tech Prep by the 1994-95 school year and the failure of the state legislature to provide much money for implementation, schools are left to their own resources. Other schools that I work with are concerned with acquiring materials, but the teachers in the Roosevelt program understand Tech Prep on a deeper level.

Many of the reports such as A Nation at Risk (National Commission on Excellence in Education, 1983) or The Neglected Majority (Parnell, 1985) focus on outcomes rather than processes. An assumption that is often made in discussing reform movements or curricular changes is that teachers are resilient enough to immediately respond to any suggestion or mandate. This is not the case. The teachers from Roosevelt High School may represent the exception rather than the rule in that they have adapted to the legislation of Tech Prep, albeit with some difficulty.

Why Integration Is Difficult

One of the key points about Tech Prep, and one of the reasons that Tech Prep is done in the first place, is to

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integrate the subjects of math, science, and language arts. Students then have a better understanding of what has been called "the big picture", that is, a holistic world view of the relationship of school and career.

The term integration needs some clarification before an assertion is made. In one form, integration means that the teachers in the areas of mathematics, English, and science are working together to plan their lessons so that their students will understand that in life discreet subject matter is seldom encountered. Most opportunities for students to use knowledge that they have learned in school presents itself in a veiled way, so the students must have a deep enough understanding of subject matter to realize that science and math applications, for example, are seldom separable from one another.

Another facet of integration is that in some Tech Prep literature the term refers to the blending of vocational and academic classes. This tends to situate integration as a hands-on component to traditional classes. In this work, the first definition of the word is the most used; however, some teachers in their quotes make mention of integration in the sense of a vocational/academic blend.

The next assertion outlines the difficulty that teachers may have in changing their view of teaching.

<u>Assertion 2</u>: The integration of subject matter desired in a Tech Prep program requires significant modification of traditional views of subject matter.

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In a presentation to a group of teachers from Arthur High School, Mr. Stillwell had this to say:

> Who says that you have to spend six weeks on Romeo and Juliet? Now Romeo and Juliet are important, and I am not taking away from the importance, just the emphasis. If we could do it in a week and a half, or use what we are doing in Romeo and Juliet and change it not, or take it from pure literature to literature that's associated with careers. Now, you know, Romeo and Juliet, right off the top, you know, I guess we could say, well there's a career in scaling walls, or whatever. I mean, you know, and that's the problem. That's the place where there's anxiety. How do we take that subject matter and tie it to careers? What does Romeo and Juliet have to do with a career? How can we develop that into a technical window and push it so that the kid can see a little relevance in studying Romeo and Juliet? And that's not really a good, but I mean, you know, but we spend an awful lot of time and it's not real, real relevant to the kid that's going to go out and be an auto mechanic. It's not bad stuff, but maybe we could find a way to work it into things that are more relevant.

We can see from this quote that Mr. Stillwell has an intermittent view of how English can be related to Tech Prep. If one is trying to find some sort of relationship of technology to Romeo and Juliet and being an auto mechanic, it becomes laughable. His example about making a career out of wall climbing from the famous scene from the play also shows that he may have a shallow understanding about what is happening in the Tech Prep English classes in his school. His idea of technology, or technical writing seems to involve some piece of equipment and not necessarily the skills involved in doing analysis or interpreting results.

Mrs. Williams, on the other hand, has a different idea about the integration of technology into the literature of English. She described to me in an interview how technical

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writing, to her, or how to use literature in regard to Tech Prep, can assume a very different form. For example, in this next quote, she talks about the use of Hot Rod magazine for students as literature in her Tech Prep language arts course.

> We are living in a society now where kids don't read very much of anything. So I figure I'm pretty lucky if I can get them to read anything at all. I have plans. I haven't told any of my students yet, but I have plans to require them to read a thousand pages a semester. A thousand pages of what? I don't care, but read a thousand pages of books, some magazines articles, things that can be . . . . You know, if it's out of their Hot Rod Magazine, and they're wanting to be an auto mechanic, I don't see why they can't use that. That's probably more technical than anything I can give them on a lot of things, putting together all sorts of different engine parts, and these kids talk about so many cc's and this, that, and the other thing, and I don't even know. And you know, they talk about pressure per square inch and that kind of stuff. Well that's physics the last I knew. So, that's technical.

Certainly when Mrs. Williams describes Hot Rod magazine and certain aspects of the technical functions of engines and brakes and systems, that is one aspect of technical writing as literature. Another aspect in which she involves technical writing is the skills of analysis that she uses in some of her poetry lessons. For example, there is a quote in which Mrs. Williams says:

> Then how do I handle the literature part? The traditional literature. We did poetry. I didn't do poetry last year, but we did poetry this year. And I went through, the way I did it was, I taught them about all the technical stuff that they are supposed to learn in writing poems like similes and metaphors and all that stuff, and rhythm and rhyme and meter and the old traditional boring stuff. And we did several assignments in class not as homework, but in class, and we'd talk about poems and we'd tear them apart and we'd look

through this, that, and the other thing. And they had to take a test over it, but equal to the test was a project. This was where I tried to get them hands-on. And this is where I'm hoping that the tech prep idea came in to it. Not so much in we had done before 'cause that was pretty traditional with the teaching of the different figurative language and that stuff. But it was the idea that when they got their project, they could either, if they felt they were a good writer, write me some poetry, and write me so many kinds of poems that we had studied. And they could contract for a grade. If they wrote so many of this kind and that kind and this kind they got an A and a fewer number for B, but they had to use similes and metaphors and personification and different poetic devices in their writing. So I figured, that's hands-on. They can do it and demonstrate that they understand. I also gave them the opportunity because some kids like to memorize something, stand up and recite it. Sometimes we don't do that enough in school. There is a place for memorization. So I said if they felt that they weren't good at writing, they could do that. And the third project was to find music that they liked to listen to. And I didn't care if it was rock and roll or rap or gospel. The only requirement I had on it was that it had to be something that if they said the words in school they wouldn't get sent to the principal for. They had to find three poetic devices, not counting rhythm and not counting rhyme. They had to find three poetic devices in their poems. That put them in touch with something they were aware of, something they were familiar with their own kind of music, whatever style it is, and it also made them look at it in a little bit different way. And that was by far in my one class at that time seemed to be more hands-on oriented than the other two. And that was by far the most popular, and the most well-done project of the three. I had kids that had no problems doing that. They were bringing in . . . two kids brought in two different songs by Megadeth and they said, "Boy, you should have heard my parents when I said I was listing to this and told them I was doing my homework."

So I felt that in that poetry unit, the project, I may even one of these days do away with the test and break the test into little quizzes and have the project be their final grade for that. It was really well received and it was fun and they could literally show me that they understood what we had been studying. So even

> though it wasn't career oriented, and even though it wasn't maybe technologically oriented, it was a hands-on situation. So sometimes if you can handle the literature by letting the kids do it, do what you have been studying, it works out very well.

In that long quote we can see that what Mrs. Williams is trying to do is teach the students how to take a piece of literature, analyze this literature, and then have the students apply this new knowledge to examples from their own experience. She is having the students use some very important analytical skills as well as teaching the traditional literature. Granted, the students will not be able to use the poetic devices in science and math, but the basic skill of breaking a task or problems into smaller components to see the relationship to the larger whole is very important and usable in the other subjects as well as on the job. Mrs. Williams is having her students work on many different levels at once. First of all, the academic level, the basic figurative language of poetry and the different poetic devices. Secondly, she is working on the level of the integration of hands-on activities into the study of this poetry. She is having students write poems, act out dramas, do collages, make paintings, and any number of alternative exercises for student assessment. The third level that exists is the level of Tech Prep competency skills. She is doing some very sophisticated things with her students that she is articulating, but she may not understand the depth or the importance of what she is doing. She mentions on occasion that she gets bored easily, or that

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she wants to make it interesting for the students. It may be that what she is accomplishing in order to keep the class interesting is very close to the true spirit of Tech Prep.

The integration of activities as described by Mr. Titus is a little bit different. Mr. Titus, the math teacher, in the first year of the sophomore Tech Prep program (which would be the 1991-92 school year) was involved in working with Mr. Stillwell and Mrs. Williams. This year he is involved in working with Mr. Stillwell and another English teacher. He is not working with Mrs. Williams. This new Tech Prep teacher is part time and is not available for many of the planning sessions that he and Mr. Stillwell attend. Mr. Titus is, in this next quote, describing one of the reasons that there is not as much integration of subject matter this year with the English component of the junior program of Tech Prep because they cannot get the part time teacher in the building as much as they would like.

> Well, you always hope that it's going to be better than it is. It'll just take time to find out which things work, which things don't work. And we're not there. I thought our major project--that we had as a group--that turned out pretty good. The solar collector. But then we had other difficulties where we didn't have other integration programs like this because of other problems we had. And we have another problem because Mrs. Kimball can't be in the building except these three hours, and we can't even meet with her. So integrating is harder than it should be 'cause Bob and I can't even meet with her until after school sometimes, and then that's after the fact. Course, you can do something the next day. So that's been a problem. But the integration part--it's just going to take a long time to find out what will work and what won't work. We have books of 22 projects; we have books of 32 projects. And a lot of those were used with the college-bound students and try to adapt it to

> others and a lot of them were used in the Tech Prep introduction things. But what works in one city doesn't necessarily work in another city. So we're just in the feeling through process yet.

As it was mentioned earlier, Mr. Titus appears to be a teacher on the brink of a shift of mindset or paradigm about teaching styles and subject matter. Even though he is working in a Tech Prep program and he is working with other teachers, he is exhibiting many of the signs that I have seen in other teachers who are hesitant about beginning with Tech Prep. For example, in his quote about ". . . what this city needs is different from what other cities need. . . ." he seemed to be denying that there is some degree of generalizability about what happens in schools and that there is some commonality among programs. In the next quote he begins to talk about the toll it takes on his private time by being a Tech Prep teacher. Mr Titus would like, on one hand, to work very closely with students, and he is given a lot of time to work with these students by way of another grant where he and the other Tech Prep teachers come to school early or stay late to do tutoring and he does that, but his words in this quote tend to tell a different story. That story seems to be that of a man who is a little tired of this. He is feeling a little sapped and may not see the full results of his extra efforts.

> It takes a lot more energy. You don't just worry about just yourself and taking care of things on your own. It's easy sometimes to get into a coasting pattern when you're on your own. And I think you get out of that situation because you have other people, that their needs must be satisfied, too. So you don't just do what you want to do. I think you grow as a person. I'm

> more tired when I go home of an evening, but I'm older too, maybe that's what it is.

Before the Roosevelt teachers began to implement Tech Prep in the way the Indiana state legislature outlined, they were forced to make an examination of their views of teaching and learning. Assertion 2 stated: **The integration of subject matter desired in a Tech Prep program requires significant modification of traditional views of subject matter.** Mr. Stillwell and Mrs. Williams seem to be invigorated by the chance to move beyond the traditional. Mr. Titus, however, understands the changes that need to take place before integration of subject matter can occur, but he is cautious because of all of the extra effort that it will require.

The changes the teachers were asked to make forced them to examine their teaching styles and challenged what they knew about their profession. Mr. Titus was aware of his abilities when he abstractly referred to some teachers as "coasting." It is my contention that change moves much more slowly than the lawmakers understand. Fullan and Miles (1992) point out that all large scale changes are implemented locally, but by extension all large scale changes are also implemented personally. For the mandated changes to be totally successful at Roosevelt High School, the changes must also be made in each of the teachers. Again, the teachers are being asked to make major changes with little guidance.

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This lack of guidance or prerequisite skills manifests itself in the next assertion:

Assertion 3: Teachers have difficulty translating their new classroom ideas and activities into a set of written guidelines that can be used by others.

In talking with many of the teachers, they are very articulate about what they are working on and how they are interrelating things in classes, but the documents that are generated about Tech Prep bear very little resemblance to what they are doing. Included in the appendix are the basic Algebra Tech Prep 1a course goals and description, and it seems that attached to the end of the goals is a short description about jobs and working together in groups. The course goals state under section 4 are:

1. To review the basic operations of the real number system and apply them to solving simple equations and inequalities and graphing their solution on the number line.

2. To understand the concept of an exponent and the laws of exponent as they apply to polynomials, factoring, and rational expressions.

3. To understand the relationships between the algebraic and geometric concepts of point and lines on a plane as they apply to linear functions and relation.

4. To solve linear systems of equations and equalities by graphing, substitution, and linear combination.

5. To work with irrational numbers, quadratic functions, and equations.

6. To work together in groups to learn to think as a team as well as individually.

7. To interrelate algebra, biology, and English.

8. To teach life and job skills, being present, having materials, enhancing self esteem, respecting others, and establishing work ethics .

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From this the reader can see the assumption that is being made on the part of the teacher, and that is in the math department if students are working to understand the concepts of algebra, naturally it will follow that they will have their self-esteem enhanced and that they will develop the team skills necessary to be good employees. The only point that is truly new here for the math class is that the students will work together in groups and learn to think as a team as well as individually.

According to the state guidelines and competencies for Tech Prep algebra students will:

1. Represent technical situations involving variable quantities with expressions, equations. inequalities, and matrices.

2. Model real word phenomenon using functions and recognize many problem situations can be modeled by the same type of function.

3. Solve single variable equations and inequalities to find missing information.

4. Select and utilize appropriate formula to serve as a problem solving catalyst.

5. Construct ratios, solve proportions, and recognize the principles of direct and inverse variations found in technology.

6. Apply the rules of powers and roots to solve technical problems.

7. Graph linear and non-linear functions and equalities to interpret status and trends.

8. Define functions and or inequalities from a graph in order to obtain specific data and analyze alternatives.

9. Solve systems of equations to aid in decision making.

What the State of Indiana has developed with the help of professional curriculum writers contain the same basic

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elements as the competencies that the teachers at Roosevelt High School developed, although the ones from the State incorporate real-world applications into the competencies. For example, when the state curriculum developers came up with a competency for construction ratios, solving proportions, and recognizing and applying the principles of direct and inverse variations found in technology, they gave two examples:

1. A weight-loss counselor determines a patient's potential weight loss in proportion to decreased caloric intake.

2. A dental hygienist using a new cavitron spends less time per patient and is able to schedule more patients per day.

What we see in this example is the difference between professionally written competencies and those written by the teachers. There is a substantial difference because the teachers have never been trained to do this. They are asked, and even paid stipends, to write curriculum and competencies, but there has been no in-service training as to how to do these tasks. Therefore, often the local curriculum guide is a copy of old curriculum guides with a few new additions.

In an interview with Mr. Titus, the math teacher, he related that this is the part of Tech Prep with which he has the most trouble, and he doesn't do that very often. Once again, we failed to have correspondence between the goals of Tech Prep and the conditions that exist in the Tech Prep classrooms. In the words of Mr. Titus:

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I know what you mean, as far as I'm concerned, now this isn't how some people feel about it. The document satisfies somebody somewhere that you have a written plan and goal. And then when school starts if you taught geometry for twenty-seven years you know what has to be taught in geometry. And you know what needs to be taught in algebra or whatever course you are doing--science, English, and those things are going to be taken care of. And so the biggest thing we have trouble with is still how we are going to tie in together is a big problem. It seems as though the projects become the best method of doing that because we was flying by the seat of our pants, because we were trying other things and to do it on just a day-to-day basis where Mr. Stillwell covers something in science that day and I try to enhance it in math is very hard to do for 180 days. Maybe someday we'll have it so that we can, I'm not writing that off, but the project type of approach seems to have some type where we can integrate them where it's going to include some math things, some science things, and how you present your program is going to be your communications and English, which makes a good tie-in, and that took us a year of trying other things before we came to that conclusion. And that's not a definite conclusion yet, but it sure points to the best thing that we have seen.

Author Did you have any special training in how to write curriculum?

Mr. T. No, I've never had any training. Whenever I have done any curriculum writing, I always get the past curriculums and study them through and then I look to where we want to go and so it's really just been a personal pursuit. I've never had anybody tell me this is what we want. The only thing of it is we have formats the State wants so we're going to put it in that format. There's no choice of that. Then you look at the book you've chosen . . . ."

Author Did your curriculum guide go into teaching styles?

Mr. T. No, we don't go into teaching styles."

Author What are the tricks, skills, and strategies that you or the team have developed to use with kids?

Mr. T. We have tried, or I have tried, trial and error a little more than we did before. I know a lot of people cringe when you say this, but I know as a person I've probably learned the most when I have

> failed the most. I have probably been more successful because of failure sometimes that I have as a success thing, too. I guess it goes back to if you really want to succeed, if you fail you're going to work until you don't fail that particular thing again. So the trial and error method I think I have used more than I have before. Whereas you give them something and give them a little time to bang around and try it, and sometimes just in the form of a worksheet, instead of giving them any guidance on it, just tell them I expect it to be completely on their own. They can use their book or their computer. They can use anything they want, and I kind of like what comes out of that more than anything I have tried on other things. I know other people have tried that before and it's nothing really new, but I do incorporate that more than I used to.
>
> Just learning the computer has taught me my fear of mistakes. I don't want to make mistakes, but I can't use a computer without making a mistake. And sometimes it crashes your program and all it is, for instance in Pascal, you forgot to put a semicolon at the end of the sentence. It's something really minor, I think it makes us human again.

It should be clear to the reader that there is a mismatch. This writer does not intend for this to appear in any way as a bashing of these teachers. This only reinforces the assertion that he is making, and that is that although these are good, caring teachers by the strict standards of Roosevelt High School, they do not have the skills necessary to write the curriculum. They are following models from other curriculum guides that have been developed. Other curriculum guides have not addressed these specific issues; therefore, what results is the old curriculum guides with new addendum. To quote from the Roosevelt High School Tech Prep philosophy we hear:

> For too many years the secondary schools have emphasized academic structure and college preparation. Those who were not focused for

> college are enrolled in a general studies curriculum which stresses neither academic nor workplace preparation. Tech Prep at Roosevelt High school is an academic alternative that stresses focusing on the future, post-secondary education, and preparing students for the workplace.
>
> According to the August 1989 Executive Report of the Jobs for Indiana's Future project, "The jobs of the future will develop in a knowledge-based economy in which workers will exercise greater discretion over their jobs. Jobs will require more and better basic skills, more technical knowledge, as well as an increased ability to work in teams, adapt to new work environments, and to communicate better orally and in writing." Tech Prep at Roosevelt High School will be involved in using different techniques and methods to provide the student with the social and academic skills to develop a focus on the future and have marketable tools for these jobs.
>
> More than half of all jobs will require some post-secondary education and training though not necessarily a four year baccalaureate degree. Workers in the future must be prepared for multiple careers and frequent retraining. Lifelong learning will be a must for future generations. Tech Prep at Roosevelt High School will take into consideration the diversity of the students enrolled and adjusts teaching techniques and courses of study to meet the needs of all students.

The information in this philosophy statement is a rewording, with some direct quotes, from the Department of Education brochure entitled "Technology Preparation Curriculum." I noted in my log from June of 1992 that Mr. Stillwell was the author of this piece, and the reader should recognize the influence of Mr. Stillwell in the writing. He believes strongly in students' being successful by way of what they are able to do--not necessarily by what they know. It mentions that Tech Prep at Roosevelt High School is an academic alternative. The teachers believe

this is an academic course and they treat it as such. Certainly Mr. Titus teaches his algebra and geometry classes in a very academic way. Some might say that it is not very much different from the way traditional math classes are taught. For example, teachers from two other communities I served in my Tech Prep region visited Roosevelt High School and met with the math teacher. They came away with the impression that Tech Prep is simply a renaming of traditional academics. They were confident in explaining to me that math classes would not need to change significantly under Tech Prep guidelines. The only way, to these teachers, that Tech Prep and math are related is that occasionally one does projects with the communication (English) and the science teachers. That was the image of the Roosevelt Tech Prep program Mr. Titus projected to the visiting teachers.

Mr. Stillwell, the science teacher, serves as a vocal spokesman for Roosevelt High School Tech Prep by visiting other schools. In my notes of February 1, 1993, I had Mr. Stillwell on a video tape as saying that the important thing is for students to get social skills and for these students to become good workers.

Assertion 3 stated: **Teachers have difficulty translating their new classroom ideas and activities into a set of written guidelines that can be used by others.** These three teachers have had no formal training or experience in writing curriculum. Consequently, the materials these teachers have written more closely resemble lesson plans or

objectives than curricular documents. According to Posner in Analyzing the Curriculum (1992), curriculum must be grounded in the needs of the community. Posner states that ideal curriculum documents provide: information about the problem to which the curriculum was responding and the kind of experts included in the development process; learning objectives, content and sequence of learning; a philosophy; and guidance for teaching strategies.

The teachers at Roosevelt High School have done an adequate job in writing learning objectives to respond to the social problems that Tech Prep was meant to address. Their written philosophy closely resembles the Tech Prep philosophy for the State of Indiana, but even so, it is a concise statement of the beliefs of these teachers. The difficulty arises in translating techniques used in the implementation of their Tech Prep program to written documentation. There is no mention of specific teaching strategies in their guidelines.

Roosevelt High School has assigned an administrator to oversee the teachers in the Tech Prep program. It is his job to obtain equipment and published curricular materials for the Tech Prep team's use. Prior to writing Roosevelt High School's Tech Prep documents, this problem could have been alleviated had the administration anticipated the need for formal training in curriculum development.

The first three assertions have been somewhat narrow in scope. Assertion 4 begins to connect the Roosevelt Tech Prep program with other educational entities.

Teacher Beliefs

Assertion 4: The Tech Prep teachers do not feel that their classes are watered down, but they do not feel that applied academics are as rigorous or as acceptable as theoretical academics.

This posed an interesting paradox in that state level materials talk about Tech Prep as a rigorous and focused program of study, if one quotes from the grey folder section labeled "Why Tech Prep":

> Tech Prep, a rigorous and focused program of study, is designed to better prepare these students enrolled in the general studies curriculum for the demands of further education or for employment by providing them with essential academic and technical foundations, along with problem solving, group process, and lifelong learning skills.

Possibly it is an artifact of the old way of thinking, but these teachers do not believe that the classes that they offer are strong enough academically. They believe that it is fine for these students who are enrolled in Tech Prep, but not if the Tech Prep student decides that they want more out of life than working in a technical career. Mr. Stillwell has a quote in which he describes his preference for the student that would take his "Principles of Technology" class and also what they would do with it.

> Now I'm not talking about the top twenty, twenty-five percent of the kids that are you know they've already got all there stuff together and they know where they're going. I'm talking about the unfocused kids who are sliding through our school system in the general program and they're graduating and you can't go out and get a job in the factory anymore and work for forty years and retire. Those jobs aren't there. They have to have some technical training. They have to work

> on being able to work with others they're not going to hold the same job for the next forty years. The statistics now are in a lifetime you're going to hold six jobs, six different careers. You've got to be ready to go with lifelong learning. So in my physics class, in our English tech class, or in our algebra and geometry class we still meet the academic standards, they are academic classes.
>
> The applied physics class that I have is not theoretical physics, I would not want these kids to graduate from Roosevelt High school and go to Indiana University and enroll in a major in physics, but they could go to Purdue and enroll in a major in technology. Because, instead of having an astronaut on video describing how centripetal force is derived at between the planets and the earth and the moon, we have this rather rotund auto mechanic in his blue shirt wide open with his computer talking about centripetal force on a flywheel in a car. Same, exact, information in a relevant situation and we go back to the lab then and we've got a flywheel for the kid to work with and do calculations and see why it keeps running and how you can send the force from the flywheel back to the machinery, and so on. Then we have computer programs and computer problems for them to solve.

From these quotes I get a feeling that there is some belief that knowledge away from its pure sense, away from its theoretical or mathematical sense, is somehow less desirable or less rigorous than learning about the information and applying it to a real-world setting. Although Mr. Stillwell described the astronaut and centripetal force and then described how in the "Principles of Technology" video an auto mechanic described the same force by demonstrating a flywheel on a car and the students are then working with a flywheel in a laboratory situation. I get the feeling from some of his words that this physics Tech Prep program, "Principles of Technology," is not

rigorous enough for someone who is going to be involved in taking a college class.

The way that I interpret this is that a student who understands centripetal force will probably be better off in college than a student who can do the math involved. This is conjecture on my part, but I have a strong feeling about it. Mr. Stillwell is the physics teacher; he has the intimate details of what colleges desire.

Mr. Titus also addressed this problem. In his quote he described how the counselors did not want to take Tech Prep algebra and geometry as academic courses. His argument was, ". . . how can it be otherwise?"

> The biggest mistake we made was not putting a counselor in at the first. We didn't think of that. And then we tried to get them on board at the end and it's kind of insulting to them, I imagine. We had a little trouble, you know nothing major. It caused a problem that probably wouldn't have been there had we had them there with us the whole time. So that's how that was really the biggest problem there. And then another problem we had I think that since they thought we was taking over the CBE block, that we were also taking over the low-end students. You know what I mean by low end--the lowest achievers. And you can't do that with algebra and geometry. Consequently, it's caused some problems for who we have in it at the present time.

This quote also gives us some insight into the way Mr. Titus approaches Tech Prep. Certainly he sees no reason why the counselors would not want to accept Tech Prep as an academic course, because in his mind there is no difference between academic algebra and Tech Prep algebra. To him it is the same thing, and he teaches it in much the same way. The only difference is that students are sometimes working

on the computer network on specific and various algebra problems there that give answers, hint, and drawings.

When we talk about counselors and their relationship to Tech Prep in this paper, it is evident that the counselors need to be very clear about the function of Tech Prep and the characteristics of the students that would belong in these classes. Another assertion that comes to mind that I need more evidence to support, but stands out in the available data, is that a well-meaning counseling staff may subvert a good Tech Prep program. What is meant by that is if a student catches on, becomes interested in a career, finds relationships between school and work, and learns to do school well in a Tech Prep environment, his grades and attitude, predictably, will get better. A counselor may look at this and not take into consideration the fact that Tech Prep should be taught in a very different way from the way that most academic classes are conducted in the high school; he may look at this success and guide a student into a path that he may not be ready for. The Tech Prep students may be doing well because the material is being taught in group concept or by team teaching, or that they are working with other students and that they are responsible for part of the work, or any number of variables. The counselor may just look at the bottom line, the numbers, and determine that this student has potential greater than was exhibited in the past and may counsel them into more rigorous academic classes. I get the feeling that the counselors at Roosevelt High School, although not directly interviewed for this

dissertation, are very concerned with what happens in Tech Prep; and they do not really understanding the level of work that is required in doing a Tech Prep class.

Mr. Titus, the math teacher, spoke about the early days of developing a Tech Prep program at Roosevelt High School, and he suggested that it was a mistake not to involve the counselors from the earliest stages of development.

> So a lot of the success of the program depends on the counselors knowing what students would be best served by this, making sure they're in it and then . . . the story I seem to hear is, the kids really catch on in this and now they're going to Purdue and IU [Indiana University] and some of the other colleges, and it seems that the schools that are doing Tech Prep are confused and the kids aren't heading into technical careers as much as they are heading into four-year colleges. And as I understand it, that wasn't the purpose in the first place. Sure, we have a few will probably go to college now that wouldn't have. I'm still concerned about what the others are going to do. Which was the ones we were after anyway. Sure, we're thrilled anytime we can say well, that person decided to go to college or a four-year school instead of a two-year school, or make the best of what they could be.

Mr. Titus went on to explain the necessity of having counselors understand what Tech Prep is all about. In the next quote he hinted at counselors defining their role as an agent of the post-secondary institutions. Tech Prep and general curriculum students may not get as much of the counselor's time since their goals may not be as lofty as some other students.

> The design of this is for the people right below the college bound students, and the average worker today needs more intelligence than a lot of people are coming out with. That's really what we started out for. I hate to use that as a sign of success by how many people that go to college out of your program when that's not what you're

> designed to do. I mean, that's like saying the SAT test today are going down in scores when they're not even a valid test for what they were invented for. And that was to tell how successful a person could be in college, and they've never done that. I'd hate for ours to be the same situation where they're gauging against something that it wasn't designed to be. I think that could happen if they keep talking that up.

As Mr. Titus continued, he exhibited the common misconception that the job of high schools has always been to educate all students. In reality the historic nature of high schools has been somewhat elitist in that their original mission was to prepare students for higher education.

> It seems overall that the whole focus of high school has become, well you're a successful high school depending on the number of kids you send on to four-year colleges. Somehow, that doesn't make a lot of sense, but I guess it's one way to measure. You know America was, we became what we became because, not the college-bound people were what they were, I mean, every society has that group of people, but the reason that America was so good, our ones right below that were such hard workers and such achiever that we were a great nation, and we're loosing that group of people and that's what we would like to see back, and I think that's what we're grasping at with the tech prep, don't you? And hopefully, we can get that back instilled in the people that, "Hey, you're the background of the country." It doesn't matter what the high end's doing, because every society has that high end. It's what's below the high end that's important.

As the reader will remember, Assertion 4 stated: **The Tech Prep teachers do not feel that their classes are watered down, but they do not feel that applied academics are as rigorous or as acceptable as theoretical academics.** The evidence supporting this assertion shows that these three teachers are being conscientious in showing concern

for their students' future. While all three teachers demonstrate belief in Tech Prep, they also understand that post-secondary institutions may not yet accept applied academic course for admission to baccalaureate programs. In summary, Mr. Titus matter of factly describes the existing situation with higher education:

> I'm wondering about the other end of it also, visiting pilot sites around the state where Tech Prep is in place I don't hear stories about yeah, we've got kids that have graduated and they've gone on to technical school. The story I seem to hear is, the kids really caught fire in this and now they're going to Purdue and IU [Indiana University] and some of the other colleges, and it seems that the schools that are doing Tech Prep are shooting themselves in the foot and the kids aren't heading into technical careers as much as they are heading into four-year colleges, and as I understand it wasn't the purpose in the first place. Sure, we have a few will probably go to college now that wouldn't have.
>
> I'm still concerned about what the others are going to do. Which was the ones we were after anyway. Sure, we're thrilled anytime we can say well, that person decided to go to college or a four-year school instead of a two-year school, or make the best of what they could be. The design of this is for the people right below the college-bound students, and the average worker today needs more intelligence than a lot of people are coming out with. That's really what we started out for.
>
> So, I agree with you there. I hate to use that as a sign of success by how many people that go to college out of your program when that's not what you're designed to do. I mean, that's like saying the SAT test today are going down in scores when they're not even a valid test for what they were invented for. And that was to tell how successful a person could be in college, and they've never done that. I'd hate for ours to be the same situation where they're gauging against something that it wasn't designed to be. I think that could happen if they keep talking that up.

Mr. Titus, in speaking for the other teachers, is recognizing the fact that most high school students do not

know what their future holds. In that regard, he wants to make certain that what Tech Prep offers by way of its curriculum, the students will have preparation for higher education or whatever their futures hold.

The Roosevelt teachers understand that each student is unique and their teaching style must respond to this individuality.

Assertion 5: While the teachers are learning to teach to a variety of learning styles according to state Tech Prep guidelines, some of them feel that some of these styles are aberrations of the student and not a natural difference.

Loosely translated, there is something wrong with these students or they could learn in the "normal" way. As Mrs. Williams stated:

> I've been doing some reading and there seems to be a lot of research out right now that's saying the traditional academic student who does well by reading a chapter and maybe doing a research paper. There's such a hugh majority of student now that's not that person, and it's all sorts of things, it's the influence of society, the influence of television, the influence of maybe not having a stable family home or just so much is going on in their world that detracts from that kind of a thing that they are not. And I just personally wonder with all of the new chemicals and things that have been added if some of that doesn't effect the development of the brain and how we learn and maybe that's why some of the things . . . you know . . . why we're getting so many kids that can't concentrate that way.
>
> We've got to do something, we've got to change somehow to help those kids and we can't just say, 'well, I wish you were academic. you've got to address the needs of these students. So I feel that tech prep is trying to do that. The philosophy behind that it getting them hands on, getting them involved in something and showing them the value of doing the job and you can't do

> it sometimes correct and sometimes not. I feel that that's really valuable.

I believe that this discussion needs to be analyzed further. It could be that there is more vestigial academic elitism present in these three teachers that are teaching Tech Prep than they would like to admit. It could be that when these teachers are off guard or feeling comfortable with the interviewing process, these comments creep out. This is uncharacteristic of Mrs. Williams to be talking this way. Usually she is the most open-minded of the three when it comes to alternative teaching styles of the students. She does a fine job that is borne out by observations and quotes as to what she does in the classroom with these students. This quote, however, is puzzling to me. It does not seem to fit with her character. The puzzle is that she suggested that there is something physically, emotionally, or chemically wrong with a student who must learn in a non-traditional academic fashion. I found it very curious that, once again, new information was processed in an old way. For a student to be normal, he must sit in neat rows and listen to lectures if one is to believe this quote from Mrs. Williams.

I suppose that information about alternative styles is so foreign to those of us who had no trouble in learning in school and learning how to do school. It could be that those of us in education have very similar learning styles, and that is why we are in this profession in the first

place. We do not learn in those other styles, so it is hard for us to imagine how anyone else would either.

Based on Assertion 5, **While the teachers are learning to teach to a variety of learning styles according to state Tech Prep guidelines, some of them feel that some of these styles are aberrations of the student and not a natural difference**, it seems that the Roosevelt teachers have not fully understood the reason for their adoption of alternative learning styles. They have come to realize that students must be taught in differing ways, but dealing with alternative teaching styles is foreign to them.

Roosevelt teachers and administrators, for whatever reason, have adopted the philosophy that Tech Prep will work in their community. As they continue to define their roles in this program, the misconception represented in Assertion 5 may be eliminated. At present there is not enough information to determine how this misconception will be addressed; but as the teachers continue to learn, their new knowledge and experience with Tech Prep will hopefully clear up this misconception. To that end, we will progress to Assertion 6.

Reasons for Success

Assertion 6: **Local districts can marshall the needed resources to have a successful Tech Prep program under certain circumstances.**

Certainly with the pilot sites around the state the circumstances were that someone, a staff member or grant writer, was interested in having the Tech Prep program.

Once the program was in place, money was pumped into all of the pilot sites in order to provide resources for the program. That was not the case in Roosevelt High School, so alternative reasons will need to be discovered as to why the program has taken root and is doing relatively well, according to the way that Tech Prep programs are going around the state.

One of the issues could be competitiveness. Competitiveness is a ticklish issue. No one would go on record in interviews to say anything about this, but the undercurrent of thought about Tech Prep at Roosevelt was that there was a mistake made. That mistake was outlined earlier in this work, and that was that Mr. Bogan, who was then Director of Curriculum, was interested in getting the Tech Prep Program in place at Roosevelt. He started the process, was promoted to principal of a different school, and left. The superintendent that he had worked with left at approximately the same time. Through this changing of personnel, the responsibility for Tech Prep was given to the Vocational Director, Mr. Wagner. The Vocational Director knew something about Tech Prep, but not as much as Mr. Stillwell, the science teacher, did; and so Mr. Stillwell came into literal, but not figurative, control of the Tech Prep program.

One of the reasons initially that the program was started at Roosevelt is the fact that they did not submit a grant to be a pilot site. Halfway across the state, one of Roosevelt's major football and basketball rivals, Robert

Dole High School, was chosen as a pilot site for Tech Prep. Dole received a large amount of money and equipment to get their program on-line. This could be, but no one will confirm that this is one of the reasons that Tech Prep was given so much attention at Roosevelt High School. Interestingly, with much smiling and winking, no one will deny this rumor either.

Another reason that a Tech Prep program may be successful is that the right staff is given enough freedom to develop it. As we observed earlier, Mr. Stillwell certainly is no angel, and if the reader will recall, he was described as a troublemaker by Mr. Bogan, the former curriculum specialist at Roosevelt. By that, Mr. Bogan meant someone who gets something in mind that he wants to do and does it. Mr. Stillwell gathered around him a group of cohorts and lobbied for much freedom to experiment with Tech Prep. He received this freedom, and that freedom may be one of the reasons why Tech Prep is successful at Roosevelt. Mr. Stillwell was given what he wanted; he had an impact on policy; and he can be very missionary in his attempts to get other schools to think in the same way. Mr. Stillwell says:

> [I'd tell any school team to] demand the time to write the curriculum during school. Don't try to write curriculum from three-thirty until five-thirty after being beat over the head by kids from eight to three. [They] have to get [their principal] to find the money . . . have him give them a half day off so they can gather in teams to brainstorm or go to visit Columbus, or Robert Dole High, or us. I know it is hard to get the other teachers from Waldo County to come to us, but we'd love to show them our program.

From this quote we can infer that Mr. Stillwell is interested in three things: showing off the Roosevelt program, urging teachers to empower themselves in the development of Tech Prep, and the self-promotion of Mr. Stillwell.

Given this freedom, Mr. Stillwell and the others (but especially Mr. Stillwell) have this expanded notion about what it means to be a teacher. They did not limit their vision of teaching by preparing, presenting information, and evaluation. Their idea is to keep current with the knowledge in the field, and Mr. Stillwell describes that in this next quote where he describes one of the disadvantages of visiting a state conference.

> All six of the members on my team are going to a conference on the twenty-third and that means our kids are going to have three subs in the afternoon, or three subs that morning, in a row--which is not a good situation. But we feel that going to conferences is updating ourselves and keeping ourselves up where we know is important. I went with [a local principal] I took the two days off and went to the national convention. I am interested in your work [this dissertation]. Maybe we can present together at the next national convention because we are doing some things that are a little bit different from the national norm.

In Assertion 6, **Local districts can marshall the needed resources to have a successful Tech Prep program under certain circumstances,** it has been established according to the model presented by Rogers (1962) that Roosevelt High School could be described as an early adopting institution. The administrators, whose support is necessary for the success of this program (Hull and Parnell, 1991, and Parnell, 1985), have demonstrated such a belief in Tech Prep

that they have channeled funds into the program from other sources. Other schools in Region 9 of the State of Indiana have yet to demonstrate this kind of support; therefore, their programs have yet to come to fruition.

Another issue concerning the success of Tech Prep is outlined in Assertion 7.

Assertion 7: A successful Tech Prep program will have teachers who, due to their sense of professional pride, are open to innovation.

Mr. Stillwell, in the following quote, describes a situation that runs counter to the way that many schools are run in the United States.

> This is really an exciting change in teaching method. I mean, I've been teaching for thirty years, and in the last three or four years I've really changed things I have done. You know? So I don't get Chapter 12 done. If I got Chapter 11 done right, it's better to have done 11 right than 12, and none of the 12 meant anything to the kids.
>
> All six of the members on my team are going to a conference on the twenty-third, and that means our kids are going to have three subs in the afternoon, or three subs that morning in a row--which is not a good situation. But we feel that going to conferences is updating ourselves and keeping ourselves up where we know is important. I went with [a local principal] I took the two days off and went to the national convention. I am interested in your work [this dissertation]. Maybe we can present together at the next national convention because we are doing some things that are a little bit different from the national norm.

One can infer that Mr. Stillwell sees the job of teaching as much bigger than just the classroom contact with students. Understanding that all of the Tech Prep teachers being out of school on the same day to attend a conference

is a bad situation, he justifies it by defining his teacher role as something bigger. The trade-off in attending the conference is that he may pick up some new information or teaching strategy that may help him reach more students. Referring back to Mr. Bogan, the former curriculum director that initially got Mr. Stillwell involved in Tech Prep, jokingly calling him a troublemaker one can see that Mr. Stillwell definitely has strong ideas about what should be done in order to get Tech Prep implemented. His strong feelings and his professional pride come out in his discussions of others not sharing his vision of Tech Prep.

> There are some teachers that absolutely will not change no matter what. Many teachers think that every teacher must make the shift to a Tech Prep way of teaching. Tech Prep is not for the high level X or AP class. It is not for that kid. It's not going to involve every teacher, and as far as the teachers go please, please, if they are devoutly against changing their teaching style, and they can't work that way, have them tell their principal. The principal knows that someday that teacher will retire and he will replace them with someone that will work that way. We were real selective. We only have 6 teachers out of 105 in our high school that are actually involved in teaching Tech Prep.

The old saying about even the most tolerant are intolerant about intoleration applies to Mr. Stillwell.

In much of my work in Indiana, as well as my work with the Secondary Schools Science Project and other projects, I encountered a type of soft resistance that I found intriguing. This type of resistance is entrenched in a type of false support. For example, in discussing Tech Prep curriculum matters with members of certain schools I often encountered support for my efforts going hand in hand with

explanations of why such a program will not work in that particular school.

In December of 1991 I met for the first time with a principal of a high school who offered all sorts of moral and professional support without acknowledging the need for such a program in his school.

Principal This Prep Tech [sic] is a good idea, but it won't work here, and I'm not even sure that we need it. On average, and you can check this with the information sheet that I gave you, we send an average of forty per cent of our graduating class each year to college.

Author What about the other sixty percent?

Principal That's just the point. Those kids take care of themselves. They are either involved in farming, or selling wood, or living off the land in some way. You haven't lived here that long, you don't know the area. People around here have a long history of self-sufficiency.

The teachers at Roosevelt High School have taken the attitude in the form of a corollary sub-assertion, and that is **it will work here.** One of the reasons that teachers do not believe that it will work here is part of the social construct of the way schools work. It is not traditional to spend a lot of time with the students in the middle or below. Most of the job of teaching, and in some ways the mission of the high school over the years, has become preparation of students for college. Technical school and an associate degree is out of the realm of acceptable possibilities when the only "real choice" is a four-year college. Teachers are reluctant to think that such a program would work in the setting where they teach. If we are going to do something meaningful for these students, why

not force them into the mold of the academic student. This also represents the attitude of the teachers that are not directly involved in teaching Tech Prep. Many of the other teachers view these applied academic courses as being watered down, or even worthless for the students and that, to them, is the only reason that the Tech Prep students are getting better grades and are having some success. The teachers on the outside view these grades and successes as a result of an inflated grading scale. Many times I heard the question, "They look like they are doing fine now, but what happens to them when there is no one to hold their hand through college? You aren't doing them any favors!" The outside teachers think that the Tech Prep students are having success on paper with nothing substantial to back it up. For example, why would one spend a lot of time teaching a high school student physics without getting into the math involved? If you are only going to examine the real world applications of physics, what good will it do a student in college? If the student is going to succeed in college, physics he also needs to know the mathematics. So there is a real mismatch between what a student who is learning to be a technician or to apply skills in a technical way in the world needs to know. Many of the teachers that are not directly involved with Tech Prep in Roosevelt High School do not understand that, and that is why there is a feeling of "it won't work here." But again, the assertion is that it **will** work here because the people who need to change their

mind about Tech Prep are the students and the administrators that have a very narrow idea about what is happening.

The Tech Prep curriculum that is in place in Roosevelt High School follows the state model. This requires that there be three curricular components to the program. First of all, there is the Tech Prep core curriculum. This Tech Prep course, like all others, is to be taught through application-based instruction. At this point many teachers seem to get lost and think this is too easy, or they begin to worry that the credit issued for completion of these classes will not be counted for college admission. As I encountered many people in my day-to-day travels, I found out that Indiana University will not accept any course that has the words "technical" or "applied" in the course title. So the mind set is that high schools must cater to the demands of Indiana and Purdue Universities and their four-year programs.

The Tech Prep core curriculum consists of a math component, a science component, and an English/language arts/communication component, all to be taught through specific courses or through integration across areas of instruction. There are also recommendations for this core of courses to include keyboarding, an introduction to careers course, and economics. Roosevelt High School does not have economics in their core curriculum. Mr. Stillwell says it best:

> We are remiss right now, and we just discovered it really this year somewhere in our Tech Prep core we didn't get econ[omics] and it's

> a bear right now. We're going to try to work it in as part of the literature and writing in the English course. We'll let econ be taught by our English teachers. You know, the difference being instead of, I'll get in trouble, but instead of diagramming sentences for a week or two or however long they do that, or underlining verbs randomly in some textbook, work that same kind of lesson with very specific reading material. And diagram a sentence out of an econ book and then talk about the econ. It can be that simple . . . .

Roosevelt High School was fairly clever in choosing to place these classes at the sophomore and junior levels because they know that almost every sophomore will take math, science, and English in those years in order to meet graduation requirements. It is very easy as a Tech Prep student at Roosevelt to meet the requirements for many colleges. The administration is doing something that is a bit shady in that their computer listing of courses will accept only seven letters and any title that has Tech Prep or applied, or any of that type of descriptor is placed after a comma. So if a student is taking Tech Prep Algebra, it is listed in the computer as Algebra, Tech Prep. The computer recognizes and prints the first seven letters. To an admissions officer it raises no red flag, because all it says is algebra. Isn't it interesting that the titles of the courses are English, Tech Prep Sophomore; English, Tech Prep Junior; Physics, Tech Prep; Biology, Tech Prep; Algebra, Tech Prep; and Geometry, Tech Prep.

The second part of the Tech Prep curriculum at Roosevelt is a specialized Tech Prep curriculum. These courses were not in place as of this writing. The teachers were concerned most with the first-year competencies. After

much of their work had been accomplished, the State of Indiana released competencies for Tech Prep as a way of establishing consistencies across the state. These competencies were for the areas of math, science, language arts, economics, career education, and keyboarding.

Another reason that a Tech Prep program may be successful is that the right staff is given enough freedom to develop it. As we observed earlier, Mr. Stillwell certainly is no angel. And if the reader will recall, he was described as a troublemaker by Mr. Bogan, the former curriculum specialist at Roosevelt. And by that Mr. Bogan meant someone who gets something in mind that he wants to do and does it. Mr. Stillwell gathered around him a group of cohorts and lobbied for much freedom to experiment with Tech Prep. He received this freedom and that freedom may be one of the reasons that Tech Prep is successful at Roosevelt. Mr. Stillwell was given what he wanted, he had an impact on policy, and he can be very missionary in his attempts to get other schools to think in the same way. Mr. Stillwell says:

> [I'd tell any school team to] demand the time to write the curriculum during school. Don't try to write curriculum from three-thirty until five-thirty after being beat over the head by kids from eight to three. [They] have to get [their principal] to find the money . . . have him give them a half day off so they can gather in teams to brainstorm or go to visit Columbus, or Robert Dole High, or us. I know it is hard to get the other teachers from Waldo County to come to us, but we'd love to show them our program.

From this quote we can infer that Mr. Stillwell is interested in three things: showing off the Roosevelt program, urging teachers to empower themselves in the

development of Tech Prep, and the self-promotion of Mr. Stillwell.

Given this freedom, Mr. Stillwell and the others (but especially Mr. Stillwell) have this expanded notion about what it means to be a teacher. They did not limit their vision of teaching by preparing, presenting information, and evaluating. Their idea is to keep current with the knowledge in their fields.

Assertion 7 states: **A successful Tech Prep program will have teachers who, due to their sense of professional pride, are open to innovation.** Although Mr. Stillwell was hesitant for the three members of the Tech Prep team to leave his students in the hands of a substitute, he justified his actions in the following quote:

> All six of the members on my team are going to a conference on the twenty-third, and that means our kids are going to have three subs in the afternoon, or three subs that morning, in a row--which is not a good situation. But we feel that going to conferences is updating ourselves and keeping ourselves up where we know is important. I went with [a local principal] I took the two days off and went to the national convention. I am interested in your work [this dissertation]. Maybe we can present together at the next national convention because we are doing some things that are a little bit different from the national norm.

When Roosevelt High School wrote the curriculum guides for Tech Prep, they did not involve outside personnel that could lend expertise or training to their efforts. In the Tech Prep literature (Hull and Parnell, 1991; Haynes, 1991; Council of Chief State School Officers, 1991; Braman, 1992; Key and Key, 1992; Peterson, et. al., 1992; Hemmings, 1991; Roanoak (Virginia) Public Schools, 1990; Brand, 1990;)

failure to include business/industry is a violation of accepted practice. But when the teachers were ready to think about implementation of Tech Prep, they did involve business, industry, and local labor. This leads to the next assertion.

Assertion 8: The involvement of business and industry in active partnership with the school is necessary for a successful program.

Many times in the past, the schools' relationships with business (including industry and labor) have been that of a one-way street with most of the resources being given to schools from business. In my job as a regional coordinator, I explained to schools in nearly every meeting with them that the way to approach business is with the hand outstretched in a gesture of friendship--not with the hand outstretched with the palm up as if asking for a handout. A story that can be used to emphasize this point happened in a town we will call Middletown. In that school I met with their Tech Prep Team, and we established that we were going to have a meeting with representatives of business from the community along with parents, administrators, post-secondary school officials, and school board members.

In this meeting the teachers that had formed the Tech Prep core team were going to provide new information, set up discussions, and try to gain interest and support from the community. This meeting went smoothly and according to plan up to a point. When the teachers had concluded with the presentation, and there was a unified feeling of local

support for the program, they made a fatal mistake. The Tech Prep committee distributed to all members present a "wish list" that included several items of equipment that the Tech Prep committee felt were, ". . . absolutely essential to do Tech Prep at [Middletown] High School." This list included televisions, VCR's, compact disc players, laboratory equipment, as well as certain large pieces of heavy industrial machinery to start a technology wing on the school.

Predictably, the result of this meeting summed to nothing. The committee and administration were surprised and outraged. It has been my experience that nothing turns business off faster than asking at the outset of the development of a partnership what kinds of resources that the business can provide free of charge.

Another vignette to underscore the wrong way to establish a relationship with a business begins here:

> Notes, January 1993, Mr. Black, Arthur High School. In meeting with Mr. Black to inform him about the Ford Academy of Manufacturing Sciences (FAMS) as an alternative to Tech Prep we called Mr. Watson at Ford World Headquarters in Dearborn to discuss the program. As we were on the speakerphone, the tone of the conversation was very promising in that Ford seemed genuinely interested in helping to set up FAMS at Arthur High School.
>
> Mr. Black then asked the inevitable principal's question, "Since Ford is such a large company, why don't you just give us the FAMS material and the training for free?"
>
> The representative of Ford was very polite in explaining that the materials were being offered on a cost-recovery basis and better than half of the expense of training was coming from Ford as a

> gesture of partnership. There was then an uncomfortable lull in the conversation.
>
> O. C. Money rears it's ugly head again to kill a good idea!

I found in my experience that there are several misconceptions that school personnel hold about business. One is that the factories are filled with people that are making substantial wages on simple, repetitive jobs with very little education. The other major misconception is that business has an endless pot of "good will" money to give local schools that is there for the asking.

Mr. Stillwell outlined the approach that Roosevelt High School took in approaching business in this next quote:

> . . . when we started, six years ago actually, trying to develop our program and what we were going to do in Tech Prep, we involved the community. We went to [Hammer Tool], we went to [Baker's Plastics], we went to [St. Mary's Hospital] and we said, "You are not hiring Roosevelt and Waldo county people; you're going to Dayton and hiring people and Indianapolis and hiring people in your workforce. Now I don't mean necessarily professional people but technical people. What are we doing wrong? What aren't we doing? And communications was the very first thing that came up.
>
> Being able to work in a cooperative group, learning to solve problems, and resolve conflicts. Those are the things that we weren't preparing our high school graduates in.
>
> Now I'm not talking about the top twenty, twenty-five percent of the kids that are, you know, they've already got all there stuff together and they know where they're going. I'm talking about the unfocused kids who are sliding through our school system in the general program, and they're graduating, and you can't go out and get a job in the factory anymore and work for 40 years and retire. Those jobs aren't there. They have to have some technical training. They have to work on being able to work with others. They're not going to hold the same job for the next 40

> years. The statistics now are in a lifetime you're going to hold six jobs, six different careers. You've got to be ready to go with lifelong learning.

Paying attention to the details of this quote, it can be discerned that the original Tech Prep team at Roosevelt was very interested in why local business was not hiring students from their high school. They were interested in establishing a pro-active partnership that would lead to benefits for all parties involved.

As the reader can see from his quote, Mr. Stillwell is interested in the well-being of the students from Roosevelt High School and with the well-being of the community. To the degree that Roosevelt High School could offer assistance, the team was willing to listen and respond. This does not take into consideration a point that was made earlier about there being a basic misunderstanding about what schools and business mean when they talk about skills. If a representative from Ford Motor Company meets with a group of teachers and the point is agreed upon that students need basic math skills, a very different language is being spoken. To teachers, basic math means addition, subtraction, multiplication, division, fractions, and decimals. From my experience, to a representative of business it means all of that plus some algebra, geometry, and a little trigonometry. There is this basic misunderstanding that Mr. Stillwell takes a step further in that he believes that many of these higher level math skills will become unnecessary if we are turning out workers with

the right attitude. The right attitude is found in the algebra competencies: be present, be prepared, be self-motivated, have a good attitude, be part of a team, and so on.

I think that business is requesting all of these things. The workers of today and tomorrow, as cited in the Secretary's Commission on Achieving Necessary Skills (SCANS) report, need these skills as well as a solid understanding of math, science, and communication. Of the teachers at Roosevelt High School, I thinks they all realize this to be true, but it has different meanings to each teacher. Mr. Stillwell thinks it will be satisfactory for him just to teach interactional skills; Mr. Titus thinks it will be satisfactory for him just to teach mathematic computations; and Mrs. Williams will creatively try to cover both subject matter content and interactional skills.

The next quote from Mr. Stillwell shows another side of how he sees Tech Prep's relationship to business. Mr. Stillwell sees business as a resource that will allow students the opportunity to explore a career before they have committed a lot of time and effort to that career. In this quote, he describes a nurse shadowing program offered at a local hospital.

> We try to show as many different career opportunities as we can in all three of our classes and with our team. A kid may say nursing sounds great so we take them out to the hospital to let them see nursing. They think its great, boy, to help these people and I'm going to be the next Florence Nightingale or Frank Nightingale or whatever. And then all of the sudden they realize that they can't handle the blood and guts. They

> can't stand the sight of blood. Well, they're going to make a lousy nurse, but now is the time to find out. And they say, "I'd love to be in that career, but I can't handle that side." Maybe we can lean them to another direction where they are still in that allied health career of jobs but not as a nurse. Or they could do radiology technology and things like this. But we've got them introduced.

The involvement of business is very important for a successful Tech Prep program. From Mr. Stillwell's point of view, not only does it involve preparing students for the job market, but also it allows a partnership to establish between schools and business where students can get some exposure to what is involved in a job before they actually commit themselves to it. In the long run, it seems that this will save the student time, money, and the avoidance of wasted time by finding out the pros and cons of the job.

In Assertion 8, **The involvement of business and industry in active partnership with the school is necessary for a successful program**, the importance of business, industry, and labor in partnership with the local Tech Prep team is stressed. From the vignettes and quotes it has been shown that Roosevelt High School followed that path. Support for this assertion can be found in the Tech Prep literature. By way of negative example, two vignettes are shown in which a partnership with the local business community was unsuccessful.

Chapter IV contains the bulk of the information concerning the interrelations of Tech Prep, teachers, schools, and the community at large with copious amounts of commentary and interpretation. Chapter five will focus on

an analysis of this information so that the implications and conclusions regarding the successful implementation of Tech Prep can be drawn.

CHAPTER V

CONCLUSIONS

Since the fall of 1991, I have worked with the three teachers with whom the bulk of this study has been concerned. Over that time I have watched these teachers struggling with new ideas and new models of change. It seems clear to me that in reporting about these teachers there is a very thin line between what I can say professionally and what I can say as a researcher. As a professional whose job it is to work with these teachers and a representative of the Indiana Department of Workforce Development, I am somewhat thrilled because they are leading the other seven high schools that I work with in their progress toward the full implementation of Tech Prep. They do have a program on line; they do have a common block of time for teaching and planning; and they do integrate their activities.

However, when viewed in the larger scope of things by playing the role of researcher, there are several things that come to mind that can be said about the program. First of all, an important quality of Tech Prep is the integration of mathematics, science, and language arts. While these teachers are making attempts and progress, the total integration of these three components is not to the standards of what the State of Indiana would require, however vague the legislation standards may be as written in Public Law 217. Be that as it may, these teachers still represent the best that Region 9 has to offer. By the

admission of the teachers, they are not doing as much as they would like. English seems to be doing the best job of integrating the activities by way of involving scientific and mathematical terms. Science is well established in second place, and math has yet to integrate.

The interesting thought that has emerged from this study is entering into the program those schools that I visit talk about Mr. Stillwell and how well he represents the ideal of what Tech Prep should be in a high school. It is becoming my experience after doing this research that while Mr. Stillwell does portray an image, one must listen closely to what he is saying. Mr. Stillwell's idea of Tech Prep is teaching group skills, cooperative learning, decision-making skills, critical thinking, and problem solving. All of this is commendable and certainly out of the ordinary in most high school classrooms; however; in doing so, the course content sometimes suffers. His idea of teaching Tech Prep is that these skills come first and the science content comes second to all. He has even gone as far in some of the interviews as saying:

> . . . that's [science content] not necessarily as important as giving the employers what they want. The employers are not necessarily asking for a body of content knowledge, a group of facts, a bulk of facts. What [business and industry] are asking for would be the certain skills involved in getting along in the work world.

Mr. Titus is very much interested in teaching the academic side. He is as far on the opposite end of the continuum as Mr. Stillwell is in the direction of teaching

the skills. Mr. Titus is content with teaching math as math. He is uncomfortable with teaching math as an exercise in cooperative learning. In his own words, he has a lot of difficulty with that. He sees the students as having one answer per person, and that is also the way that the teacher can assess. Mr. Titus, as was mentioned earlier in Chapter IV, may be on the cusp of shifting this paradigm, although his perception is that there is something lacking in the students, not necessarily lacking in his training about cooperative learning. By his admission, he has tried cooperative learning, but it has failed and he attributes his failure mainly to the group of students. He thinks that in some way that the students are deficient; and when more students go through the program and know the skills of cooperative learning then he will have an easier time teaching in that style. Mr. Titus does not see it as his role to teach the students how to learn cooperatively.

Emerging out of the study as arguably the most interesting of the three teachers is Mrs. Williams. She characterizes herself as an experimenter, and the experiments are supported in some degree in her Tech Prep classes by those people that are in charge of administering the Tech Prep program at Roosevelt High School. Mrs. Williams has said in interviews that she gets bored easily, and she is always ready to try something new. This may or may not account for the fact that she ended up in the Tech Prep program out of Career-Based Education, as was Mr. Titus.

What makes Mrs. Williams so interesting is that she has assimilated the skills that are necessary that employers are asking for by way of reports such as "Secretary's Commission on Achieving Necessary Skills" (1991) and "Toward a New Definition of Employability" (1992). She sees this, but she does not let this get in the way. She very skillfully blended the skills needed with the activities that are necessary to teach English. She does not skimp on literature because of her wide definition of what literature is. Literature to her is anything that is written, although she does use several classics to teach certain concepts. For example, Julius Caesar was mentioned and observed in her classes. She is also toying with the idea of using such futuristic works as Huxley's Brave New World in order to get the technology component in. This is very similar to what other pilot sites in the state are doing, but I think maybe they miss the point. Mrs. Williams is probably right on track by saying:

> If a skill is needed in analysis or interpretation, I can use poetry to do that. I can have students study particular devices and then go out and pick up literature or song lyrics of their own and look for these poetic devices such as rhyme, rhythm, simile, metaphor, personification, and so forth.

This relates favorably to analysis skills that are being requested by business and industry by way of the aforementioned reports.

Another finding of this study that is not necessarily new, but is replicated in this work, is that when teachers are asked to write curriculum they very seldom have specific

training in how to do that; so the result is a list of skills and competencies and objectives that they wish the students to have. It is interesting that what teachers say about the program in presentations to other schools and state meetings is not represented in the curriculum that they write. It is also not recognizable from their daily lesson plans. Daily lesson plans for Tech Prep teachers look very similar to lesson plans of traditional teachers in that there may be a few page numbers jotted down, or the number of a page of problems, or a worksheet for the students to do. Most of what they know about Tech Prep is internalized. They experiment with things and there are very few formal projects in which all of the details are outlined. The one major exception to this is the solar cooker project that they did with Tech Prep students. This project was very successful in that it was an integration of geometry and algebra drawing parabolic curves; constructing the curves and doing the rest of the problem was done in science class; and writing the technical report of how the group did the construction was carried out in English class. It should be noted that these teachers did not come up with this project on their own. This was a project that they went through as a team in a workshop at Purdue University. In doing so, they were given the curriculum materials which they transported wholly to Roosevelt High School.

What is interesting about this is that once again it is found that a strong element of discovery learning is present with these teachers. Discovery learning to them is to give

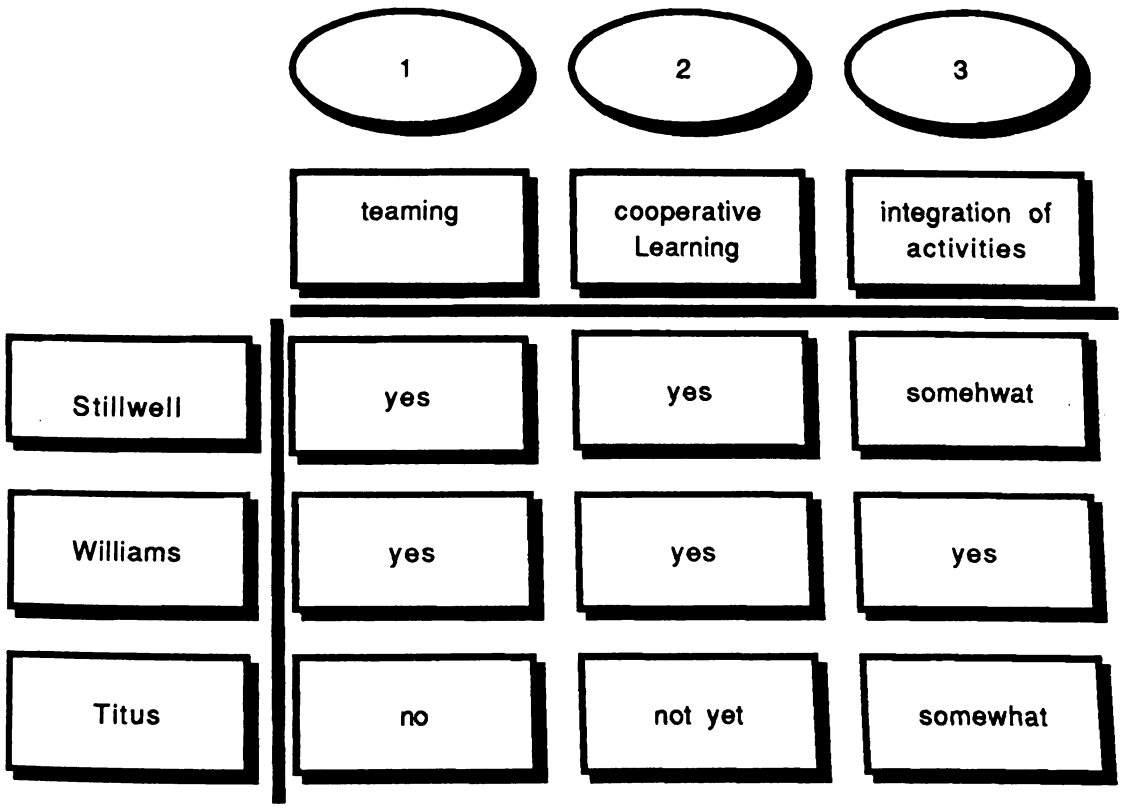
a problem and let the students struggle with it. In the meantime, what the teachers are involved in doing is they are acting as facilitator; they are not really guiding the discovery at all. The students are left to their own resources. Surprisingly, students were successful so, once again, there is the possibility that what is told about the solar cooker project and the amount of help that they gave the students during construction are two different things.

Another conclusion that I can state about this work is that many times change in schools cannot be affected because teachers cannot see beyond just exactly what is required for them to do the job. They look at an innovation with the normal constraints of school. Kuhn discusses a similar phenomenon in the The Structure of Scientific Revolutions (1962, pp. 62-65) in reference to an experiment performed by Bruner and Postman (1949) with anomalous playing cards.

In much the same way, teachers are put off by Tech Prep because it doesn't necessarily fit their notion of how teaching school could be. Many of the teachers that I worked with were dealing with standards for college prep or advanced placement. They were trying to apply the same measure of success to the middle two quartiles of students in their school, the "Neglected Majority." Consequently, they feel that any successes that these students have must be because the content is watered down or for some other reason.

Acquisition of Skills

As we have seen from the vignettes in Chapter IV and from the beginning analysis in Chapter V, the teachers have moved ahead in a somewhat fragmented manner. In the following diagram, a matrix has been constructed in which skills are nominally assigned a number. For example, teaming skills = 1, cooperative learning = 2, integration of activities = 3, and so on.



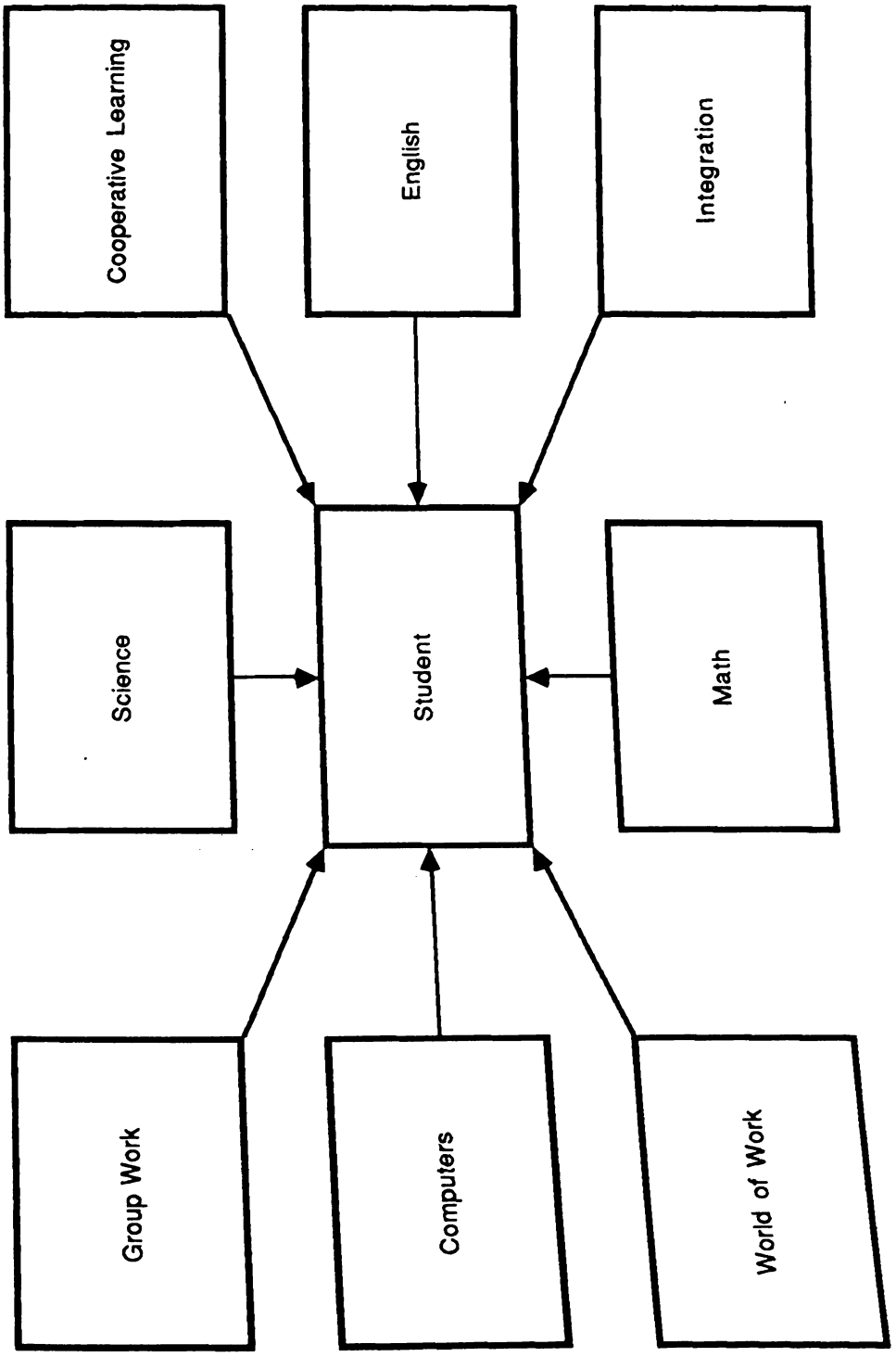


Fig. (2) Teaching Skills Matrix

What we can see from this diagram is that teachers acquire different skills at different rates. The implication of this is that teachers must be given more in-service training than just the typical half day that is standard practice at Roosevelt High School and many other schools around the country. Teachers must be afforded the opportunity to learn and construct meaning for themselves. If we are expecting teachers to become acquainted with and later embrace the constructivist theory of knowledge, we must present information to them; rather, we must allow them to construct their own meanings in regard to Tech Prep and the various skills that are necessary to teach these classes.

This diagram shows a representation of the skills that Mr. Titus, the math teacher, Mr. Stillwell, the science teacher, and Mrs. Williams, the English teacher, have acquired over time. These teachers have all had in-service training in the following areas, yet in their classrooms they do not use all of the skills that they have had training in. The skills that they are using, they are using successfully. Examples of this from this research include Mrs. William's use of integration of activities, Mr. Stillwell's quest for preparing a better worker, and Mr. Titus' endeavor to prepare students to be academically proficient in algebra and geometry to get them through whatever exclusionary gatekeeping is done in the workplace.

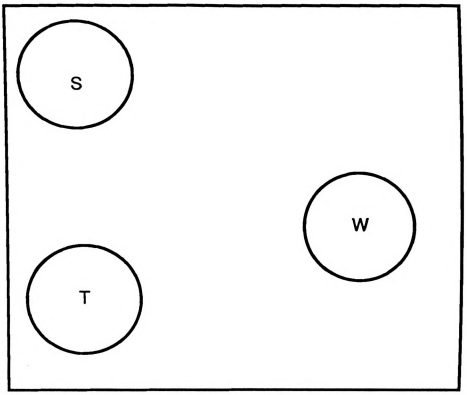
The implication of this fact is that schools and teachers are being forced into the implementation of a

project by a specific guideline as outlined by, in this case, the State of Indiana Department of Education. There must be sufficient time for the teachers to be trained and sufficient time for the teachers to use these methods in a piloting phase before the implementation date. With the legislation date of Public Law 217, at first glance, allowing four years for the implementation of Tech Prep to be in place by the 1994-95 school year seems like a long time. Under close analysis, teachers are not given enough time away from their day-to-day duties in order to become proficient with the new skills. If, as the research on teacher thinking tells us, the major factor in teacher thinking is decision-making; if a teacher is not quite proficient or has not yet made the shift in thinking required of a new skill, for example, cooperative learning in the case of Mr. Titus; if the teacher does not fully understand the new skill and is not sure of the methods being employed, he may fail. If he is trying to use this new skill and he comes to a difficult point of decision-making with his students, he is likely to suspend the activity and move on, in time, but backward to his old way of teaching. Certainly this is what happened to Mr. Titus. He was unsure of the methods of cooperative learning, or even the philosophy of cooperative learning in relationship to algebra and geometry, so after a cursory trial he continued with a safe and time-tested method of teaching that he felt more comfortable with.

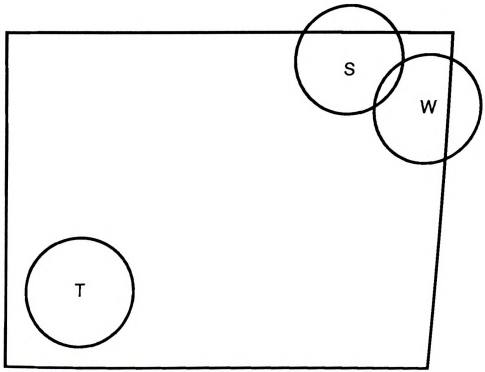
On the other hand, Mr. Stillwell took quite a different direction. Knowing that the students in Tech Prep are in Tech Prep because they were unfocused and not headed toward a college-prep track, his thinking and actions seem to indicate that since these students are less able academically, (his terms, not mine) and they are going directly into the workforce instead of college, the important things to work on with these students are work skills, group skills, and social skills. Mr. Stillwell tends to work considerably with the affective domain with his Tech Prep students.

The diagram that follows will represent three things. First, the box represents the milieu of Roosevelt High School. In the milieu we have three teachers represented by the three circles marked s, t, and w. This represents Mr. Stillwell, Mrs. Williams, and Mr. Titus before they were involved with Tech Prep and before they were teamed together. Their circles do not overlap because they did not integrate their classes or activities and functioned as an autonomous unit within the school.

The second box represents the three Roosevelt teachers after they became involved with the Tech Prep program and they had specific skills training, had written the Tech Prep curriculum for Roosevelt High School, and had a year and a half of Tech Prep teaching experience.



Before Tech.
Prep.



Present

Fig. (3) Representation of Teachers' Progress

What we see is that Mr. Titus has retreated to one of the corners. He is not moving in a left to right direction in the figure. The left side of the milieu box represents the past, and the right side of the box represents the present, or the old way versus the new way. Progress and professional growth is represented by expansion out of the Roosevelt High School milieu box and movement in a direction toward the right. The dotted lines represent where the boundaries of the box were in the previous figure. Mr. Titus is still in the New Tech Prep milieu, but he is to the back. As one professor said recently, "He's on the train, but he's setting near the rear."

Mr. Stillwell has pushed the boundaries of the milieu. He has extended the boundaries of what the average or traditional teacher would do with these students, but notice the direction that he has pushed the envelope. Mr. Stillwell is pushing in a vertical direction, that axis of the milieu representing work habits and skills--the affective domain. He is supportive of Tech Prep, and he is anxious to help these students, but he is not emphasizing the academic rigor that the legislation demands.

Mrs. Williams, as represented in this figure, is also expanding the traditional view of teaching. She is moving in the progressive direction of left to right and also in a vertical direction, as did Mr. Stillwell.

The third Venn diagram represents the ideal view of Tech Prep integration of math, science, and English that is held by the Indiana Department of Education. There is very

little overlap of activities by these three teachers at this stage of their development. In their interviews and through observation, they did have some success when they did overlap their activities.

Robin Fogarty, in an article entitled, "Ten Ways to Integrate Curriculum" (1991), defines ten models of how the integration of activities can be graphically represented in a single subject area, across disciplines, or within and across learners in a total integration of school and life. It seems that the teachers ar Roosevelt High School are not necessarily moving in the direction that the Department of Education would have them as being three interlocking rings, but more like the representation in the following figure.

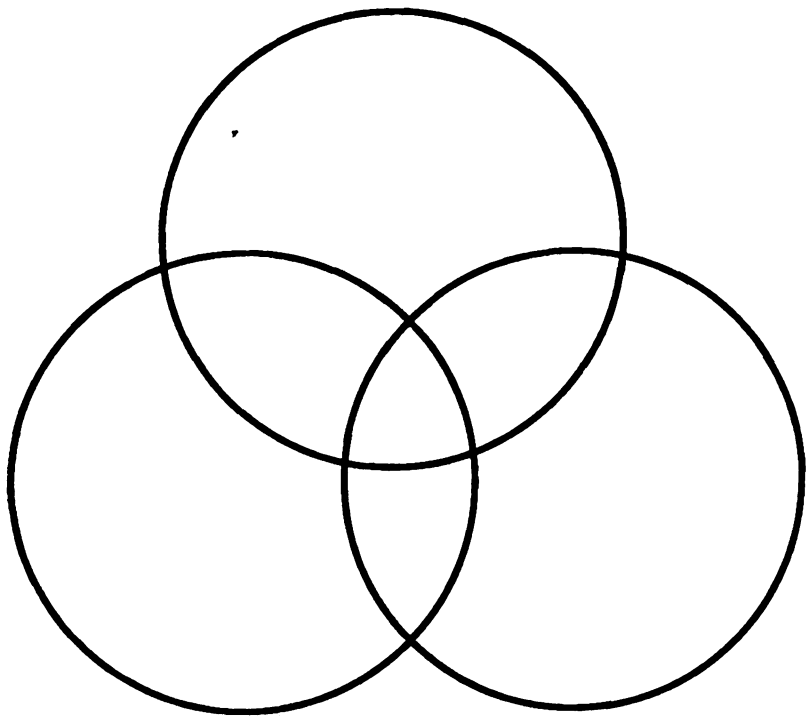


Fig. (4) Ideal View of Tech Prep Integration

The several areas that are labeled are converging into one area. For example, the box in the middle of the figure represents the student, the boxes on the outside with arrows pointing into the student would represent the areas of math, science, English, computer applications, keyboarding, work skills, cooperative learning skills, and so on. All of these things are impacting upon the student and the student may or may not have a total picture of how this integration is working. The student may be in these Tech Prep classes at Roosevelt as to why English, science, and math are working together.

The example that comes to mind is when Mr. Stillwell was talking about his best physics student:

> We've had heads of businesses just tell the kids, "We will teach you when we hire you what you need to know for us. You need to come in with the ability to be 1) lifelong learner, 2) communicate, 3) do computations, and 4) be able to work on a team. And so that's what I do in my classes. I'm still teaching [quote] "physics" but I'm really using the physics lessons to teach how to work together, how to solve problems, and I, my very best straight A student in my physics class hates group work. And fights me constantly, "Mr. Stillwell, I don't want to be in this group. I know I'm right and they keep telling me I'm wrong." I said, "Your job in that group, if you know you're right, is to learn how to get your point across without smacking them in the mouth." And she gets that way! "I'd rather go over here and do it myself!" And I said, "I'm not making you a teacher," although that's what I am really doing, but part of your job in this group is to make sure everybody in the group, we started this right off, we used to give group grades, the best grade this group of three people can get is the worst grade that any one of them got on the test. Well, Julie gets an A on the test and William gets a C and Elizabeth gets an F. Julie got an A on the test, but the group got an F, boy did the phone ring off the hook on that one! You know, we had to make adjustments real quick! We

> had to find another way of evaluating the group dynamic rather than just giving them a grade in the class. We got pretty innovative with that in some areas, too. But that's part of it. What tech prep is make them learn how to work in a group, be a leader sometimes and a follower others, and you know you don't do that right off the top of your head. You got to go take a class in cooperative learning or at least some workshops in cooperative learning so you know how to assign jobs and sneak up on a kid, and let them figure out what the job is without them knowing you taught it to them. You got to be sneaky sometimes with Tech Prep.

It seems that if the student had a clear understanding of team concept as would be required, she would understand after a year and a half of Tech Prep instruction: she wouldn't be behaving as she is in this vignette. The student needs to make sense of the integration. It may not be explicit to the students why they are doing things.

Over the observation and interviewing period, each of the three teachers said that they were not integrating their classes as much in this year as they were last year. Whether this represents a disinterest in Tech Prep or a sliding to normalcy is not clear. This area needs more information. It does not make sense for three teachers, and now six teachers, who have it as their goal to have a totally integrated program would integrate less in a second year than they would in the first.

One of the difficulties with Tech Prep at Roosevelt High School is its placement in the high school experience. Parnell (1985) and Hull and Parnell (1990) write that Tech Prep should be a 2+2 program. Two years of high school connected to two years of a post-secondary school leading to

an associate degree. By placing Tech Prep courses in the sophomore and junior year at Roosevelt High School, the students have their Tech Prep training for two years and then there is an extra year. This extra year, as it was explained, was put in place to allow the students who may decide by way of Tech Prep that they would like to attend a four-year college, to have additional time to take courses needed for admission to universities. This runs counter to the goals of Tech Prep in that the "seamless" nature of the transition between Tech Prep and an articulated agreement with an associate degree program. It seems that connected with the assertion that a well-meaning counselor could subvert a good Tech Prep program, Roosevelt schools are encouraging that sort of subversion. What good would it be for a student who is going to be a laser technician to work for two years as a sophomore and junior in high school and then wait for a year with no additional training before entering technical school? Hull and Parnell write about the wasted senior year that many students in the general track experience. It seems that by using a sophomore and junior model for implementation of Tech Prep, Roosevelt High School is circumventing the whole reason for a Tech Prep program.

Keep in mind that this writing represents a period of roughly eighteen months. The teachers and the school administration are still learning about Tech Prep. They are still developing curriculum and experimenting. As was shown with their teaching styles and their acquisition and subsequent usage of knowledge, they still have a long way to

go. The Tech Prep program at Roosevelt in general has a long way to go. There are still many bugs and glitches that need to be worked out. The teachers, being the innovative, or more correctly the early adopters, that they are, have few models to draw from around the state and country. Many of the state pilot schools for Tech Prep also are learning and represent a work in progress.

It can be seen that the teachers in this study are pioneers with very little guidance. The guidance that is lacking for these teachers at Roosevelt can be another on a very different level of the autonomous teacher who closes himself off from the rest of the school. These teachers, under the direction of Mr. Stillwell, have been given much freedom. In this analysis, it looks like this freedom is resulting in six teachers who are still working somewhat autonomously. They occasionally have the nod to integration of activities with a project interrelating science, math, and English, but that is the exception rather than the rule. In this, it is clear that Mr. Titus would much rather work by himself. Mr. Stillwell would work closely with Mr. Titus because of the naturally interrelated nature of science and math. It also appears that Mrs. Williams is reaching out to become part of a team, but her integration with Mr. Titus and Mr. Stillwell seems to be of a token nature. Her examples of integration come on an individual subject matter level, which would lead us to reexamine the integration model.

As a group, the three teachers follow the webbed model that was described earlier, but in her own class, Mrs. Williams situates her curriculum in a more nested fashion. Within the realm of language arts she targets multiple skills, a social skill, a thinking skill, and a content specific skill. According to Fogarty (1991), her English curriculum could be represented as in the following figure.

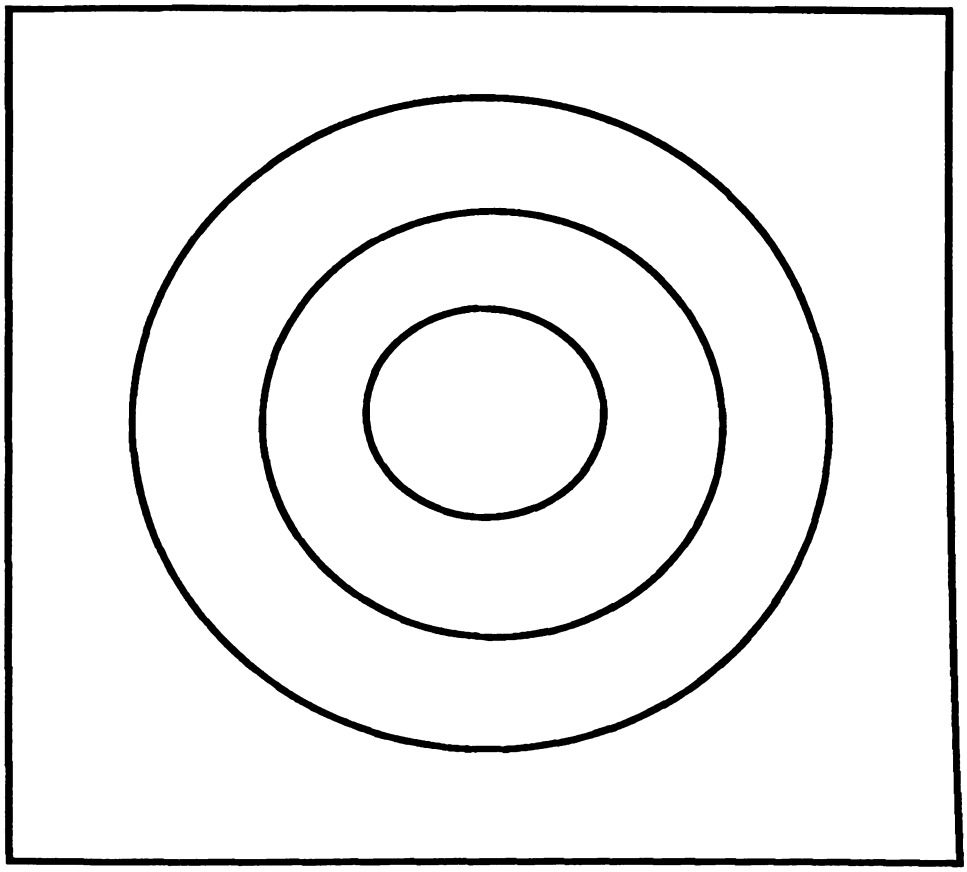


Fig. (5) Nested Curriculum (Fogarty, 1991)

At the end of Chapter I there were three questions that were outlined that I now have enough information to answer. The first question asked what the impact of Public Law 217 was upon Roosevelt High School. The impact of the law upon Roosevelt High school is clearly defined. Roosevelt High School elected in the late 1980's to have a Tech Prep program. At the time Mr. Bogan, the former curriculum director, was employed at Roosevelt High School, there were discussions at the state level about the implementation of Tech Prep in high schools. He started very early in collecting information and visiting schools that were using applied academic courses. From this he created an outline of what curricular changes would be necessary in the successful implementation of a Tech Prep program at Roosevelt High School.

It can be said that the Impact of Public Law 217 upon Roosevelt High School was substantial, but for a very small, focused group of 75 students and 3 teachers. These three teachers were profoundly influenced by Public Law 217 and the Tech Prep mandate, but few other teachers at Roosevelt High school had any idea of what changes were taking place. The law also had a dramatic influence on 75 students in its first year of implementation, but once again the remainder of the student body had little idea these changes were taking place.

Assertion 6 (Local districts can marshall the needed resources to have a successful Tech Prep program under certain circumstances), fits with the preceding question.

Many of the schools that I worked with were complaining that the state of Indiana has not allocated any money for equipment or for the purchase of materials--just funds for curriculum development. These schools are unwilling to come up with the money locally. Roosevelt High School, on the other hand, did find the money because administrators at the top believed in the program. Part of Roosevelt's success, in my opinion, was also because Mr. Stillwell drove the program and demanded certain pieces of equipment. All in all, Roosevelt High School has a successful Tech Prep program because of the "Stillwell Factor."

The second question that this study asks concerns the changes to the teachers that were involved with Tech Prep. At Roosevelt High School, three teachers--Mr. Stillwell, the science teacher; Mr. Titus, the math teacher; and Mrs. Williams, the English teacher--have been profoundly effected and changes have occurred in their teaching styles and in their methods as a result of Indiana Public Law 217. This law defined that Tech Prep classes would be taught in an applications based way, for mastery learning, with integration among subject areas, by using cooperative learning methods and other alternative teaching styles. These teachers admit that the skills as defined by the law are not skills that they had used very often before their exposure to Tech Prep. By virtue of the organization of the school, these teachers did not have the opportunity to network with other teachers about matters of curriculum or staff development other than the pre-arranged, in-service

days that were built into the Roosevelt calendar. A profound change happened when these teachers had to plan their lessons together and each was responsible to two other members of a team. This represents a major change in the teachers as a result of Indiana Public Law 217.

Another change that occurred in the teachers was a rebirth of their interest in the profession. Mr. Stillwell discusses this to some degree as does Mrs. Williams. Mr. Titus is intrigued by alternative teaching styles, but has not yet seen the relevance of cooperative learning or other teaching strategies to mathematics instruction. It could be said that the visions of these three teachers have expanded. They now see beyond the bricks and mortar of the school building and understand how their students are to be involved in the community upon graduation. Again, this is an impact of Public Law 217 upon the teachers. According to the law, there must be business and industry advisory panels to help decide and define curricular issues within the school. In doing so, the three teachers that I have worked with have a larger sense of purpose. They see themselves not just as teachers of math or science or English but as fellow citizens involved in preparing students for the world of work. Mr. Titus goes beyond that; not only does he feel that he is preparing students for the world of work, but he discusses issues of citizenship. He has a view that Tech Prep will help to resituate these students in the middle class in the traditional sense, i.e., skilled labor and/or technicians. One can refer back to his lengthy comment

about the United States and why he feels that it has slipped from prominence in the global picture.

Assertion 1 (Changes in teaching are a consequence of changes in teachers actions and beliefs, not simply the result of adopting a new program or acquiring new materials) also fits well with the second question. The state legislature can mandate programs and plans, but unless teachers believe in the reform and are actively involved in learning to use these new concepts, there is not much chance for the success of the program.

Assertion 2: Changes in teaching are a consequence of changes in teachers' actions and beliefs, not simply the result of adopting a new program or acquiring new materials. This assertion also works well with the second question in regard to the changes that have occurred in the teaching methods of those teachers observed. The integration of subject matter desired in a Tech Prep program requires significant modification of traditional views of the subject matter. Mr. Stillwell spoke earlier of his reply when asked what he teaches. "I teach kids." I think that statement crystallizes the thought that a Tech Prep teacher must be dedicated not only to his discipline, but also to the learner. These teachers realize that not all learners acquire the information in the same way.

In Assertion 7 I stated: A successful Tech Prep program will have teachers who, due to their sense of professional pride, are open to innovation. These teachers now approach their jobs in a holistic manner. They

understand the interrelationships among school, work, community, and family, and they look for opportunities to integrate these elements into the Tech Prep curriculum. These teachers realized that before they could help students they had to learn more about the program and about alternative teaching styles. Due to some unknown factor, they all have this professional pride in varying degrees.

The third question for analysis in this body of work asks about the successes and failures that the teachers have experienced as a result of Public Law 217. The best quote to sum up the feelings of the teachers in regard to their successes and failures comes from Mr. Stillwell. On the way to Purdue University for a Saturday workshop he told me, "We'll probably never save all of them, but we're saving more than if we had never tried." In this quote he is referring to that middle group of students that have been passed over for many years. He sees Tech Prep as being a way up for many students that would have been locked into a dead-end career otherwise.

Not all of the successes can be measured in terms of student achievement. The personal growth that each of these three teachers has made during the last eighteen months has been substantial. It is easy by way of the vignettes, interviews, and quotes to see how Mr. Stillwell has progressed in being not only a science teacher but also a partner in the students' preparation for the world of work. It is also easy to see how Mrs. Williams has done the same; but it takes a little more thought and analysis to see that

Mr. Titus has made much progress as well, although he is aware that he does not understand and use alternative teaching styles, like cooperative learning, as well as he should. In Chapter IV I referred to Mr. Titus as a man possibly on the cusp of a paradigm shift. He is thoughtful and analytical about his teaching, and he does try new things, but he is still more comfortable with his old style of teaching. I believe that he is growing increasingly uncomfortable with his old way of doing things. The fact that Mr. Titus is also responsible to two other teachers may be accelerating his unrest with his personal style. Mr. Stillwell and/or Mrs. Williams guide him along with peer coaching and encouragement, and I feel that he is responding. In some ways, one of the major successes of this program had been in the teaching of Mr. Titus. It has been mentioned in interviews and vignettes that Mr. Stillwell and Mrs. Williams feel they have a natural inclination toward teaching in more of a Tech Prep style. Mr. Titus does not.

Assertion 3 (Teachers have difficulty translating their new classroom ideas and activities into a set of guidelines that can be used by others) defines a failure the teachers in the Roosevelt Tech Prep program have encountered. In their training they were not given any information on how to set up curriculum or how to write curricular documents. If teachers, as curriculum writers, know a subject as well as these three teachers do, there are sometimes many assumptions made about what the reader understands. This

problem could be resolved in future Roosevelt Tech Prep curriculum documents by training all teachers involved in the curriculum development process.

Mr. Stillwell, Mr. Titus, and Mrs. Williams are all thoughtful and very intelligent individuals that are capable of writing curriculum documents. As for Mr. Titus, I am not sure he is convinced as to the value of these documents. He sees curriculum guides as being, as one quote mentions, ". . . to satisfy someone somewhere."

Assertion 4 I stated: Tech Prep teachers do not feel that their classes are watered down, but they do not feel that the applied academics are as rigorous or as acceptable as theoretical academics. I think this statement results from the teachers having a foot in the classroom and a foot in the real world. They understand that not all students need to go to a four-year college and that for a student to be a technician, two years at a vocational facility such as Indiana Vocational Technical College would be enough training. The teachers know that by teaching academics in an applied way the students will probably understand more, and consequently the students' grades may improve because of this understanding. Once the students feel this initial success, their sights and standards for a career path may be set a little higher. Mr. Stillwell talks about how he would not want any of his Tech Prep physics students enrolling in a state university thinking that they could become a physics major because his course content does not include the failure intertwined.

Assertion 5 (While the teachers are learning to teach to a variety of learning styles according to state Tech Prep guidelines, some of them feel that some of these styles are aberrations of the student and not a natural difference) is problematic to me because of such little evidence.

I hesitate to mention the following as a failure, because it is wrapped in a success. Mrs. Williams at one point mentioned that she is using alternative teaching styles and strategies in order to meet the needs of the students, but she feels that there may be something wrong with these students. I think she may have not completely thought through some of the things she said in interviews in regard to the students, or she would understand that these environmental or dietary factors she mentions aren't really causing the students to learn in a way that is "other than normal." I think, rather, she may be projecting her own learning style onto her students.

CHAPTER VI

AREAS FOR FURTHER STUDY

The institution of a statewide Tech Prep program for the state of Indiana has been ongoing since 1987. In this time there have been five demonstration schools to serve as models for the implementation of this reform. On the local basis, schools other than demonstration schools that have been developing the Tech Prep programs are sparse. Information regarding the work at Roosevelt High School needs to be disseminated as an alternative to the information that is being generated by the demonstration schools.

For further research, articles written for publication in scholarly journals need to be written from the information collected in this research for two reasons. First, it represents to this author a more accurate depiction of Tech Prep programs and the process of implementation. On many visits to the demonstration schools, the stories that are told are the encouraging tales of the finished product. Part of the mission of the demonstration schools is to convince other schools that Tech Prep can be developed locally. Their function is that of advocate and inspiration. The views represented by the teachers at Roosevelt, while representing a work in progress, seems to present a more believable account of the trials of developing and implementing this program. Representatives of schools that visit the pilot sites may be somewhat mislead about the relative ease of putting Tech

Prep in place, especially in regard to changing the attitudes and instructional styles of teachers. The pilot schools, while willing to help, may trivialize the difficulty of the change process. Teachers do not give up old ways of doing things and become part of a team overnight.

Another reason for the publication of this material about Tech Prep regards the current status of education in the United States. One of the issues during the presidential election of 1992 was that of school reform, specifically apprenticeship programs or the so-called school-to-work transition. This was also dubbed the "Arkansas Plan" and there was much speculation among state officials and school personnel as to what ripples a national presidential policy would have at the state and local level. At the time of this writing, no one is sure what this program will look like when it is disclosed. Information about Tech Prep in Indiana, in response to a state level legislative mandate, may become valuable to those who are considering the implementation of a national program at the state level. Whether or not local schools understand the significance of their efforts, the importance of the linkages between schools and business cannot be emphasized enough. If a national plan is enacted, the documentation of Indiana Public Law 217 and its subsequent implementation could serve as a model for other states.

Other issues for further research that have arisen from this work include the importance of the counseling staff in

the success of a Tech Prep program. In other aspects of the implementation of Tech Prep in Indiana, it has been shown that the counselors play a vital role in the success of the program; but in the material that was collected for this research there was not enough direct evidence to support this assertion. In interviews, several of the teachers, mentioned the importance of a well-versed and sympathetic counseling staff. The middle majority of students in high schools that are unfocused as to career or college plans are sometimes steered, or dumped, into courses that fill a schedule but amount to nothing that resembles a course of study. Whether it is by way of attention or by addressing different learning styles, teaching styles, or alternative methods of handling these students, for the first time in their school career, many of these students have some success. This success manifests itself in student attitude and improved grades. Counselors, as it is told, when working with these students, misread the changes in the students as the students finally applying themselves. Counselors see this change in the student as coming from maturation but not necessarily as a result of the Tech Prep programs. These students are sometimes counseled back into academic classes and the old cycle of lecture and boredom begins anew. With this said, more research is needed in how to retrain counselors and involve them in the Tech Prep process from the very beginning. Certainly, a staff development article showing the importance of the counselors to the Tech Prep theme would be timely and important.

Another issue needing further research was represented at Roosevelt High School; but once again there is not enough information to support this claim as an assertion. The author was also steered by his guidance committee to avoid the issue of racial balance in the Tech Prep classes. The ratio of minority to non-minority students in the classes did not reflect the ratio that represents the school as a whole. There are a whole series of issues involved here that may need some further research. It is not known how, exactly, that the Tech Prep students were chosen; but the author feels that in the first year of the implementation at Roosevelt, students were hand picked to insure the success of the program. This is a dangerous issue and tempers flare readily even when questions of racial balance are mentioned in passing at Roosevelt High School. It has been the author's experience, though, that the Tech Prep demonstration schools have a dearth of minority students. Until he has more solid information, the less said about this issue, the better.

A longitudinal study of teachers and the process of their change and growth would be as valuable to those working with Tech Prep programs as it would be to teacher educators and staff development personnel. The documentation of how change was and is being affected at Roosevelt High school is described in sketchy detail in this dissertation, but more thorough work needs to be done as to the reasons that the teachers elected to become involved with Tech Prep and how that decision changed their teaching

style and, subsequently, their abilities as a teacher. More information is needed about the training process of the teachers. Now a snapshot exists as to the abilities of the teachers through the period of late 1991 through early 1993. What existed in the past, and the journey from the past to the present, needs to be documented. Following these teachers over the next five to ten years in a longitudinal study would lead to some fascinating stories to the body of literature about teaching. A story about Mr. Titus, the math teacher, finally having success with cooperative learning and the conditions in his skills and mental state at the time would make for an interesting piece. What happens next is always interesting in teaching.

A complementary longitudinal study of students in the Tech Prep programs needs to be undertaken. A typical outline for this would include baseline data about the students before entering Tech Prep and what paths their lives took as a result of this training. It would be interesting to determine what their direction would be after high school. Did they enter a technical field or a four-year college? Did they stay in school? What sorts of jobs are they doing? Is their position in their place of employment significantly different from other workers that did not have the benefit of Tech Prep? There would be the beginnings of an important study tracking the lives of Tech Prep students when compared to a non-Tech Prep control group.

Finally, another area that would need further research would be the parents' and students' views of this program. Social issues have been avoided in this study in order to make it a bit easier to deal with, but certainly there are many social issues that are at play in the milieu. One of the glaring issues is that Tech Prep runs counter to the role of high schools that has emerged over the past several years and that is to academically prepare students for college. Those students who were headed for technical careers or the world of work were enrolled into terminal vocational programs or were left to fend for themselves. This is a true representation of the neglected majority. It would be interesting to interview Tech Prep and non-Tech Prep students about the program. What knowledge of the program do they possess? Where do they see Tech Prep leading them? Is there the same social stigma attached to Tech Prep that there is to vocational education? Mr. Stillwell, the science teacher, puts it quite eloquently when he says,

> . . . involve [the] counseling department, your vocational department, and your academic department, get them together. That's what tech prep does. It bridges the gap that has been there for years. "Oh, you're in the auto shop! You're a dummy!" Have you tried to work on your own car lately? You're not going to be a dummy if you can work on your automobile. And so we bridge the gap. How does this kid have to read? Technical material. How does the kid have to be able to operate? The computer. In order to work on your automobile, what math is involved in working and operating a lathe? There is a horrendous amount of trigonometry involved in a machine shop. A lot of machine shop kids never take a course in trigonometry. But we can use our course to show how the math is relevant to all the materials.

Ford Motor Company has a program that is called Ford Academy of Manufacturing Sciences that the author was able to see in place in a Michigan school. This course of study is very similar to Tech Prep in that it targets the same student population and it has the same goals. While the author has little information about the Ford program, it seems that across the country industry is requiring better trained workers; if the schools will not provide the training, the large companies will create the curriculum and provide incentives for the schools to participate.

While meeting with the students in the Ford program the author discovered that there are no average kids. Kids become average when their learning style does not match the transmission mode of the teacher. The Ford program and Tech Prep take these conditions into account, and the results appear to be encouraging.

Another area for further research is the parents' view of the program. The author continually heard in teacher's meetings that one of the reasons that schools are reluctant to adopt a Tech Prep program is that parents would not support it. Many teachers believe that all parents believe that their children, especially as freshmen and sophomores, are going on to a four-year college program, usually Purdue University or Indiana University--depending on who has had the best sports seasons. Teachers feel that parents believe that Tech Prep would close the students' options. The author has no idea if parents feel this way or if it is just the teachers projecting their own resistance onto the

parents. More work needs to be done in this area. Many of the parents of students in Region 9 are blue collar and hold on to the idea that by going to a four-year college their child will have a better, or at least less difficult, life. The parents are living the economic crisis in that they see many of the factory jobs drying up and moving away, and they want an alternative for their children.

All of these issue represent areas that need to be examined in the coming years in order to give an accurate depiction of the impact of Tech Prep and Public Law 217.

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APPENDICES

MICHIGAN STATE UNIVERSITY

OFFICE OF VICE PRESIDENT FOR RESEARCH
AND DEAN OF THE GRADUATE SCHOOL

EAST LANSING • MICHIGAN • 48824-1046

December 30, 1992

TO: Mr. David Cline
518 East 10th Street
Rushville, IN 46173

RE: **IRB #:** 92-564
TITLE: THE TECH PREP MOVEMENT: ONE SCHOOL'S RESPONSE TO INDIANA P.L. 217
CATEGORY: 1-A, 1-C, 1-D, 1-E
REVISION REQUESTED: N/A
APPROVAL DATE: December 30, 1992

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete. I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRIHS approved this project including any revision listed above.

UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Investigators planning to continue a project beyond one year must seek updated certification. Request for renewed approval must be accompanied by all four of the following mandatory assurances.

1. The human subjects protocol is the same as in previous studies.
2. There have been no ill effects suffered by the subjects due to their participation in the study.
3. There have been no complaints by the subjects or their representatives related to their participation in the study.
4. There has not been a change in the research environment nor new information which would indicate greater risk to human subjects than that assumed when the protocol was initially reviewed and approved.

There is a maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for complete review.

UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. Investigators must notify UCRIHS promptly of any problems (unexpected side effects, complaints, etc.) involving human subjects during the course of the work.

If we can be of any future help, please do not hesitate to contact us at (517) 355-2180 or FAX (517) 336-1171.

Sincerely,

David E. Wright, Ph.D.
UCRIHS Chair

DEW:pjm

cc: ✓ Dr. James J. Gallagher

CONSENT FORM
MANAGEMENT TEAM VERSION

We, the undersigned, freely consent to acknowledge and allow the educational research conducted by Mr. David Cline, Ph.D. candidate in the Department of Teacher Education, Michigan State University. The study has been explained to us, and we understand the explanation that has been given as well as what our participation will involve.

We understand that the researcher, in conjunction with Dr. James Gallagher, Professor in the Department of Teacher Education, Michigan State University, will use the fieldnotes, discussions, and interviews for his research work. We also understand that some interviews or discussions with teachers may be tape recorded and that these tapes will be destroyed after the completion of the project. We understand that every effort will be made to guarantee confidentiality and to protect anonymity in published reports which we will have opportunity to review whenever possible.

We understand that the regional consortium's participation in the study may result in benefits for our schools and our teachers as well as other consortia and teachers statewide, however, such beneficial results are not guaranteed.

We understand that we are free to discontinue participation in the study at any time without recrimination.

Signed, Robert A Hoffman Date, 4-29-92

Signed, Gwillen Reed Date, 4-29-92

Signed, Michael Walton Date, 4-29-92

Signed, Rebecca Nicholi Date, 5-1-92

Signed, Stan C. Bryant Date, 5-1-92

Appendix A

TEXTS OF LEGISLATION

Carl D. Perkins Vocational and Applied Technology Education Act Amendments of 1990

Public Law 101-392
Title III Part E.

TECH-PREP EDUCATION

Section 341. SHORT TITLE.
This part may be cited as the "Tech-Prep Education Act."

Section 342. FINDINGS AND PURPOSE.
(a) FINDINGS. – The Congress finds that –

(1) rapid technological advances and global economic competition demand increased levels of skilled technical education preparation and readiness on the part of youths entering the workforce;
(2) effective strategies reaching beyond the boundaries of traditional schooling are necessary to provide early and sustained intervention by parents, teachers, and educational institutions in the lives of students;
(3) a combination of nontraditional school- to-work technical education programs, using state-of-the-art equipment and appropriate technologies, will reduce the dropout rate for high school students in the United States and will produce youths who are mature, responsible, and motivated to build good lives for themselves;
(4) the establishment of systematic technical education articulation agreements between secondary schools and postsecondary educational institutions is necessary for providing youths with skills in the liberal and practical arts and in basic academics, including literacy instruction in the English language, and with the intense technical preparation necessary for finding a position in a changing workplace;
(5) by the year 2000, an estimated 15,000,000 manufacturing jobs will require more advanced technical skills, and an equal number of service jobs will become obsolete;
(6) more than 50 percent of jobs that are developing will require skills greater than those provided by existing educational programs;
(7) dropout rates in urban schools are 50 percent or higher, and more than 50 percent of all Hispanic youth dropout of high school; and
(8) employers in the United States pay an estimated $210,000,000 annually for formal and informal training, remediation, and lost productivity as a result of untrained and unprepared youth joining, or attempting to join, the workforce of the United States.

(b) PURPOSE. – It is the purpose of this part –

(1) to provide planning and demonstration grants to consortia of local educational agencies and postsecondary 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 postsecondary educational institutions.

Section 343. PROGRAM AUTHORIZED.
(a) DISCRETIONARY AMOUNTS. – In any fiscal year in which the amount made available under Section 3 (d) (1) (E) to carry out provisions of this part is equal to or less than $50,000,000, the Secretary, in accordance with the provisions of this part which are not inconsistent with this paragraph, shall award grants for tech-prep education programs to consortia of –

(1) local educational agencies, intermediate educational agencies or area vocational education schools serving secondary school students, or secondary schools funded by the Bureau of Indian Affairs; and

(2) (A) non-profit institutions of higher education which offer a 2-year associate degree program, a 2-year certificate program, and which are qualified as institutions of high education pursuant to section 481 (a) of the Higher Education Act of 1965, including institutions receiving assistance under the Tribally Controlled Community College Assistance Act of 1978 or a 2-year apprenticeship program that follows secondary instruction, if such nonprofit institutions of higher education are not subject to a default management plan required by the secretary; or

(B) proprietary institutions of higher education which offer a 2-year associate degree program and which are qualified as institutions of higher education pursuant to section 481(a) of the Higher Education Act of 1965 if such proprietary institutions of higher education are not subject to a default management plan required by the Secretary.

(b) STATE GRANTS. –

(1) In any fiscal year for which the amount made available under section 3(d)(1)(E to carry out the provisions of this part exceeds $50,000,000, the Secretary shall allot such amount to the States in accordance with the provisions of section 101 (a)(2).

(2) From amounts made available to each State under paragraph (1), the State board in accordance with the provisions of this part which are not inconsistent with this paragraph, shall award grants on a competitive basis or on the basis of a formula determined by the State board, for tech-prep education programs to consortia described in subsection (a)(1).

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 of at least two years following secondary instruction, with a common core of required proficiency in mathematics, science, communications, and technologies designed to lead to an associate degree or certificate in a specific career field.

(3) include the development of tech-prep education program curricula appropriate to the needs of the consortium participants;

(4) include in-service training for teachers that –
  (A) is designed to effectively implement tech-prep education curricula;
  (B) provides for joint training for teachers from all participants in the consortium; and
  (C) may provide such training in weekend, evening, and summer sessions, institutes or workshops;
(5) include training programs for counselors designed to enable counselors to more effectively –
  (A) recruit students for tech-prep education programs;
  (B) ensure that such students successfully complete such programs; and
  (C) ensure that such students are placed in appropriate employment;
(6) provide equal access to the full range of technical preparation programs to individuals who are members of special populations, including the development of tech-prep education program services appropriate to the needs of such individuals; and
(7) provide for preparatory services which assist all participants in such programs.

(c) ADDITIONAL AUTHORIZED ACTIVITIES. – Each such program may –
(1) provide for the acquisition of tech-prep education program equipment; and
(2) as part of the program's planning activities, acquire technical assistance from State or local entities that have successfully designed, established and operated tech-prep programs.

Section 345. APPLICATIONS.

(a) IN GENERAL . – Each consortium that desires to receive a grant under this part shall submit an application to the Secretary or State Board, as appropriate, at such time and in such manner as the Secretary or the State Board, as appropriate, shall prescribe.

(b) THREE YEAR PLAN. – Each application submitted under this section shall contain a 3-year plan for the development and implementation of activities under this part.

(c) APPROVAL– The Secretary or the State board, as appropriate, shall approve applications based on their potential to create an effective tech-prep education program as provided for in section 344.

(d) SPECIAL CONSIDERATION. – The Secre-tary or the State Board, appropriate, shall give special consideration to applications which –
(1) provide for effective employment placement activities or transfer of students to 4-year baccalaureate programs;
(2) are developed in consultation with business, industry and labor unions; and
(3) address effectively the issues of dropout prevention and re-entry and the needs of minority youths, youths of limited English proficiency, youths with handicaps and disadvantaged youths.

(e) EQUITABLE DISTRIBUTION OF ASSISTANCE.– In making grants under this part, the Secretary shall ensure an equitable distribution of assistance among States and the Secretary and State board, as appropriate, shall ensure an equitable. Distribution of assistance between urban and rural consortium participants.

(f) NOTICE. –

(1) In the case of grants to be made by the Secretary, each consortium that submits an application under this section shall provide notice of such submission and a copy of such application to the State educational agency and State agency for higher education, of the State in which the consortium is located;

(2) The Secretary shall notify the State educational agency, the State agency for higher education, and the State council on vocational education of any state each time a consortium located in such State is selected to receive a grant under this part.

Section 346. REPORTS.

(A) REPORT TO THE SECRETARY– In the case of grants made by the Secretary, each grant recipient shall, with respect to assistance received under this part, submit to the Secretary such reports as may be required by the Secretary to ensure that such grant recipient is complying with the requirements of this part.

(B) REPORT TO THE CONGRESS– After grant recipients who receive grants in the first year in which grants are made under this part complete their eligibility under the program the Secretary shall submit to the Congress a report evaluating the effectiveness of the program under this part.

Section 347. DEFINITIONS. For purposes of this part:

(1) the term 'articulation agreement' means a commitment to a program designed to provide students with a nonduplicative sequence of progressive achievement leading to competencies in a tech-prep education program.

(2) the term "community college" –

(A) has the meaning provided in section 1201 (a) of the Higher Education Act of 1965 for an institution which provides not less than a 2-year program which is acceptable for full credit toward a bachelor's degree; and

(B) includes tribally controlled community colleges.

(3) The term "tech-prep education program" means a combined secondary and postsecondary program which –

(A) leads to an associate degree or 2-year certificate;

(B) provides technical preparation in at least 1 field of engineering technology, applied science, mechanical, industrial, or practica art or trade, or agriculture, health, or business;

(C) builds student competence in mathematics, science, and communications (including through applied academics) through a sequential course of study; and

(D) leads to placement in employment.

(4) The terms "institution of higher education" include institutions offering apprenticeship programs of at least 2 years beyond completion of secondary school.

Indiana Public Law 217-1987 as amended

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

Sec. 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 the executive officer of the commission for 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 be developed by November 1, 1990 and must:

(1) be performance based;

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

(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 postsecondary sequence models; and

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

(d) The task force shall identify certain occupations for secondary and postsecondary articulation curriculum agreements in cooperation with the standing technical committee of the Indiana commission on vocational and technical education. *As added by P.L. 217-1987, Sec. 11 Amended by P.L. 51-1990, Sec. 18.*

20-10.1-5.6-2 Technology preparation curriculum

Sec. 2. (a) By the 1990-91 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 one-third (1/3) of the school corporations to make available a technology preparation curriculum to the school corporations' 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.

(d) This chapter does not eliminate the approved industrial arts/technology education curriculum adopted by the board by rule in effect on July 1, 1990. *As added by P.L. 217-1987. Sec. 11. Amended by P.L. 342-1989 (ss). Sec. 16. P.L. 51-1990. Sec. 19.*

20-10.1-5.6-3 Equipment expenditures; funding
Sec. 3. Expenditures for equipment necessary to implement this chapter by a school corporation may be paid for:
(1) through technology loans from the common school fund; or
(2) from the school corporations cumulative building fund under IC 21-2-6.
As added by P.L. 217-1987. Sec. 11.

20-10.1-5.6-4 Rules
Sec. 4. The state board of education shall adopt rules under IC 4-22-2 to implement this chapter. As added by P.L. 217-1987, Sec. 11.

21-3-1.6-3.2 Additional count for participants in technology preparation programs.
Sec. 3.2 (a) The additional count for each pupil participating in technology preparation programs is set out below. The additional count of the school corporation for this category is the aggregate additional counts of its pupils in this category with legal settlement in the school corporation.

TECHNOLOGY PREPARATION PROGRAMS – 0.33

(b) Participation does not require participation to the extent of full-time equivalency. The state board of education shall adopt rules further defining the nature and extent of participation and the type of program qualifying for application of subsection (a). No additional count shall be made on any program set out in subsection (a) that has not been approved by the state board of education or where the student is not participating to the extent required by any rule of the board.
(c) For the purposes of this chapter:
(1) "additional count" of a school corporation or comparable language includes the aggregate of the additional counts of the school corporation for pupils as set out under subsection (a); and
(2) reference to section 3 of this chapter shall be considered to include this section.
As *added by P.L. 217-1987, Sec. 21.*

CURRICULUM OUTLINE

TECH PREP I

PHILOSOPHY:

For too many years the secondary schools have emphasized academic structure and college preparation. Those who are not focused for college are enrolled in a general studies curriculum which stresses neither academic nor workplace preparation. Tech Prep at Richmond High School is an academic alternative that stresses focusing on the future, post secondary education, and preparing students for workplace.

According to the August 1989 Executive Report of the Jobs for Indiana's Future project, "The jobs of the future will develop in a knowledge-based economy in which workers will exercise greater discretion over their jobs. Jobs will require more and better basic skills, more technical knowledge, as well as an increased ability to work in teams, adapt to new work environments, and to communicate better orally and in writing." Tech Prep at Richmond High School will be involved in using different techniques and methods to provide the students the social and academic skills to develop a focus on the future and have marketable tools for these jobs.

More than half of all jobs will require some postsecondary education and training, through not necessarily a four year baccalaureate degree. Workers in the future must be prepared for multiple careers and frequent retraining . Lifelong learning will be a must for future generations. Tech Prep at Richmond High School will take into consideration the diversity of the students enrolled and adjust teaching techniques and courses of study to meet the needs of all students.

INDIANA PROFICIENCY GUIDE EXCERPTS

Tech Prep programs should be targeted to those students in a general, unfocused high school program of studies, i.e., general or basic education students. In Tech Prep, the student will have the opportunity to acquire the basic skills needed for admission to a postsecondary education program and have sufficient knowledge and skills in a field of work to qualify for an entry-level position in that field.

The Tech Prep program should actively involve local business, industry, and labor in the planning, delivery and evaluation of the curriculum.

The Tech Prep program should require that each student develop an individual plan of study which reflects intended post high school goals and technical areas of interest.

The Tech Prep program should include articulation agreements between secondary and postsecondary institutions which may provide for advanced placement and dual credit.

The Tech Prep program should incorporate a staff development process, including teacher, administrators, and counselors

The Tech Prep program requires students to meet compentencies in math, science and English.

OBJECTIVES:

1. prepare students to enter a two or four year pst secondary technology program in an area of interest to the student

2. prepare students to enter the job market of [redacted] and

county upon graduation for R.H.S.

3. develop critical thinking skills and creativity in the technological areas

4. develop an understanding of the ways knowledge and information are processed in our changing technological world

5. develop an understanding of basic Technological principles to prepare for today's job market

6. prepare the student in cooperative learning and interpersonal relationship skills

7. develop areas of interest for the general studies student to pursue at the academic high school and post secondary levels

8. develop a high level of communication skills, in verbal, written, and computer modes

9. develop an understanding of how school subjects are interrelated and how these subjects affect other areas of learning

CURRICULUM OUTLINE

TECH PREP II

PHILOSOPHY:

For too many years the secondary schools have emphasized academic structure and college preparation. Those who are not focused for college are enrolled in a general studies curriculum which stresses neither academic nor workplace preparation. Tech Prep at Richmond High School is an academic alternative that stresses focusing on the future, post secondary education, and preparing students for workplace.

According to the August 1989 Executive Report of the Jobs for Indiana's Future project, "The jobs of the future will develop in a knowledge-based economy in which workers will exercise greater discretion over their jobs. Jobs will require more and better basic skills, more technical knowledge, as well as an increased ability to work in teams, adapt to new work environments, and to communicate better orally and in writing." Tech Prep at R. High School will be involved in using different techniques and methods to provide the students the social and academic skills to develop a focus on the future and have marketable tools for these jobs.

More than half of all jobs will require some postsecondary education and training, through not necessarily a four year baccalaureate degree. Workers in the future must be prepared for multiple careers and frequent retraining . Lifelong learning will be a must for future generations. Tech Prep at Richmond High School will take into consideration the diversity of the students enrolled and adjust teaching techniques and courses of study to meet the needs of all students.

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Tech Prep programs should be targeted to those students in a general, unfocused high school program of studies, i.e., general or basic education students. In Tech Prep, the student will have the opportunity to acquire the basic skills needed for admission to a postsecondary education program and have sufficient knowledge and skills in a field of work to qualify for an entry-level position in that field.

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county upon graduation for R.H.S.

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9. develop an understanding of how school subjects are interrelated and how these subjects affect other areas of learning