DISSERTATION

THE TECH-PREP INITIATIVE AND THE QUALITY OF THE SECONDARY EDUCATIONAL EXPERIENCE FOR TARGETED STUDENTS

Submitted by

Mark R. Steinle

School of Education

In Partial fulfillment of the requirements

For the degree of

Doctor of Philosophy

Colorado State University

Fort Collins, Colorado

Summer 2003

ProQuest Information and Learning Company
300 North Zeeb Road
P.O. Box 1346
Ann Arbor, MI 48106-1346

COLORADO STATE UNIVERSITY

June 18, 2003

WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY MARK R. STEINLE ENTITLED THE TECH-PREP INITIATIVE AND THE QUALITY OF THE SECONDARY EDUCATIONAL EXPERIENCE FOR TARGETED STUDENTS BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

Committee on Graduate Work

Adviser

Director

ABSTRACT OF DISSERTATION

THE TECH-PREP INITIATIVE AND THE QUALITY OF THE SECONDARY EDUCATIONAL EXPERIENCE FOR TARGETED STUDENTS

The majority of the research that has been reported on the federal funding initiative, tech-prep, has been done with the administrators perceptions of what is being done and how it is affecting the students learning experience. A three-year study was conducted in Colorado (Gloeckner & Lyons, 2001) to evaluate the student's perceptions, tech-prep versus non tech-prep. This study expanded on that project looking at the tech-prep students and analyzing the data, on two independent variables, the effects of the size of the school district and the number of years of funding.

The survey developed for the Colorado State University was modified to include Wyoming consortium data. Surveys were collected and analyzed for the two independent variables and for any interaction. Significant results were found in several areas. The analysis of school district of size showed significance in the assignment of a counselor, with large districts more likely to assign students to a counselor. Small schools reported to have experienced an improvement in grades and that the teachers in small schools are more likely to take time to explain assignments to the student as well as take time to instruct the students in what is required to learn and receive a passing grade in class. Students

felt that the math classes as well as the communication/English/language arts classes were useful to them in their personal life.

Those students that were enrolled in classes that have received funding for six or more years were more likely to be assigned to a counselor, however those enrolled in programs that had received funding for three years or less reported more frequent visits to the counselor. Those students that attended classes supported for over six years reported having better grades this year and in high school in general. Students in classes that received funding for three years or less felt that their grades had gotten better in the past two years. Students that attend classes that have received federal funding for six years or more, students reported that the use of calculators and technical journals was increased.

The interaction of the two independent variables was significant in three instances. Students reported higher grades from consortia that had received funding for six or more years and being from small school districts. There were two disordinal interactions, students from large districts that had received funding for six or more years found mathematics to be more useful in their personal lives, conversely students from small districts that had received funding for six or more years found Comm/English/Language arts classes more helpful in their personal life.

Mark R. Steinle
School of Education
Colorado State University
Fort Collins, CO 80523
Summer 2003

Lastly I want to thank my advisor Dr. Gene Gloeckner. He has demonstrated considerable patience and offered untold support and guidance in the development and culmination of this dissertation as well as throughout the degree program.

TABLE OF CONTENTS

ABSTRACT.....iii

ACKNOWLEDGEMENTS.....v

TABLE OF CONTENTS.....vii

TABLE OF CHARTS.....x

TABLE OF FIGURES.....xi

CHAPTER 1: INTRODUCTION.....1

The Need for Reform..... 1

The Reform, Tech-Prep.....3

Impact of School District Size.....6

Time Required to Evidence Change.....7

Research Questions.....8

Definition of Terms.....10

Delimitations.....12

Limitations and Assumptions.....12

Significance of Study.....13

Researcher's Perspective.....15

CHAPTER 2: REVIEW OF LITERATURE.....17

The Need for Reform, 1980.....18

The Need for Reform, 2000.....22

History of Vocational Education.....24

Tech-Prep.....28

Evaluation of Tech-Prep.....32

Time Required for Reform to be

Measurable.....67

Tech Prep Students' Perceptions as Effected by

School District Size.....72

Urban versus Rural.....76

Summary.....79

CHAPTER 3: METHODS.....80

Variables.....80

Population and Sampling.....82

Research Questions.....85

Instrument.....87

Statistics.....88

CHAPTER 4: FINDINGS.....90

Part 1: About Yourself.....91

Part 2: About Your Classes.....96

Part 3: About Your Future.....104

Summary.....105

CHAPTER 5: DISCUSSION AND SUMMARY.....108

Summary.....108

Size of District.....110

Years of Funding.....112

Discussion.....114

Suggestions for Further Study.....119

Lessons Learned.....121

Recommendations for Practice.....124

REFERENCES.....127

APPENDIX A

Questionnaire

APPENDIX B

Student Consent Form

District Consent Letter

APPENDIX C

Student responses to open ended questions

TABLE OF CHARTS

Table 1

Demographics of Sample Collected.....90

Table 2

Ethnicity of Sample and Entire Student Body.....91

Table 3

Number of Times Student Met with Counselor.....92

Table 4

Student's Grades for this Year in High School and Change in Past Two Years.....94

Table 5

Size of District Comparisons of Teachers' Methods Helpfulness and Enthusiasm.....101

Table 6

Years of Funding Analysis of Learning Aids.....103

TABLE OF FIGURES

FIGURE 1

Estimated Marginal Means of High School Grades.....95

FIGURE 2

Estimated Marginal Means of math helpful in Personal life.....98

FIGURE 3

Estimated Marginal Means of Comm/Engl/Lang. Arts helpful in personal life.....99

CHAPTER 1: INTRODUCTION

The Need for Reform

"Over the past two decades, several major changes in America's economy have altered the skill requirements of the workforce and have focused attention on the way American education prepares young people for work (p. 9)." This statement comes from the Final Report to Congress on the National Assessment of Vocational Education. The statement was penned in 1993; prior statements made in 1990 by the National Center on Education and Economy claimed that America has the worst transition from school to work of any industrialized country (Commission on the Skills of the American Workforce, 1990). The mission, to prepare students for the workplace, still garnered support in the 1998 renewal of the Carl D. Perkins Vocational and Technical Education Act. The major stated objective was to develop more fully the academic, vocational, and technical skills of secondary and post-secondary students, thus preparing students for further education and work (Congressional Record, 1998).

The project reported in this dissertation is an evaluation of one attempt, to improve the school to work transition. Tech-prep, funded under the Perkins Act, was an educational design of applied academics and technical training

beginning in high school, then coupled with further training either in a post-secondary institution or the application of a youth apprenticeship model.

This charge of technical training inadequacy as reported in America's *Choice: High Skills or Low Wages* (Commission on the Skills of the American Workforce, 1990) may be compared to the 1983 academic shortcomings chronicled in *A Nation at Risk* (National Commission on Excellence in Education, 1983). These academic challenges were a result of poor performance of American students on international achievement tests. State governments responded to the criticism of a failing academic educational system with increased high school graduation requirements and state college and university entrance requirements. The shortage of skilled workers has resulted in the federal government funding vocational educational acts to increase the occupational training offerings in the secondary and post secondary institutions of this country. Currently our nation is experiencing a shortage of workers possessing technical skills beyond secondary education yet not requiring a bachelor's degree (Grubb, 1996).

As the world economy becomes more global, front line workers are being required to assume many of the duties once delegated to mid-level supervisors as the competitive market reduces the number of supervisors. As a result, these workers are now expected to improve operations, solve problems, and assure quality control. Workers are required to become involved in critical thinking processes and in fostering communications and

collaborations with co-workers, to facilitate teamwork and satisfy customer service needs (Boesel & McFarland, 1994).

In addition to the global economy, technology has played a role in the changing requirements of the American worker as the fingers of technology spread over nearly every occupation. For example, the auto mechanic uses computer diagnostic equipment; the insurance industry uses computer-underwriting software; the farmer and rancher use computers for herd management and crop rotation. Computer assisted design in architectural firms is reported to have increased draftsman productivity six fold over traditional methods (National Assessment of Vocational Education, 1994). The National Center on the Educational Quality of the Workforce polled 3,000 business managers in 1996, asking if the skill level required of the worker had gone up, down, or remained the same, 57 percent reported higher skills were now required than three years ago (National Alliance of Business, 1996).

The Reform, Tech-Prep

One proposal to alleviate this shortage of trained workers was the Tech- Prep initiative, funded under the Perkins Act. Congress supported this reform with funding of $63 million in fiscal 1991 and increased support to $90 million in 1992. Tech-prep was envisioned by Dale Parnell as a connection between secondary and post-secondary curriculum, as an alternative to the traditional college prep track (Smith & Rojewski, 1993).

The tech-prep design is proposed in a 2+2 manner, that is, two years of secondary training enhanced by two years of post-secondary training. During the last two years of secondary education the student is given a broad foundation of applied academic and occupational classes, followed by two years of advanced technical and academic training, at a community college, or other approved training environment, such as youth apprenticeship or cooperative worksite. The program has often evolved into a variety of 4+2 or 2+2+2 designs, involving either all four years of the secondary education or the two years of the community college education being matriculated to a four year school to culminate in a bachelors degree. This model has become popular in many areas. In June of 1990, 122 tech-prep programs had been implemented in 33 states (Mendel, 1994), and by 1995 states had created over 1,000 local consortia, encompassing 70 percent of all high school districts (Hershey, Silverberg, Owens & Hulsey, 1998).

The Perkins Act defines the tech-prep program and stipulates the requirements for these programs. The act requires two years of education at the secondary level, and either two years of higher education or apprenticeship training, with a common core of mathematics, science, communications, and technologies culminating in an associates degree or certification. The goals set forth in the Perkins Act are the following: (a) an articulation agreement must be developed between the educational agencies involved in the program, (b) training programs must be provided for both teachers and counselors, and (c) equal access must be available to special

populations. Other components of the programs involve linkage to business and industry, general occupational skills, specific job training, applied technology training, a sequential course of study, and apprenticeship training (Bragg, 1991).

Tech-prep programs are not designed to replace college preparatory programs; rather they are designed to reach the approximately 40 percent of students who follow a general study curriculum, with little focus on preparation for either higher education or entering the workforce. The student enrolled in the high school general academic track is the target population for tech-prep programs (Hull & Parnell, 1991). Earnings data support this need for continuing education. Over the past twenty years the economy is demanding more refined skills, as evidenced by earnings data, which reports in the 1980's earnings rose 10 percent for college graduates while high school graduates lost 9 percent and high school dropouts fell 12 percent. These data coupled with the loss of manufacturing jobs in this country have made it increasingly difficult for those individuals with only a high school education to prosper (National Assessment of Vocational Education , 1994).

This study is designed to look at the students' perceptions of their education experience as enhanced by federal funding of the tech-prep initiative. Specifically this study will compare students' perceptions with respect to the size of the school district they attended and by the number of years that the tech-prep consortium they were involved in had received funding.

Impact of School District Size

The effect of school size has been debated from the turn of the 20th century when Ellwood Cubberley and Joseph Kennedy took opposing views on school size, with Cubberley advocating that bigger would be better and asking" How large of a school can be created?" (Cubberley, 1922). Kennedy (1914) asked the opposing view, "What is the lower limit on school size?" These two questions are still being researched today, with both extremes still undefined (Howley, 1996). The literature is limited as to the affect of size on occupational education, the interest of this study. Additionally the literature on size as it is experienced in rural situations as represented in this study is also limited (Roth, 2000).

One reported consequence of size is budget constraints and their effect on the students' educational experience. Rural communities are greatly affected when their secondary schools do not prepare the local youth for life after high school. Many of these communities have been especially affected by the changing economy: mills, mines, farms, and factories have become much more mechanized or shut down, forcing the youth to leave the rural community to seek employment in urban areas. Most students from the rural community do not receive the benefit of ample career and technical education, as the schools, when faced with budget decisions, often choose to support the college bound student, leaving the occupational training out of phase with the world of work (Miller & Hahn, 1997). In rural communities

often, business and industry are sparse. This difference from metropolitan educational arenas often creates a circumstance where the educational reform approach utilized in a larger community will not be possible. With most school-to-work programs, the first step is to link school with industry. In small communities, industry does not exist (Nachtigal, 1995).

In a 1986 study of high school size correlation was established to be significant for all of the listed variables: course offerings, student-teacher ratio, guidance personnel, certification of staff, staff turnover, and media resources for students and staff. This study found that course offerings in occupational education were universally offered and not dependent on school size. The ratio of students to courses was better at the small schools, because the small school offered more courses on a proportional basis (Ramirez, 1989).

Time required to evidence change

The time required to acquire evidence of the results of educational reform have not been well reported. Much has been written about the difficulties of change, and the changes that are required by administrators for educators to facilitate change, but the literature is short on the time required to experience change. One monograph, chronicling standard based school reform in Kentucky, recognizes that in over 10 years much has been accomplished, with much more to go (Whitford & Jones, 2000). When the effects of the changes were recognized, is not evident in most literature. This

study investigates at the years of consortium funding as it relates to changes in the students' perceptions.

Research Questions

Many studies have been conducted to determine the effectiveness of the tech-prep initiative, with most of the work done by polling the consortium directors to determine what administrators think is going on with educational reform. This study was developed to utilize materials that were developed by a prior study at Colorado State University (CSU) to determine if the tech-prep programs are making a difference in the students' perception of their educational experience. The same survey instrument that was developed for the Colorado study was utilized.

The focus of this study was to determine if there was evidence of differences in tech-prep students' perception of their educational experience when analyzed with respect to the number of years the consortium had received federal funding. The students' perceptions were also reviewed with respect to the size of the school districts the students attended.

Specific statements were posed to students, enrolled in classes supported by tech-prep, for their response in the following areas:

1. Student assignment to a counselor and the frequency of visits to the counselor.
2. Self reported grades for the current and previous year, and change in grades in the past two years.

3. Perceptions of mathematics classes as to interest and application.

4. Perceptions of science classes as to interest and application.

5. Perceptions of English/Communications classes as to interest and application.

6. Perceptions of teaching methods.

7. Use of learning aids in the classroom.

8. Career counseling and investigation they have experienced.

Open responses questions were asked about most/least useful classes; likes and dislikes of school and the relevance of high school.

The results of the questionnaires were evaluated using the following research questions:

1. Are there any differences in the educational experience for tech-prep students that attended large (over 7,000 student) school districts compared to those attending small (under 3,500 student) school districts?

2. Are the educational experiences for tech-prep students different for those students attending classes supported by a consortium that has received federal funding for over 6 years than for the student attending a class that has received support for less than three years?

3. Is there an interaction relationship between the main effects of size and years of funding?

Definition of Terms

The definition of tech-prep and the many components that are available for the post-secondary training will be defined for this project as follows:

Articulation Agreement: A commitment between institutions to a program designed to provide students with a non-duplicative sequence of the educational achievements leading to competencies in a tech-prep program (Hoerner, Clowes & Impara, 1991).

Tech-prep: This term, as it is used currently, refers to the philosophy attributed to Dale Parnell, who announced the program in his 1985 book *The Neglected Majority* cited in Hull and Parnell (1991). The program is designed as a 2+2 curriculum, with the student taking two years in secondary education, preparing for the workplace and higher education. The second portion of the program takes place at either a community college, a technical school or in a youth apprenticeship. The program coursework is concentrated in applied mathematics, science, technology, and communication skills, offered in harmony with technical job skills. The programs are designed with input from business, industry, governmental agencies and labor involvement in the form of advisory boards (Hull & Parnell, 1991).

Cooperative education: Co-op is the most common and established school to work transition program, having been recognized by the federal

authority since 1917 (Stern, Finkelstein, Stone, Latting & Dornsife, 1994). Co-op provides the student with classroom instruction and on-the–job training related to the students' career aspirations in high schools, community colleges, and four-year colleges.

Career academies: These programs were developed in Philadelphia in an attempt to combine work and classroom instruction, breaking the barrier between them. Initially the academies were created as "schools within schools" to serve students with high potential for dropping out (Manpower Demonstration Research Corporation, 1995).

Youth apprenticeship: This program takes the best elements of the career academy and tech-prep and reinforces the design with considerable work-based learning. This design includes more job experience and occupational skills with the student receiving a certificate and often-permanent employment with sponsoring employers at the completion of the program (Corson & Silverberg, 1994).

Post-Secondary Educational Institution: This term refers to a school that provides formal educational programs with curriculum designed for students who have completed the requirements of a high school diploma or equivalency certificate, including programs of academic, vocational, and continuing professional education, excluding strictly vocational and adult basic education programs (National School-to-Work Office, 1996B).

School-to-Work Program: This term refers to a program that integrates academic and occupational training, and provides links between secondary

and post-secondary education. This program provides students with an opportunity to complete a career major, including experiences and understanding in all aspects of the industry. Equal access is provided to a full range of program activities and components. These programs will include a school-based learning component, a work-based learning component, and a connecting activities component (National School-to-Work Office, 1996B).

Delimitations

There are two significant delimitations for this project; the study is conducted in the state of Wyoming, and the administration of the federal Tech- prep funding is left to the state discretion; thus, limited generalizations to other states using different systems to administer the funds are possible. Also, the human subjects committee, required the student, if less than eighteen years old, to provide parental consent to participate in the study. Secondary student apathy resulted in a limited number of students willing to return the required consent form, which may have skewed the sample by including only those students willing to put forth an additional effort.

Limitations and assumptions

There are several assumptions to this study: first, the assumption that all consortium members are equally involved in the consortium and receive equal support from the consortium and, the second assumption, that the students surveyed may not have been in the class for the entire semester. Three limitations are recognized: (a) non tech-prep students were not

included in this study, therefore no control was offered in the size of district analysis, some differences may have been recognized in all students; (b) some of the surveyed school districts have multiple consortia, therefore have received funding for both less than three years and over six years, potentially skewing the results; and (c) there may have differences in explanation given to the students about the survey and the request for information by the different instructors administering the questionnaire.

Significance of study

This study is undertaken to determine if the tech-prep initiative, funded through the Perkins Act of 1990 and re-authorized in 1998, is having the desired effect of improving the educational experience of career and technical students in Wyoming high schools. Hershey, Silverberg, Owens, and Hulsey (1998) conducted a thorough research project of the implementation of the tech-prep initiative; however, student perceptions of the effect of the initiative were not collected. In Bragg's (2001) work only eight consortia were reviewed; therefore, the results are difficult to generalize across the country. Gloeckner and Lyons (2000) conducted a study of student perceptions in Colorado, providing data on the differences in student perceptions of their educational experience as to being tech-prep or non-tech-prep. This study, conducted in Wyoming, utilized the same questionnaire to look at the effects of years of funding, and the effects of size.

This initiative was important to the workforce education in America. Therefore, the evaluation of the student perceptions of their educational experience, as affected by the tech-prep consortia, was of value to allow feedback and revision. The information learned from this and other similar studies will provide insight into whether or not the reform is working and if changes are needed to improve the effectiveness of the program.

In looking at the discussions of economists, policy makers, employers, and labor representatives, the perspectives are different. However, they all focus on the need in this country to improve the educational opportunities for our youth. One suggestion is to promote apprenticeships to reduce floundering in the labor market. High school graduates between 18 and 27 who had not enrolled in post secondary education held approximately six jobs and were unemployed for four to five periods (Veum & Weiss, 1993). This is reinforced by data from the U.S. Department of Labor (2000) reporting that, in the 16 to 24 year old cohort, the national average for unemployment was 7.5 percent comprised of those with less than a high school diploma representing 14.6 percent, high school graduate, with no college 8.6 percent, some college but no degree 5.4 percent, Associates degree 4.6 percent, and Bachelor's degree or higher 4.8 percent. Median income displays a similar pattern: in 1998, those workers with no diploma earned on average $23,958; those who had graduated high school averaged $31,447; some college with no degree averaged $36,934; those with an Associate's degree were averaging $40,274 (U. S. Department of Commerce, 1999).

This study looked at the progress from a students perspective the tech-prep initiative has made over time in looking at consortia that have received funding for three years or less as opposed to those that have received over six years of funding. The researcher also looked at the effect of school district size on the implementation of this educational reform. The tech-prep reform initiative is designed to improve the career technical educational system in this country. The size of schools is an important consideration because in educational change literature many consider size of the school to be a factor in any reform (Roelke, 1996). The participation in tech-prep has increased. In Bragg's (2001) investigation, the increases were from 60 percent to 250 percent over four years, and these increases are attributed to more teachers, greater emphasis on guidance, more integrated instruction, and heightened recruitment. The independent variables of this study should indicate a difference in students' perceptions of their educational experience if Wyoming is following the reported trends.

Researcher's Perspective

The researcher, having read the literature was unsure of the outcome of the size question. Is a small school, in this case rural, a better opportunity for the student to experience a changed educational experience, or does the influence of budget and remoteness restrict the opportunities for the student? The effect of years of funding was expected to relate to the effect of the tech-prep initiative to be more pronounced. That is, it was anticipated that the

older consortia would affect the student more than those that have had fewer years of funding.

This researcher had an interest in the tech-prep initiative for many reasons, having worked in many occupations that required less than baccalaureate education, but considerable training beyond high school, the manner of maintaining this workforce was of interest. On another front, the researcher, having been a project manger on a tech-prep grant for the past three years had an increased the interest in the impact of the initiative. Finally having worked with post-secondary students for the past eight years as an instructor in occupational training, this researcher was interested in the secondary education the students receives.

CHAPTER 2: REVIEW OF LITERATURE

The focus of this study was to establish the need for the evaluation of and the results of evaluations of the tech-prep initiatives. The literature was screened for the following reasons: (a) to establish the need for the reform, literature was reviewed prior to the time of the original approval of the act, 1990 and again for the reauthorization; (b) to identify evaluation projects, the results of those studies, and areas of further study suggested, and (c) to review the limited literature available on effects of school district size on vocational education and the time that is required to identify change has occurred in educational reform.

In conducting this literature review, the following sources were utilized: the ERIC database, the National Center for Research in Vocational Education (NCRVE), Dissertation Abstracts, the bibliography or reference lists of all relevant literature found, and the National Research Center, National dissemination Center, and data from selected school districts. Ample research was found on tech-prep, indicating the interest in improving the outcomes and efficiency of the use of federal dollars to improve education; however, the literature on how the size of the school district

affects vocational education and the time required to recognize the effect of change was limited.

Reform and Vocational Education

The Need for Reform, 1990

In 1985, Parnell called for the nation to transform the educational system in *The Neglected Majority,* in which he proposed a tech-prep associate degree (TPAD) to serve the high school student who wandered aimlessly to nowhere, because low skills equal low wages (Commission on the Skills of the American Workforce, 1990). The Commission on the Skills of the American Workforce in a report in 1990 stated, "America may have the worst School-to-Work transition of any advanced industrial country" (p. 4). This poor transition coupled with the expansion of training requirements for technology in the workplace, as evidenced in an article in *U. S. News and World Report*, "The Forgotten Half" (Whitman, Shapiro, Taylor, Saltzman & Auster,1989), have indicated a need for change. The requirements of an automobile mechanic in 1965 were to read and understand a 5000-word repair manual; today, however, the same job requires interpretation of 465,000 pages of technical text and the use of computers to order parts and monitor engine functions.

Changes in the economy have occurred over the past two decades forcing a change in workforce development. These changes include the globalization of the marketplace, the development of new forms of

organizational structures to remain competitive, and the swelling of technology in the workplace. The United States was able to dictate to the marketplace for the 20 years following World War II, as many countries had been weakened by the war and many other countries were undeveloped. By 1970, America's share of the market had begun to shrink, and its economic position has continued to decline through the 1980's. The competitiveness of our nation remains a concern today (Boesel & McFarland, 1994). Some of the competing nations bring a highly skilled manufacturing economy with well educated workforces, while others bring a semi-skilled and disciplined workforce to the manufacturing workplace, willing to work for lower wages. This competitiveness has facilitated the moving of many of America's jobs to other countries.

Another change in the economy that had forced change in the American workplace is the re-organization of the corporate structure, the leveling out of the hierarchy. Deming and Crosby brought forth a movement in total quality management that makes greater use of the skill and abilities of the front-line workers, reducing the need of the mid-level of management, and relocating that level of decisions to those on the front line of the manufacturing process. These new requirements of the worker involve more skills and competencies than that position had previously demanded. Active thinking, communication, and collaboration are expected; therefore, the workforce must be more educated, more flexible and more socially adept (Boesel & McFarland, 1994). This organizational structure is growing, and as

it grows, it will continually require more workers willing to accept the responsibility of decision making to allow American companies to utilize this more efficient design and remain competitive.

The need to remain competitive and to provide a means of training workers to compete in today's economy is best demonstrated in the pocketbook of the workers. In the 1980s, the earnings of a college graduate increased by 10 percent, those of high school graduates fell by 9 percent and those of high school dropouts fell by 12 percent (Boesel & McFarland, 1994). This fact supports the findings of a jointly sponsored conference by the Secretaries of Labor and Education in 1990 focused on linking school education to work. The participants of the conference were education, business, labor, and federal and state policy makers. The observations of the participants included the following: (a) the economy of the United States at one time had room for unskilled workers however, the demand for workers who can think on their feet, are willing to learn on the job, and willing to work is increasing daily; (b) in practically all industrialized countries, the success one has in school will be a predictor of the type of job the student receives, but in the U.S. high schools grades are not considered by firms when hiring; (c) as a society we pay a terrible price for not providing students with an incentive to do well in school; and (d) work has moved to a new level, yet the schools have fallen behind and now need to develop a new training model (U.S. Department of Education & U.S. Department of Labor, a paper presented: "The Quality Connection: Linking Education to Work", 1990).

As the need for a new training model had many sponsors, the "author" of the Tech-Prep Education Act, former U.S. Representative William Ford of Michigan said in a 1990 address to the House:

> The work force of the future will need increasing levels of technical skills. High School vocational education, even well done, does not provide a sufficient level of skills for most of the jobs of the future. Training in the skills to get a good first job is not enough, the workforce must be able to grow and change with the evolution of technology and the world economy. Although most young people will need to continue their education beyond high school, the secondary and post-secondary educational systems frequently do not mesh smoothly.
>
> A great many high school students, particularly those in general education curriculum have no clear path either into further education or into the workforce. What is needed is a broader approach; one that is consistent with the reality that workplace needs continue to change and that learning throughout one's life is essential. (p. 5-6)

This thought is reinforced with data collected about the demographics of the typical high school class. About one third of the class is following a college prep curriculum and will plan to complete a four year degree, about one fourth of the students will seek employment out of high school, and the remaining 40 percent learn a general curriculum with little focus and preparation for either higher education or enter into the workforce (Hull & Parnell, 1991). The Mid-Continent Research reconfirmed these data for Education and Learning study in 1997(Jennings, 1997) that showed that only 27 percent of the 25-29 year olds complete a four-year degree, with 60 percent of the same group having attended some college. The need for educational reform is not required for the third planning to complete a four-year college degree, but it is for the 75 percent who are planning to enter the workforce or have not developed a career plan.

The Need for Reform, 2000

In looking at the discussions of economists, policy makers, employers, and labor representatives, the perspectives are different; however they all focus on the need in this country to improve the educational opportunities for our youth. One suggestion is to promote apprenticeships to reduce floundering in the labor market. High school graduates between 18 and 27 who had not enrolled in post secondary education held approximately six jobs and were unemployed for four to five periods (Veum & Weiss, 1993). This is reinforced by data from the U.S. Department of Labor (2000) reporting that in the 16 to 24 year old cohort the national average for unemployment was 7.5 percent, comprised of those with less than a high school diploma representing 14.6 percent, high school graduates with no college 8.6 percent, some college but no degree 5.4 percent, Associates degree 4.6 percent and Bachelor's degree or higher 4.8 percent. Median income displays a similar pattern in 1998 those workers with no diploma earned on average $23,958., those who had graduated high school averaged $31,447., some college but no degree averaged $36,934., and those with an Associate's degree were averaging $40,274 (U.S. Department of Commerce, 1999).

Most economists and labor analysts have identified a new economy as emerging in the United States, this change is often labeled globalization, and while the specifics are varied the majority report the new economy will have many of the following characteristics:

1. Manufacturers spurred by advanced technologies have been moving from high-volume mass production toward customization.

2. The globalization of the market place has increased the competition for skilled workers, as well as goods and services.

3. Information handling continues to increase in importance: this low overhead requires customization of data rather than mass production of information and services.

4. Business management is experiencing extensive restructuring, continued downsizing, premium on people that manage knowledge as opposed to people, increased outsourcing for most work, resulting in managers becoming brokers, and a flatter structure. Job functions converge reducing the division of labor into discrete tasks, requiring workers to interact in teams, alternating expertise, and leadership roles, reward will be on performance of teams and networks.

5. Competition in the profit and not for profit institutions will require innovation, and the ability to do it faster, better, and cheaper, those that prosper will be the ones that constantly restructure to achieve efficiency. (Rojewski, 2002)

Reich (2000), former U.S. Secretary of Labor, predicted that in the near future new enterprises comprised of entrepreneurial groups linked to old-line brand names are to be the big winners. To remain competitive, these enterprises have to continually cut costs, increase leases, seek out lower priced suppliers, push down wages, and flatten the hierarchies, forming organizations fostering decentralized decision-making, and reorganizing work

structures around autonomous task-oriented teams. Reich expected to see an end to steady work, requiring workers, regardless of time on the job and tenure, to provide continuous effort to improve efficiency with a widening gap in wages between top and lower level workers. Workers will have to possess a broad set of abilities, including both technical and interpersonal/communication skills, higher order thinking skills, problem solving skills, as well as flexibility, the ability to manage information and resources, creative thinking skills, creativity, and conflict resolution skills (Carnevale, 1991).

History of Vocational Education

President Woodrow Wilson signed the Smith-Hughes Vocational Education Act into law on February 23, 1917. This law was the result of Congress authorizing the President to appoint a commission to study national aid to vocational education in 1914. The Smith-Hughes Vocational Act was an answer to the national feeling that a broader curriculum in high school was needed to improve the graduation rate of 8 percent and prepare the youth of America to compete in world agricultural and industrial markets (American Vocational Association, 1998).

The Smith-Hughes Act appropriated $1.7 million dollars increasing to $7.2 million in 1925-1926, also creating a Federal Board of Vocational Education, to administer the new laws. States were required to create similar Boards of Vocational Education to develop a plan for the operation of

vocational education, with each federal dollar requiring a state match. Vocational enrollment increased steadily during this period to 900,000 in 1926 (American Vocational Association, 1998). In 1926, the American Vocational Association emerged from the National Society for Vocational Education and the Vocational Education Association of the Mid-West to becoming a united voice in Washington. This voice was important, as the mood in the 1930's was to curtail federal expenses. Fortunately, the permanent funding of vocational education prevailed, however, the Federal Board for Vocational Education lost favor and Franklin D. Roosevelt transferred the oversight function to the U.S. Office of Education in 1933.

In 1936 the George-Deen Act replaced the Smith-Hughes Act, removing the federal funding in perpetuity, and replacing it with authorization for Congress to appropriate an amount not to exceed the total authorized. In 1936, $14.55 million was authorized for vocational education. This act covered vocational education during the World War II years, and when in conjunction with the National Defense Training Program, nearly 7,500,000 persons were trained for defense and war production employment.

The 1950's and 1960's saw vocational education drawing considerable criticism; however the demand was present and this period saw the advent of area vocational schools and special training for the displaced and disabled. In 1963, vocational educational bills recommended by a presidential study were passed over the objections of vocational educators. HR-4955 was introduced by Carl Perkins of Kentucky to respond to these

criticisms and was later signed into law by Lyndon B. Johnson as the Vocational Education Act of 1963. Carl Perkins, an influential advocate of vocational education in Congress, later became the chairman of the House Education and Labor Committee. In 1968 funding of $800 million was authorized for spending in 1970, but only $365 million was appropriated.

The late 1970s saw federal legislation looking to address social issues (i.e. disabled and disadvantaged students). This trend continued into the 1980s with the Carl D. Perkins Vocational Education Act of 1984, authorizing funding for five years, focused on improving vocational education and serving students with special needs. The law was re-authorized in 1990 as the Carl D. Perkins Vocational and Applied Technology Act. This act authorized the spending of $1.6 billion dollars per year for five years.

The 1990 Act placed a great deal of emphasis on the integration of academic and vocational instruction. The focus was on preparing students to compete in the complex and technologically advancing jobs of the future. This act continued to stress the importance of serving special, disadvantaged and disabled student populations. The Carl D. Perkins Act of 1990 also included funding for the tech-prep initiative championed by William Ford, the Chairman of the Education and Labor Committee. The tech-prep initiative and the integration of academic and vocational training was to position the Perkins Act as the tool for educational reform, providing the link between academic and vocational educational and linking to postsecondary education.

A similar act was passed in 1994, the School-to-Work opportunities Act. This act promoted the integration of academic and vocational education and internship or apprenticeship learning. The act was written to affect all students in the K-12 system. In 1995 a much-changed congress addressed the reauthorization of the Perkins Act.

The Republican Party had gained control of both the house and the senate in 1994, providing for a different agenda for educational reform, the Perkins Act served as a test case for reform as it had been long envisioned by the republican party. The two major objectives of the legislation were (a) to combine the myriad of programs that had been created over the years into one streamlined, cohesive act, and (b) to reduce the number of federally mandated state and locally funded programs by "block granting" funds for the states to administer as they see fit. One such proposed reduction in red tape involved the combining of the Perkins Act with the Job Training Partnership Act, removing it from the oversight of educational authorities and allowing governors to spend federal vocational educational dollars on retraining of disadvantaged adults. The pressure from the conservative groups also worked against the School-to-Work Opportunities Act because it was felt to reduce parental control of education through the stated goal of creating school-to-work systems for all students. Many felt this approach would limit rather than enhance students' educational and career choices. The far reaching goals of the Republican educational reform agenda and the narrow margin the party held in the Congress resulted in the Perkins Act not being

re-authorized and allowed to expire in October 1995, however funding was continued pending the reauthorization.

In 1997 Congress re-addressed the vocational act, and the House and the Senate approved two very different bills. The lengthy process of negotiation and compromise continued until October 31, 1998 when the current version of the Act was signed into law. This act continues to fund the tech-prep Initiative and mandate the integration of vocational and academic instruction.

Tech-prep

The 1998 Carl Perkins Technology Act defines the requirements of each tech-prep program to include activities paraphrased as follows:

1. Activities shall be carried out under an articulation agreement between the parties.
2. Consist of at least two years of secondary education preceding graduation and two years or more of higher education or an apprenticeship program of at least two years following secondary instruction, with a common core of proficiency mathematics, science, reading, writing, communication, and technologies designed to lead to an associates degree or a post secondary certificate in a specific career field.
3. Include the development of tech-prep programs for both secondary and post-secondary participants.
4. Meet state developed academic standards.

5. Link secondary schools with two year postsecondary institutions and when practical four year institutions of high learning through non-duplicative sequence of courses in career fields, including the investigation of opportunities for tech-prep secondary students to enroll concurrently in secondary and post secondary coursework.

6. If available work based or worksite learning in conjunction with business and all aspects of industry.

7. Use educational technology and distance learning to involve all partners in the development and improvement of programs.

8. Provide in-service training that Is designed to train vocational and technical teachers to implement tech-prep program.

9. Provide joint training for teachers in the consortium.

10. Provide in service training that is designed to insure teachers and administers stay current with the demands and expectations and methods of business and all aspects of the industry.

11. Focus on training post-secondary faculty in the use of contextual learning and applied curricula and instruction.

12. Provides training for the use and application of technology.

13. Provides training to counselors to enable the counselor to more effectively: (a) Provide information to students regarding tech-prep educational programs, (b) support students in completing tech-prep programs, (c) provide students with related employment opportunities, and (d) ensure students are placed in appropriate employment.

14. Stay current with the needs, expectations and methods of business and all aspects of the industry.

15. Provide equal access to the full range of technical preparation programs for special populations to include developing program services appropriate to the needs of special populations.

16. Provide the preparatory services that will assist participants in the tech-prep programs. (Congressional Record, 1998)

The first federal funding was secured for the tech-prep Initiative through the Carl D. Perkins Vocational and Applied Technology Act of 1990. The commitment to support this reform was established by federal legislation on September 25, 1990, when the Tech-Prep Education Act authorized $63.4 million dollars to states and territories for the establishment of educational programs that resembled Parnell's vision of a 2+2 design (United Sates Department of Education Office of Vocational and Adult Education, 1991).

The Perkins Vocational and Technical Education Act of 1998 (P. L. 105-332) re-authorized funding for the next five years at a level of "such sums as necessary" (Brustein & Mahler, 1998). This reauthorization brings with it some changes in the form the 1990 Act, primarily the move to a more outcomes based evaluation of performance; however, many of the changes are favorable to the tech-prep initiative. Examples include the required state leadership activities by allowing funds to be used to support partnerships with institutions of higher learning, thus supporting programs that integrate academic and vocational education. The current requirement is for the

"establishment of agreements between secondary and post secondary institutions to provide post secondary education and training to participating students, such as tech-prep programs"(Section 124(c)). The requirement under program quality in the state plan section is for the plan to identify how funds will affect the link between secondary and post-secondary institutions. In the link to labor markets, the state plan must now identify how the programs are supported and how they will prepare students for post secondary opportunities or entry into high skill/wage jobs in current or emerging markets.

The accountability requirements of the Perkins Act further supports the tech-prep initiative, in moving from measuring competency gains in the achievement of the basic and academic skills to now requiring the attainment of academic and vocational/technical proficiencies. Also required is attainment of one of the following: a secondary degree or GED, a proficiency credential in conjunction with secondary diploma and/or a post-secondary degree or credential. The tech-prep portion of the act now allows the inclusion of post secondary institutions that award four-year degrees and labor unions in the consortia. This is further supported in the additional authorized activities, allowing the establishment of articulation agreements with institutions of higher education, labor organizations, or businesses in and out of state. The language expands the program elements to include the building of competencies in reading, economics, and workplace skills through the use of applied contextual academics and integrated instruction.

Evaluation of Tech-Prep

Many authors have established the need for evaluation (e.g., see Bragg & Layton 1995; Connell & Mason, 1995; Dornsife, 1992; Hammons, 1992; and Roegge, Leach & Brown 1993), and this literature review will look at several evaluation projects undertaken in order to define what should be evaluated and who has done the evaluation.

A study completed by Roegge, Leach, and Brown (1993) demonstrated that concept mapping is a valid technique to determine what to evaluate for tech-prep programs in Illinois. The team developed 97 statements related to tech-prep through document analysis and individual and group interviews. These statements were submitted to 450 teachers, administrators, counselors, employers, and Illinois State Board of Education representatives with an interest in tech-prep; 156 of those responded by first grouping the statements into mutually exclusive groups and then ranking them on the level of importance of each group. These statements were reduced to nine categories and bridging values were calculated to establish relative consistency in the manner the statements were sorted. The ranked outcomes of this study were:

1. Outcomes assessment, entailing improvement in mathematics, science, communication skills, computer application usage, and work readiness skills.

2. Planning and support, establishing as a priority that school board and administrative personnel support tech-prep programs and concepts with adequate building and facilities.

3. External involvement and support establishing as a priority the involvement of business in curriculum development and providing feedback on student performance, and the establishment of programs based on industry standards.

4. Articulation/Integration requiring integrated vocational academic courses applied curriculums in mathematics, science and communications with secondary and post-secondary teacher collaboration.

5. Benefits, recognizing the increase in student motivation, improved self-esteem enjoyed by the now successful student, and increased probability that the student would enroll in post-secondary education without remediation needs.

6. Enrollment incentive measures to include: wage and advancement incentives for tech-prep completers, outreach and recruitment activities and appropriate support services for at-risk students.

7. Staff development and collaboration, to recognize the need for counselor, teacher and administrator collaboration, by joint in-service training for academic and vocational teachers and specific training in the tech-prep initiative.

8. Program components including: work based learning agreements, common core subject requirements and community college visits for continuing students.

9. Populations served, this item identified the target population as students that learn through application, students seeking a challenging and rewarding technical career and any student that expressed an interest.

Bragg (1997) undertook a similar project to establish three stakeholders' perceptions of the priorities of tech-prep students' outcomes. Bragg developed a concept map for educators, employers and students' perceptions finding that, in rank order, the perceptions of expected outcomes included personal attributes, attributes and employability skills:

1. School to work transition.
2. Technology and quality management.
3. Information use and decision-making.
4. Work and interpersonal relationships.
5. Educational attainment.
6. Communications.
7. Mathematics and science.
8. Democratic and participatory strategies.

This research evaluated the perceptions of the various stakeholders to see if a common expected outcome existed, and found that the commonality of the responses was closer between student and educators and that for

employers the occupational outcomes were ranked higher than the academic responses (Bragg, 1997).

Hammons (1992) reported in a dissertation, a basis for tech-prep evaluation. The design surveyed program coordinators asking what performance indicators they felt were important. Hammons's survey consisting of, among other things, 60 program performance indicators were mailed to tech-prep coordinators in the Southeastern United States and Puerto Rico. Responses were then tallied to determine whether the respondent had checked yes or no to each "performance indicator." The top responses gaining 90 percent or more yes votes are:

1. Program completion rate.
2. Tech-prep student academic achievement at grade level.
3. Retention the tech-prep programs.
4. Student academic progress on grade level.
5. Student attainment of technical skills.
6. Business/Industry reaction to program.
7. Actual number of tech-prep students transferring to post-secondary education.
8. Evaluation of program by tech-prep students and alumni.
9. Student program progression rate.
10. Number of students planning to continue education beyond high school.
11. Employer satisfaction of tech-prep graduates job skills.

12. Student demonstration of job competencies.
13. Professional in service development of staff.
14. Career counseling services.
15. Student attainment of inter-personal skills.
16. Student placement services.

This study provided some consistency to later studies concerning what the coordinators of tech-prep programs feel is valuable in evaluation (Hammons, 1992).

Gloeckner and Lyons (2000) developed and subsequently administered a questionnaire to tech-prep students and non-tech-prep students in Colorado to evaluate perceived differences in several areas. The first part of the questionnaire collected data about the participant, age, gender, ethnicity, and self-reported grades for the year(2000-2001) and the past year. Parental educational level, general enjoyment of school, extra-curricular school activities, and if the participant has a job and if so is the job related to the area of training the student was pursuing in high school was also reported. The second part of the questionnaire required the student to evaluate the classes they were taking with respect to the interest and usefulness of mathematics, science, and English/communication classes. The student was asked to provide insight about the teachers as to whether the teacher was helpful, interesting, and was using a variety of teaching methods to reach the student. The student was further requested to report the frequency of the use of learning aids, such as calculators, newspapers,

the internet, journals, maps and blueprints, measurement devices, and computer software programs. Some open-ended questions about the usefulness of classes and the likes and dislikes of the school and whether the students are currently taking a community college class are asked. The questionnaire in part three collects data about the students' future. Participants are asked to disclose the amount and type of career counseling they received and what they feel they will pursue after graduating from the secondary institution.

The study, as reported, in 2000 is the second year of a proposed three-year longitudinal study. The 2000 data represented 592 students; 311 were tech-prep and 281 were classified as non-tech-prep. Three schools, Jefferson County, Centauri High School, and Denver Public Schools accounted for 418 respondents. The demographics of the respondents were, fairly evenly split male to female, the tech-prep population was 55.6 percent male, most of the students were Caucasian/white 68 percent (Gloeckner & Lyons, 2000). The first data revealed that there was a significant difference in the students' grades, parents' education, whether the student had a job, and the relevance of the students' interest in the job. Tech-prep students were found to have lower grades; however, they had improved their grades more in the past year. The tech-prep students had a higher percentage holding a job that was related to the student's interest. With respect to parents' education, significant differences were noted, with non-tech-prep students' parents having more education than the tech-prep students' parents. This

significance held for both the fathers' and mothers' education, with the mothers' educational level being slightly lower. The data also revealed that in the school year, 2000-2001, that more tech-prep students were taking a community college course or courses than non-tech-prep students; however, it is noted that only 18 percent of all students responding are taking a community college class. It was further stated that the 1999 data indicated no significant difference between groups on the above referenced variables.

The next area of the survey reported the career and college counseling information from part three of the questionnaire. The significant results were that tech-prep students received more information from a teacher or counselor about attending a community college, the student had been more likely to have visited one community college and had established plans to attend the community college after high school graduation. The tech-prep students also had received information about internships and had participated in an internship more often than the non-tech-prep students. Again the total number of students who had received any information on internships was lower than hoped, only 47 percent, with only 19 percent actually participating. Non-tech-prep students were planning to attend a four-year institution and work part time more often than tech-prep students. These data were consistent for both the 1999 and the 2000 study.

The "about your classes" portion of the study revealed significant differences, in that more tech-prep students reported mathematics to be helpful at work, while the non tech-prep students felt that science was more

helpful in school and English/communication arts classes were interesting. While significant differences were reported in 2000, the means were clustered around the sometimes choice on the questionnaire and, it is noted that the 1999 data did not reveal a significant difference in this area. The use of learning aids demonstrated significance in three areas, calculators, technical journals, and the use of computer software. The non-tech-prep students utilized calculators more with the tech-prep students using technical journals and computer software more consistently. It is again noted that while significance was indicated the responses were clustered toward the center of the scale on the questionnaire, and the 1999 data did not support any significant differences in the learning aids utilization (Gloeckner & Lyons, 2000).

The authors of the Colorado study state "the tech-prep programs appear to be making a difference for students who need an alternative solution to education" (p. 14). The results of the study reveal that the tech-prep students are doing as well in school as the non-tech-prep students, recognizing that many of the sample of non-tech-prep students are college bound. The application of learning aids and the students recognizing the usefulness of their education would support the position that tech-prep is making a difference in the educational experience for the students.

Hershey submitted to the U. S Department of Education a report prepared from a five-year study of the tech-prep initiative in 1998. The purposes of this study were: (a) to evaluate how effectively tech-prep had

been implemented, to document the number of consortia, who was involved, and who was being served, and (b) to document effective methods of implementation and chronicle the challenges that effective implementation experienced. A survey of state level tech-prep coordinators was conducted in the fall of 1993 and the spring of 1997; a survey of local tech-prep consortia was conducted in the falls of 1993, 1994 and 1995; and in-depth studies were conducted on 10 local consortia. Every local consortium coordinator was contacted for the 1993, 1994, and 1995 study. Surveys were sent to 812 consortium coordinators in 1993, 953 in 1995 , and 1,029 in 1995 and they offered high response rates of 86, 81, and 87 percent respectively. This study provided information as to the role the state government plays in the development and direction of the tech-prep funding. The federal funding is to be distributed by the states through grants to local consortia that operate programs that adhere to the main elements of the initiative. This lack of direction from the federal government has resulted in the states interpreting the elements as guidance on what programs should include or make available for students; this has resulted in two patterns of implementation. One, the states have given the consortia ample latitude in defining what tech-prep is and two tech-prep has remained an educational program, with a variety of policies and governance linkages to other educational reform efforts (Hershey, Silverberg, Owens & Hulsey, 1998). This lack of guidance has resulted in many faces of tech-prep, as evidenced by the lack of definition, by 1993, 27 states had issued a definition of tech-prep and 18

states required local consortia to use the definition in reporting. By 1995, this number had increased to 40 states offering a definition and 35 states requiring the definition to be utilized in reporting activities. However, only 21 percent of the state consortium coordinators surveyed report that their state office provided a definition of what the core of a tech-prep program should be. Most states offer little operational guidance. In only five states did more than 75 percent of the consortium coordinators acknowledge that their state agency had mandated a definition of the core tech-prep program, although a few states such as West Virginia and Ohio have limited funding to only programs that match a state model. In the majority of states, the focus of the state agency is to facilitate an understanding of tech-prep. This has taken three main avenues: (a) almost every state hosts a statewide conference or workshop to allow teachers, counselors, and administrators to exchange information and curricula; (b) 28 states in 1995 reported to have developed or be developing tech-prep materials and tools for local use, this was to include applied curricula and 14 reported to be developing technical curricula; and (c) states are working toward statewide articulation of tech-prep curriculum; this has included statewide agreement on coursework at the community college level and offering model articulation agreements for local use (Hershey et al., 1998).

The common result of the tech-prep funding has been the states offering funding and support for local consortia. This has resulted in tech-prep consortia now encompassing most of the American educational system;

by the fall of 1995 1,029 local consortia were being funded, representing almost 70 percent of the school districts. Eighty-eight percent of all high school students attend school served by tech-prep funding, however the level of involvement for the individual schools varies as does the involvement of the school district. The early implementation of the initiative in some instances was devoted to vocational schools or vocational departments with gradual later involvement by the other academic divisions gaining interest in the type of curriculum that the promoters of tech-prep were encouraging. This lack of consistent involvement was furthered by the size and complexity of many of the consortia with some representing 21 or more secondary schools and 10 or more post secondary institutions. In sharp contrast, two of the consortia surveyed indicated being a single secondary school with no post secondary partner (Hershey et al., 1998). Community colleges amount to 66 percent of the post-secondary partners, as it appears that most community colleges in the country are involved in some fashion in tech-prep. Tech-prep was initially envisioned as a targeted program as opposed to sweeping educational reform, with the modest resources support this concept. In 1994-1995 tech-prep funding to consortia was $99 million dollars representing only .04 percent of total funding for K-12 education, and only 10 percent of the total Perkins funding for vocational education. Grants to local consortia represent limited resources. If every district was distributed to equally, each district would receive an average of about $12,000.00, around 25 percent of the grants 1995 were for less than $40,000.00 limiting the

impact the initiative can have for widespread educational reform. (Hershey et al., 1998)

The funding received by the consortia are in addition to coordination and administration of tech-prep activities are utilized for four common activities: (a) promote professional development for teachers, counselors, and administrators; (b) coordinating statewide or at least district wide articulation with post-secondary institution and development of curriculum, (c) providing material and equipment to member schools, and (d) promoting awareness and acceptance of tech-prep.

The marketing of tech-prep amounted to 5 percent of the total spending to promote the program and attempt to overcome negative attitudes towards vocational education. Seventy percent of the local coordinators in 1995 still identified negative attitudes as an obstacle slowing program growth or implementation, 90 percent of the consortia were still actively promoting the initiative (Hershey et al., 1998).

The initial vision of the tech-prep Initiative was to provide for students an educational experience that included a coherent program focusing on a particular career, students were expected to establish a career path in the secondary school and then complete at a community college or vocational center or youth apprenticeship program. Each program was to include the technical training, related mathematics, science, and communication classes offered using an applied instructional approach. The program was also to offer the students career guidance, a preparatory services to help the student

select a career pathway. The research of Hershey and others revealed that many programs were emphasizing some component of the program as it was envisioned, but not all of the components.

The research revealed that the common outcomes of the efforts of tech-prep has been: (a) to increase the students awareness of career guidance, to include increases in interest in technology and educational planning; (b) curriculum has improved to include more applied techniques much work is still in progress on this component of the tech-prep program, (c) The work done toward articulation has increased the communication between secondary and post-secondary faculty, and (d) although, not an original component of the tech-prep program workplace learning has become more available to students.

The efforts of tech-prep have caused the school districts to re-evaluate guidance counseling and include a greater focus on career guidance and development. The National Occupational Information Coordinating Committee in 1989 set forth national guidelines for comprehensive career guidance, these included: (a) help students become aware of their own interests, (b) advise students in avenues of education and careers they might pursue to utilize these interests and skills, and (c) help students make informed decisions about their future. These guidelines were furthered with support from resources provided by the tech-prep initiative.

Tech-prep has used various methods to improve career guidance, to include the purchase of career exploration software with consortium funds,

career and technical staff have developed and provide career development classes or curriculum which offer students information as to educational requirements, earning potential and working conditions of various technical occupations. The alliance often formed with industry as part of the tech-prep partnership has afforded many students and employers to meet through career fairs and employer presentations to students. This partnership has also offered the opportunity to students for job shadowing and worksite visits. The development of career centers at many high schools, or at least increasing the role of guidance counselors to include career counseling, offering the students access to career exploration software and other information to increase the awareness of technical opportunities (Hershey et al., 1998). The career development activities are offered by nearly all consortia in the country, however substantial variations exist in the types of career development offered by the individual schools. In 1993, special counseling materials were available to all high schools in 28 percent of the responding consortia; this number had increased to 36 percent by 1995. This effort toward career counseling has resulted in as many as 83 percent of the students surveyed having completed career interest inventories and 68 percent have attended talks by employers on career options.

The improvement of curriculum to include a more applied teaching method is the next objective of tech-prep that has been recognized as an effect of the initiative. Local tech-prep consortium coordinators consistently responded to the national evaluation surveys, indicating that improving the

integration of academic and vocational coursework and the development of instruction plans and curricula that promote hands-on learning are the most important topics for staff development in tech-prep. In responses to all three surveys, 70 percent indicated staff development in the area of integrated and more hands-on learning were to be the focus as compared to other aspects of tech-prep. Marketing, work based learning career development, articulation and secondary post-secondary cooperation receiving 35 percent to 65 percent of the highly emphasized responses (Silverberg, 1996, and Silverberg, Hulsey & Hershey, 1997).

This focus in applied academic curriculum has been developed or adopted in at least some schools in almost all consortia. The move has been to developing in-house curriculum rather than acceptance of the products that are offered off-the-shelf. These changes in curriculum at the post secondary level are much less common than at the high school level. The integration of academic classes has resulted in four changes that are described as more applied: (a) the class instruction involves more hands-on activities, more experiments are conducted in science, the students perform measurements in mathematics, and gather outside information for English essays and other written work; (b) curriculum is directed to relevant occupations, the exercises, experiments, research projects, and classroom discussions are career oriented and expose the students to potential careers they might pursue; (c) assignments promote required workplace skills, that is, the students are required to perform in teamwork settings, provide self-

evaluation, analyze problems and propose solutions, and resolve interpersonal conflicts without disrupting the assignment; and (d) academic assignments are designed to require the use of relevant theory of skills developed in the vocational classes the students are working on (Hershey et al., 1998). Tech-prep consortia reported almost universally that some schools in the consortia have used or are using at least some of the applied approaches in some of the classes. Overall 96 percent of the consortia reported in 1995 they had adopted applied curricula to some extent over the previous four years, however the site visits suggest that in most schools, it is only some instructors that are excited about the changes in curriculum and therefore often the revised curriculum is only offered in a few sections of the classes. The total proportion of consortium schools with any applied mathematics curriculum is estimated to be no more than 89 percent, and probably lower. The use of applied curriculum packages in other subjects is even more limited (Hershey et al., 1998).

While several anecdotal examples of the success of applied curriculum are offered, it is reported that the greatest reward of the development of applied curriculum is the communication that resulted amongst faculty members. The development of curriculum committees with representatives from mathematics, science, and English and communication teachers from member high schools and often faculty from other academic disciplines and vocational teachers provided a forum for discussion that was

beneficial to all of the parties involved and sometimes resulted in a handbook for applied curriculum or a compendium of applied lesson.

Central to the original design of tech-prep was the concept of a seamless program that moved the student from secondary to post secondary educational facility with non-duplicative and progressive sequence of courses. Articulation agreements established between secondary and post-secondary schools have been established as the vehicle for this seamless transition. The research conducted by Hershey in the 1998 study presents three major conclusions with respect to articulation: (a) articulation can improve communication amongst faculty and upgrade vocational education, (b) articulation agreements are extremely common, however they are for the most part course specific rather than linking broad programs at the high school to college level course work, and (c) taking an articulated vocational course is often a tech-prep requirement for high school participation, however few students actually receive college credit for these classes.

The communication that the articulation process has fostered is valued as one of the most successful aspects of tech-prep by the local coordinators in the 1995 survey (Hershey et al., 1998). This articulation process is credited with upgrading and increasing the consistency in vocational education. Ohio has established committees of high school teachers, college faculty and representatives from industry to develop curriculum that offers students skills that will help students at both educational levels. This has often resulted in entirely new technical classes

for tech-prep career clusters at both educational levels. This articulation has also in some instances resulted in the high school adopting the course outline and textbook for the equivalent college class. Conversely, in some instances, the articulation and fostered communication has resulted in the college recognizing that the post secondary offering need to be more advanced as the high school classes are offering a thorough foundation in many areas. It was recognized in the study that the process must be ongoing rather than the manner it is often undertaken, that is, as a one time intensive effort to have long term benefits.

The articulation process most often involves high schools (or districts) and post-secondary institutions arranging to meet and establishing general terms and objectives for the agreement. Faculty from comparable departments meet to discuss the curricula from their institution and identify the similarities and differences to be resolved. This done, courses are identified and altered to provide similar learning experiences and a means of offering credit at the post secondary institution is established. This process has been conducted in nearly every tech-prep consortium (Hershey et al., 1998). By 1995, 96 percent of the consortia reported that at least some specific articulations had been established between high school and college members.

The articulation process resulted in the development of agreements that allow students to receive college credit in specific courses once the faculties from both institutions have agreed that the content, or skills to be

developed were similar at both institutions. The credit was generally granted upon the student completing the course, or demonstrating skill levels or testing at the college level. The disadvantage of the course specific articulation, is that the importance of taking a coherent sequence of both vocational and academic courses is lost. Often students do well and receive the articulated vocational credit while later failing to succeed in the academic classes (mathematics and English in particular) therefore not succeeding in the college level career program (Hershey et al., 1998).

Another form of articulation that has emerged from the element mandating a seamless transition from secondary to post-secondary institution is the development of more advanced classes at the community college. The high school teacher and the college instructor communicate and develop a sequence of classes that allow the student to receive more advanced training at the community college as a result of taking classes at the high school level that establish a solid foundation for further learning. This approach has many advantages, as the traditional form of articulation has resulted in many high school students earning college credit, with many not receiving the credits earned. No systematic data were discovered for a nationally representative sample. The in-depth surveys conducted for the Hershey study (1998) revealed and it established a pattern believed to be common elsewhere, with only 15 percent of the students identified in the 11th grade cohort in 1993 reported 18 months later that they had earned college credit in high school and entered a post-secondary program where credit

were awarded. This was explained to result from four factors: (a) lack of systematic promotion, the students are unaware of the credit available; (b) procedural hurdles, even after the credits are earned the students must apply for them; (c) definition of tech-prep, often the students do not recognize themselves as tech-prep and no coordinator interacts consistently with the students, therefore the students do not know of the articulation agreement and the attached college credit; and (d) student's own performance and preferences, the study revealed that students participation tech-prep rarely indicated a firm intention to attend the community college where credits they might earn in high school would be awarded. Other students intentionally did not request the credits earned, opting to retake the class because of self-doubt of the acquired skills, or to ease the course load of the first year of college.

While early promoters tech-prep envisioned a program that involved: (a) an informed selection of a career focus with an emphasis on a technical career, and (b) completion of a sequential program of academic and technical courses beginning with the second year of high school and extending through two years of post secondary education or training. The lack of consistent definition from the states administering the federal funds resulted in an inconsistency in the implementation of the tech-prep initiative. Having looked at the application of the initiative, three prevalent forms of the implementation of tech-prep are apparent. The three forms identified are: (a) a structured comprehensive program of study focusing on particular

careers, (b) a program that enhances and supplements traditional vocational programs, and (c) programs that introduce one or more elements of the initiative without targeting particular students (Hershey et al., 1998).

The structured program is representative of 10 percent of the consortia; this program combines all of the elements of tech-prep for participating students. This often takes the from of a youth apprenticeship, a career academy, or a new program created to provide the vocational and academic classes. This form of tech-prep requires the students to apply and be selected for a specific career focus. The classes are well defined to include both technical and academic courses offered in a logical sequence, to include mathematics, science, and English/communication training. The coursework supports a technical or occupational program offered at the post-secondary level at which students are expected to continue. This model of implementation most often involves grouping students of similar career focus together in the technical courses and at least some of the academic classes. This clustering allows opportunities for integration of technical and academic curricula. Structured programs may offer the proponents the best opportunity to provide all of the elements of tech-prep to the students, but they have numerous challenges to overcome in establishing. The entrance requirement often is limiting, however it cannot be compromised without creating difficulties in the clustering of classes. This entrance that attracts the most qualified student often works against the 2+2 design, as the more qualified students often opt to enroll in four-years schools instead of the articulated

two-year college. Scheduling also is difficult as the grouping of students only works if all of the group is interested in taking the same courses. Often some of the group wants to take other classes that meet at the same time, which means that the tech-prep class may not have enough students and have to be cancelled. These obstacles can be best overcome in the form of career academies and youth apprenticeship, however many parents object to this design as the culmination is not the four-year degree that the parents envision for their child (Hershey et al., 1998).

The enhanced vocational implementation model is the most common implementation of the tech-prep initiative, represented in 50 percent of the consortia studies (Hershey et al., 1998). As existing vocational programs were the logical starting point for most consortia, and the program focuses on career preparation, most consortia directors and coordinator were either secondary or post- secondary instructors and were able to identify areas in their programs that could be enhanced using the federal funding that came with tech-prep. This strategy has been shaped by vocational instructors, voicing concerns about the weak achievement of vocational students in mathematics, English, and science, being aware that budget constraints may have left many programs teaching technology without the most up-to-date equipment, and realizing that vocational students, as well as students in general, have failed to develop an educational and career plan. The tech-prep dollars have been focused on all vocational students, not just those with moderate academic success as is demonstrated in the more structured

model of implementation. This has resulted in more applied classes being offered to all vocational students. Often tech-prep students are defined as those taking a vocational class and an applied academic course, as opposed to the clustering of students with similar career interests as is common in the more structured model. A core sequence of classes is often developed for all vocational students in this model, rather than career specific offering in the structured model. This core is used by guidance counselors in discussion of classes for next year, often with little emphasis on the logical sequence of classes that would provide the seamless transition into the post-secondary component of tech-prep. While this design has some advantages, such as reduced scheduling conflicts, the student is not required to make a commitment, and course selection for the student is open to more variation. Some disadvantages are also recognized. Students are not made a part of a new rigorous program, are not clustered, many do not recognize this as a program. Most see it as traditional vocational education, the course specific linking of vocational and academic classes is not possible. Many students do not avail themselves to the applied classes offered for fear of tracking, as the classes are often looked upon as not as challenging, and targeted to students with academic difficulties (Hershey et al., 1998).

The last implementation model identified by Hershey et al. (1998) is the introduction of tech-prep elements without targeting specific students. This design was identified in 40 percent of the consortia surveyed. The feeling that the elements of the tech-prep initiative would benefit all students

is the support for this model of implementation. Many educators feel that attaching "real world" activities to academics classes will benefit all students, as will career and educational planning. In this design, most students do not associate the term tech-prep with any more than if the student plans to attend a two or four-year college. This design can be recognized by the untargeted introduction of applied academic classes, often a focus on career guidance and logical course selection or with a focus on articulation. The introduction of applied academics may be through the use of purchased curriculum, or through program development programs offered to teachers to instruct them in the concepts of contextual learning. The classes are offered to all students in an effort to replace the general track of allowing students to meet graduation requirements with low-level classes. When counseling staff assumes the lead role in tech-prep implementation, the element emphasized is career guidance and course selection. Students are often required to develop career and educational plans based on interest inventories, enhanced career resource centers are established, and students are advised of a logical sequence of classes required for them to meet their goals. Most often, the element of articulation is the emphasis in this model of implementation; the priority is given to increasing the number of articulation agreements for vocational courses that allow students to receive college credit, rather than developing a logical sequence of courses that align academic classes and technical education (Hershey et al., 1998).

While this approach to tech-prep is the least disruptive to the school, it also is the least likely to have an effect on the educational experience of an individual student. In most cases when this design is adopted one or two of the elements are selected for implementation, with efforts spread across many students and teachers, resulting in the effect of the tech-prep initiative on individual students experience difficult to establish.

The primary reasons proposed for this diversity in the form of implementation were: (a) misconception by the students of the options offered, (b) existing relationships between secondary and post-secondary institutions, (c) limited funding for planning and implementing tech-prep reform, and (d) direction, or lack of, in the state guidance of the tech-prep initiative. Students and parents are often reluctant to attempt to choose a career focus mid-way through high school, failing to recognize the transferability of problem solving and analytical skills that are the focus of the technical education, preferring a more generalized program. Parents generally desire programs that result in a bachelor's degree, and even weak students assume that they will pursue a four-year degree. Many consortia face the parents and students' suspicion of tracking if vocational students are clustered away from the traditional academic classes and offered a more applied approach (Hershey et al., 1998).

The history of member schools relationships can affect the implementation of any program that attempts to link secondary and post-secondary institutions. Some have a history of collaboration and can spend

resources more effectively in other elements of tech-prep. The turnover of staff and faculty in institutions can affect the implementation as leaders come and go and the initiative relies on leaders in an institution to promote it and work with other faculty to develop and deliver applied classes. Additionally, some institutions expect a transience of students that make some aspects of reform difficult.

Limited resources affect the manner in which tech-prep is implemented. Sixty percent of the consortia surveyed rely solely on title IIIE grants to support consortia activities, including promotion, professional development, equipment purchases, the facilitation of communication between member schools, and development of articulation agreements. The staffing and support that can be supported by the grant affect the implementation and effect of the initiative. A lack of resources is consistently listed as a problem affecting implementation by coordinators, in 1995, 69 percent cited this problem, 74 percent of the coordinators of consortia that receive less than $50,000.00 perceive funding as a problem to implementation (Hershey et al., 1998).

The structured form of tech-prep implementation is only common in states that mandate the design. Every state has developed a definition and goals for tech-prep, however often this is only a reproduction of the federal language found in the act. 40 states have developed definitions of what it means to participate in tech-prep, whereas only 35 require the local consortia to adopt the state definition for reporting purposes. This lack of consistent

definition and the obstacles identified previously has resulted in the diversity of implementation designs.

Participation in tech-prep was measured by five criteria in the annual evaluation surveys conducted by Hershey et al. (1998), students were identified to be tech-prep participants if: (a) they chose tech-prep as a program, (b) they had developed an educational plan that included a sequence of classes that spanned secondary and post-secondary training, (c) they were taking or had taken an articulated (or unarticulated) vocational course, (d) they had taken or were taking an applied academic course, or (e) they were participating in a work/training experience related to a tech-prep career cluster. In the 1995 survey more than 30 combinations were used to describe tech-prep participation (Hershey et al., 1998). Accepting this variety of criteria, the consortia continue to have difficulty in reporting participation. The number of consortia that could identify tech-prep participation grew from 36 percent in 1993 to 65 percent in 1995. The longer a consortium has received funding, the more likely they will be able to report on participation. The number of member schools that are able to count participation is also growing. In 1993, consortia that reported participation could only do so for 17 percent of the member schools; this number had grown to 42 percent of the member schools by 1995.

The diverse implementation designs are part of the difficulty in counting participation. The structured programs only need to look at accepted applications, the enhanced vocational programs are more likely to

look at vocational students taking applied academic classes, however the programs that do not target any population and implement only some the elements of tech-prep operate with the intention of including all students in the reform, and therefore find it difficult to count except to contend all students are affected. These difficulties aside, the evidence indicated the growth of tech-prep is substantial. The 1992-93 surveys reported 173,000 participants, this number exploded to almost 740,000 by the 1994-95 surveys. With this growth, the number of tech-prep participants still falls well short of the intended middle 50 percent of the secondary population, with only six to eight percent of the secondary students being served (Hershey et al., 1998). Compared to the student population considered vocational, in that they earn at least three credit hours in a vocational course, tech-prep participation still relatively small. The National Assessment of Vocational Education (1994) estimated that 30 percent of the student population participates in vocational education.

The accomplishments identified by Hershey et al. (1998) are fourfold: (a) new lines of communication have been fostered, (b) interest in curriculum change and innovation have been promoted, (c) employer contact with schools has grown, and (d) the need to strengthen mathematics and science skills in vocational students has been recognized. The effort to develop applied coursework has helped to reduce the isolation for faculty, requiring them to work together, exchange ideas and promoted professional development. The articulation process has opened communication channels

between many secondary and post-secondary faculty. The applied context of tech-prep has stimulated interest in developing applied coursework that promotes problem solving and application of theoretical concepts, using real career contexts in many academic classes. The contact between employers and schools has developed beyond just equipment donations and sitting on vocational advisory boards, with tech-prep instituting the request for input for applied curriculum, job shadowing, and cooperative learning experiences opportunities and involvement in the promotion of tech-prep. Tech-prep has drawn attention to the need for mathematics and science for vocational students. The development of core curricula and the logical sequence of courses that have been developed in response to the tech-prep element of a seamless transition to the post-secondary training has brought attention to the importance of providing vocational students with an adequate foundation in mathematics and science skills. The accomplishments are important, however tech-prep has fallen short of the vision the early proponents held. In at least half of the consortia implementation has resulted in marginal and often unconnected efforts to develop particular aspects of the initiative, rather than the coherent sequence of training that would substantially affect the educational experience of the participant, the transition for secondary to post-secondary and important element of tech-prep has in most cases not been a priority, and it had failed to reach the majority of students it was expected to (Hershey et al., 1998).

The Office of Vocational and Adult Education (OVAE) commissioned a study of the relationship between tech-prep implementation and student outcomes, that was conducted with Bragg as the Project Director and published as *Promising Outcomes for Tech-Prep Participants in Eight Local Consortia, A summary of initial results* (2001). This study was undertaken to: (a) document the implementation policies of selected local tech-prep initiatives focusing on policies and practices designed to enhance student transitions from high school to post secondary training and work, (b) document the educational experiences and outcomes of student participation in tech-prep as compared the their non tech-prep counterparts, and (c) to examine various qualitative aspects of student experiences of tech-prep, to develop the deeper, richer understanding of the student perceptions that can be established through focused in-depth interviews. Eight consortia were selected as mature implementers; they represented urban, suburban and rural school districts of various sizes. The research consisted of survey research of tech-prep and non tech-prep students selected in approximately equal numbers from the selected consortia, high school and community college transcript evaluation and a short and long interviews with key stakeholders and students. The findings across all consortia are documented as well the data from the individual consortia.

In reporting the results of the study across the eight consortia, several consistent outcomes were chronicled. The goals and objectives of the tech-prep initiative have been unclear to many of the practitioners, beyond the

local coordinators. This has resulted in various forms of implementation and the lack of focus on the neglected majority that Parnell (1985) envisioned tech-prep would serve and expanded the target population to all students in many consortia. This lack of understanding has also resulted in many leaders linking tech-prep to increased academic course takings and rising academic standards as mandated by state agencies of the 1990's. This expanded population and academic focus has resulted in many challenges for those consortia that were began as expanded vocational offerings, with a focus on technical skills. The redirection of focus to improved academic performance, while still offering workforce training, often required a district policy change that went beyond the span of control of those involved in tech-prep. This frustration was coupled concern that the initiative would be the next funding cycle (Bragg, 2001).

The tech-prep initiative gained support from the districts in two major components. The first change was the implementation of block scheduling in at least some of the high schools in each consortia, this allowed sufficient time frame in classes for integrated instruction in career/technical offerings and facilitated workplace learning experiences for both students and teachers. The other change that has contributed to the raising of academic standards is scholarships in technical fields, as many employers and consortia offer financial rewards to students pursuing a technical career and demonstrating academic success. The students are recognizing the value of tech-prep and are also matriculating to the post secondary offerings. The

tech-prep initiative has seen incremental change in governance and administrative frameworks, as the programs that evolved from existing vocational programs have seen changes to counter the perception that they were only terminal programs and the parental concerns of tracking that were often attached to such programs. The changes have resulted in service to all students in the form of career guidance, expanded work-based learning and contextual offerings. Another common obstacle of the tech-prep implementation that was reported across consortia was locating the fiscal agent for the consortia at the community college. Often the tech-prep leader had no control over the budget, scheduling, personnel and other policies that needed change at the secondary level, and often had only limited ability to change the community college policies (Bragg, 2001).

In evaluating the implementation of tech-prep in relation to the seven elements, Bragg (2001) reported the articulation provided a foundation for curriculum reform, however students do not receive the credit they earn for a variety of reasons. The students are often unaware they have earned credit, they are often discouraged by teacher from taking the credit, for reasons of lack of confidence of preparation, sometimes this reason was cited by the student as they lacked confidence in the high school class. Dual credit was the response from the tech-prep leaders. This manner of articulation results in the student receiving high and college credit for the same course, the focus of dual credit courses has evolved from the career/technical classes to now include a number of academic classes. The articulation element was

again credited with improved communication between secondary and post-secondary faculty, often resulting in new sequences of career/technical courses providing the seamless transition that was envisioned by the early proponents of tech-prep (Bragg, 2001).

The element of a sequence of courses involving the last two years of high school and two years of post-secondary training has been implemented in many models. In many consortia, the entire four years of high school are considered to be tech-prep, whereas in other designs the program included the first two years of college and then the last two years of college purportedly resulting in a bachelors' degree. Some consortia have included college certificate programs, clearly not meeting the requirement of terminating in a degree, but viewed as a stepping-stone to the Associates' degree. The success of the matriculation process is linked to the implementation design the consortia employed, as defined by Hershey, Silverberg, Owens, and Hulsey (Bragg, 2001).

The original design of tech-prep included an element of curriculum development, with the intent to design classes that offered the student a contextual learning opportunity, tying occupational interest to career pathways. As educational reform evolved, the tech-prep efforts was linked to raising academic standards. Most tech-prep curriculum did not require classes beyond traditional high school graduation requirements. This is not true of the tech-prep college prep or the youth apprenticeship programs,

these programs have established higher standards to promote student success at the post-secondary level (Bragg, 2001).

Professional development for teachers and counselors constitutes two of the elements of the tech-prep initiative. This component has been well subscribed from the beginning. Early efforts were implemented to develop planning and awareness, this completed the efforts evolved into implementation information. More recently the focus of much of the professional development has grown into the development of core curriculum, and the creation of integrated learning opportunities. The most recent has emphasized work based learning, career pathways, and contextual learning. Those involved in this training has grown from the career/technical teachers and guidance counselors to now include all stakeholders, parents, business representatives (Bragg, 2001).

The preparatory services offered through the tech-prep initiative have evolved since the early 1990's, when preparatory services were thought to include career guidance through the use of individualized career plans, career inventories, career exploration and job shadowing. The expanded services include mentoring conducted by previous tech-prep participants. This is most prevalent in the youth apprenticeship, mentoring was continued at the post- secondary level and is fostered through work-based learning. Other consortia are using tech-prep resources to provide "college readiness" classes to help students complete ACT testing, complete financial aid, and improve study habits (Bragg, 2001).

In reviewing student demographics, it would appear that the composition of the tech-prep cohort is a reasonable comparison of the overall student population. In consortia where admission was by an application and selection process, it appears that the female gender is underrepresented; Bragg (2001) indicated this will require further research to identify any discriminatory practices. The survey response to household income revealed in five of the eight consortia polled, household income was similar tech-prep and non tech-prep students. In the remaining three the household income was lower for the tech-prep students. Parental education level was distributed in a similar pattern, with the tech-prep students' parents to have been slightly less likely to have attended college than the non-tech-prep students parents (Bragg, 2001).

All of the consortia surveyed reported a growth in participation in tech-prep, with overall participation rates varying from seven percent to 35 percent with an average of 15 percent. This growth is attributed to program information being disseminated and the development of a larger cadre of teachers becoming informed and trained and an expansion of course offerings. The matriculation to college was reported to be 65 percent of the tech-prep participants entering a two- or four-year college within one and three years of high school graduation. In seven of the eight consortia studied, a higher percentage of tech-prep students entered a two-year college than a four-year school, however this percentage was typically small. The data also indicated that more tech-prep participants worked part or full time after high

school graduation than their non-tech-prep counterparts. The tech-prep participants were more likely to work full time than part time, whereas the non-tech-prep group were more likely to work part time (Bragg, 2001).

Time required for reform to be measurable

The literature on change is extensive (Sarason, 1996; Fullan, 1993; Whitford & Jones, 2000; Nolan & Meister, 2000) however; the majority of the literature is to report on a specific change effort undertaken or to provide information to educators on the elements to be expected in the change process. The literature that is available to document the time required to experience the effect of change is limited. Two books were reviewed that were written to document specific change efforts that were mandated to occur in one school year (Sarason, 1996; Nolan & Meister, 2000) and one chronicles the efforts on assessment of reform in Kentucky (Whitford & Jones, 2000).

The work of Sarason (1996) *Revisiting "The Culture of School and the Problem of Change,* goes to the "new math" change mandated to be adopted in seven months from the time the teachers involved would be required to offer this new revised curriculum. The results of this change effort were far from the desired result of more students learning to enjoy mathematics. The work chronicles the teacher frustration and apprehension involved in systemic change that was mandated to be implemented without any involvement of the teachers in developing the new curriculum. The frustration

stemmed in part from the lack of understanding of the new design by the instructors, the lack of evaluation, inadequate in-service training, and lack of administrative support for offering this new mathematics. Other change efforts are described and the resultant change or failures are evaluated and defined to the culture of the institution attempting the change. The discussion of the time required to perceive the effects of change are limited to the mathematics issue with a complete change to occur with in seven months and be eternal, other change efforts are noted to be worthy of further evaluation over time as evolution of the change model occurs.

The work of Nolan and Meister (2000) is a study of the teachers' perceptions of the implementation of a restructuring effort to offer an interdisciplinary curriculum at the secondary level. This project was conducted throughout the one–year implementation period. The perceptions of the team members were consistent across five themes; uncertainty, intensification and limited time, lack of administrative leadership, content loyalty vs. team allegiance, and craft pride, caring and moral purpose. In this reform attempt, the teachers were placed in teams to develop and provide an integrated course across five subjects for the secondary students, other teams were charged with the same mandate. The teachers were overwhelmed with uncertainty, heightened by lack of administrative leadership as they tried to develop curriculum, as none was readily available commercially. The teachers were untrained in this endeavor, and perceived the requirements to over work them due to the hours they were spending in

the implementation of this course. They also had difficulty with content loyalty they were committed to the new course, however they were equally committed to preserving the depth on teaching in their specific discipline.

The conclusions of this study reveal that the teachers were willing to attempt this change for the sake of the students as they felt the new course would benefit the students, while they did not fully understand nor take ownership in the initiative, as they had not been a part in the development of it. The teachers were motivated by their commitment to the students and each other, yet no apparent commitment came from the cause of school restructuring. In this effort the communications between the teachers were meaningful when they discussed student issues, however the communications were labeled "contrived collegiality" as the teachers would work together on issues directed to interdisciplinary teaming (Nolan & Meister, 2000). This mandate came in a top down format, that is the administration conceived and delivered the directive to the teachers to implement, without following up with adequate support. The teachers were not given the mission, the purpose, or the goals of the initiative, and were left to feel that their contribution and expertise were being trivialized. This aside, the teachers worked diligently to implement the initiative as they felt the students would benefit. This lack of understanding of the underpinnings of the initiative was compounded by the lack of administrative support and leadership during the planning stages, the implementation process, and the evaluation phase. The teachers were left feeling isolated and unsure of the

success or effectiveness of the initiative due the lack of school-wide communication and administrative important to teachers. This commitment may be replaced with a commitment to the students and to other teachers, therefore, change agents need to direct efforts to providing time and leadership for teachers to interact and develop a commitment to student learning, using this commitment as the benefit of implementation of new initiatives, rather than focus on the merits of the initiative itself.

In a report of the lessons learned for the Kentucky reform efforts, Love provides this insight; *Success Need Time to Grow* (2000). The public's perception of the Kentucky Education Reform Act of 1990 is that this act has been a remarkable success, however in looking at the discussions with educators, the success is not as apparent. This reform effort (KERA) was enacted along with an assessment component, Kentucky Instructional Results Information System (KIRIS) to provide an aggressive standards based educational reform along with reliable assessment tool that allows students to demonstrate their abilities to recall, apply, and integrate knowledge, using good judgment in realistic situations. The interviews with teachers chronicle many instances where content loyalty overrides the mandate to offer integrated subject matter in all classes. Often the teacher fails to recognize the benefit to the student of integrating writing into all subject matter and reports the time required for the integration of writing detracts from allowing the instructor to investigate the specific course content to the depth appropriate. The mandate that all students perform at high levels

is credited with another obstacle in the implementation, teachers are reported to support high standards, but not as their most urgent goal, they are more likely to place pressures of social problems, lack of funding, overcrowded classes, and lack of parental participation as most urgent. Teachers are able to admit that due to troubled backgrounds and educational failures, some of the students will slip through the cracks and graduate with less than basic skills.

The reform was well instituted by the best teachers but appeared to stall on the majority, Haragan, of the Kentucky Collaborative for Teaching and Learning, stated that the vast majority of teachers need help with the reform process, and particularly in incorporating the changes into lesson plans. Haragan estimates that approximately 15 percent of the teachers recognize the opportunity offered in change and adapt instinctively and intuitively recognizing how to implement the change into their classroom, while the remaining 85 percent need more guidance and assistance (Love, 2000). In the conclusion, Love credited this reform with many successes, however while many of the mandated changes have had a positive effect, much more will be gained as teachers come to value the changes for their own sake, as teachers move from compliance to commitment. Love stated "reform will never be linear, neat, or soothing. From my perspective KERA's greatest risk is not the uncertainty, vulnerabilities, or errors of change, but the peril of impatience... Success needs time to grow. Less than 10 years into the effort, it seems early yet for confident expressions of either satisfaction or

resignation" (p. 218). The results of this study report that the time to realize the effects of a reform effort are confusing, some will be recognized in the beginning, other may take well over ten years to reach full commitment form those asked to implement the change.

Tech-Prep Student's Perceptions as effected by School District Size

The argument over school size has been waged since the turn of the 20th century, though the research would be judged naive and inadequate, the focus was on administrative and instructional issues, resulting in opposite results. Ellwood Cubberley, a leading professor and former urban superintendent, and his colleagues were pursuing the question "How large a school can be created?" While Joseph Kennedy, Dean of the School of Education at North Dakota State University, in his 1915 book *Rural Life and the Rural School* championed the question "What is the lower limit of school size?"(Howley, 1996). This question of size is still studied today. The one question asked is what is the right size for a school, recognizing that when schools become too large they are no longer efficient or effective, and the smaller size does not provide any economies of scale. The research has determined that the right size will vary from place to place. The socio-economic status of the community plays a role in school size effectiveness, it is recognized that the lower the socio-economic status of the community, smaller schools may better serve the students (Howley, 1996). This concern is compounded in rural situations, where distance and topography play a role

in school size and many rural residents live in poverty. The desire to consolidate schools to enjoy the economies of scale that large consolidated schools offer, often provides a disservice to the students, while in the urban situations are experiencing similar problems as changes in residential patterns have resulted in large inter city schools attempting to meet the needs of impoverished students. The early research focused on the advantages of larger schools, promoting the large schools ability to offer a breadth and depth of offerings as a result of size, while research conducted in the late 1980's and early 1990's has reversed the conclusions and established that small schools are more productive and effective (Lee & Smith, 1995).

In an article published in the *Journal of Rural and Small Schools*, Ramirez (1989) reported on the equality of educational offerings as affected by school size. In the question of breadth of offerings, larger schools offered more advanced courses. Ramirez reported that all of the schools studied offered occupational, at the school boards discretion, not as a graduation requirement. The ratio of students to courses in all disciplines was better at the small schools. Both advanced academic and vocational courses were offered in larger numbers at the larger schools, and the demand for admittance to both curricula increased as school size increased. The same phenomenon occurs with guidance counselors, the larger schools have more, with the small schools having more per student. Class size is

traditionally larger at the large school with the large school having more students per teacher.

Small schools report a higher staff turnover, where it is more troublesome, as often when a staff person leaves it represents the whole department leaving. Upon further investigation this turnover was related to the isolation and lack of services characterized by the rural location rather than as a direct result of school size. In looking at GPA, in high school or entering college how does school size affect grades? The research indicated no statistical significance across the size grouping on high school GPA or grades earned in the first semester of college. The school size was directly correlated to scores on the ACT, with larger schools scoring better. It was added that the larger schools also had a larger percentage of students taking the test.

In meeting the states requirements that a core curriculum be offered at all schools, it is reported that schools enrolling as few as 100 students offer the base courses in mathematics and sciences at rates comparable to schools enrolling 1,200 to 1,600 (Haller, Monk, Spotted Bear, Griffith & Moss, 1990). In looking at the course offerings, the smaller schools are found to offer less advanced courses, however large school size is no guarantee of advanced offerings (Monk, 1986). The vocational career technical offerings follow a similar pattern while larger schools have funding to offer more specialized courses and extracurricular activities, however the number of students competing for the offerings is larger. As larger high schools tend to

offer a broader array of courses, smaller schools offer more courses per pupil (Ramirez, 1989).

With the movement toward smaller schools, the impact on cost has received some attention. The cost per graduate was reported by Stiefel, Iatarola, Fruchter, and Berne, in a report titled *The Effects of Size of Student Body and Performance in New York City High Schools (*1998). This study looked at the outputs of education and cost, recognizing that the research consistently reflects that smaller schools have a more positive impact on students. The studies on cost are more varied, no report that schools smaller than 900 students have lower cost per student. This study looked at ultimate output cost, graduates and noted that smaller schools with higher per student cost have a higher percentage of graduates allowing the smaller schools to achieve a lower cost per graduate. The work reported that when using budget per pupil as a dependent variable in a regression analysis a small negative effect of students size on budget per pupil, for a 10 percent increase in number of students results in a 0.7 percent decrease in budget per pupil, thus an increase in school size results in a decreased cost. Using units per pupil as the dependent variable, the size of the student body is significant as to the cost of basic support, a 10 percent increase in students results in a 3.8 percent decrease in cost per student, there is no savings in instructional support, except in vocational high schools that report a small positive effect, a 10 percent increase in students results in a 0.12 percent increase in instructional support. In all cases the data indicate that increases in school

size result in a lower cost per pupil for both basic and instructional support. However, the increased percentage of graduates from the small school, allow the small school to claim a lower cost per graduate while admitting to a larger cost per student.

In looking at the cohort groups, the small academic and articulated alternative schools have the lowest cost per graduate, with the large schools a close second. The smaller medium range schools, particularly the vocational and transfer alternative school are responsible for raising the medium schools group in cost per graduate. In looking at cost per graduate, the dropout rate of the different groups needs to be evaluated, Small articulated high school have very low dropout rates, while the small transfer alternative high school have very high rates, medium vocational schools have slightly higher dropout rates than average. The small transfer alternative schools have considerably higher cost per student, medium vocational high schools have somewhat higher cost per student, thus the smaller transfer alternative schools with high cost per student and high dropout rates have the highest cost per graduate, small to medium vocational schools have high cost per student with slightly higher dropout rates result in relatively higher cost per graduate (Stiefel et al.).

Urban versus Rural

In looking at the size issue in high school, in many instances the issue is related to rural versus urban not selected size. Rural school research is

minimal as the thought has been that given economic development and urban sprawl, the issue would resolve itself, the rural aspect of America would diminish, this has not happened (DeYoung, 1987). One fourth of all U.S. school children attend schools in rural areas or small towns of less than 25,000 population, 14 percent go to school in places even smaller with populations of less than 2,500 people (Rural schools and community trust, 2000). In 1980 the number was nearly 66 percent of all school districts, 50 percent of all public schools, 33 percent of all teachers were involved in rural areas of the United States (National Center for Educational Statistics, 1980). The body of knowledge on rural schools is not as abundant as urban school research and history. What has been reported is that much of the rural educational is that in early research all rural methods of teaching, organizing instruction, and making decisions on school policy were outdated and virtually without utility for an emerging urban industrial and progressive America (DeYoung, 1987). The literature that exists appears to chronicle the inadequacies that are recognized in rural schools, difficulty in staffing, administration and the funding of small schools. It is noted that teachers were to be more aware of school/community relationships, and to possess a more general competence or more than one specialization, recognizing that there is no emphasis in teacher preparation for rural schools.

In an article represented to be "the first time ever that data on rural America from a wide variety of sources has been complied and analyzed" (p.1) some of the issues of rural education are identified (Rural School and

Community Trust, 2000). While rural schools experience many of the same problems plaguing all school, the remoteness and sparse population creates some specific issues; recruitment and retention of well qualified teachers, and administrators due to professional isolation and low pay. Teachers are expected to teach both in and out of the field they are certified for, high per pupil costs and lower discretionary spending, and distance and sparsity make connection to the digital world slower. In rating the urgency for state policy makers to make rural education policies, this group reviewed data from many sources, looked at the average teacher salary, difference between rural and urban teacher salary, free lunch eligible student numbers, rural communities scoring below average on Educational Climate Index, average student to teacher ratio, percentage of rural householders with less than 12 years of education and no diploma, percentage of schools with internet access, percentage of out of field teachers, percentage of rural school expenditures, percentage of schools with enrollment, percentage of states population living in rural areas. Wyoming in this report was rated, "it is critical that state policy makers recognize and develop policies for rural education," whereas, Colorado was rated as "fair". Wyoming reported that 35 percent of the population was living in rural areas, of less than 2,500 population with 46.2 percent of the schools in these areas Colorado reported 17.6 percent of population with 24.3 percent of the schools in 1990. (Rural School and Community Trust, 2000) In looking at other Wyoming demographics, 21.6 percent of the public school students are in rural schools, in looking at

number of students to grades in Wyoming the number is 28 compared to a national average of 60, the average rural teacher salary is approximately $2,500 less and 22.8 percent of the rural householder have less than 12 years of education (no diploma) (Rural School and Community Trust, 2000).

Summary

The following subjects were reviewed for this review of literature: (a) the need for educational reform to offer a career technical curriculum for students that will not pursue a traditional four year education, (b) the history of vocational education as influenced by federal funding, (c) an overview of the tech-prep initiative, a component of the Perkins vocational educational Act of 1998, (d) evaluation efforts that have been undertaken to provide information as to what the impact of the federal funding has been, (e) the time required to experience the effects of change, and (f) school size and it's influence on student offerings, rural educational issues was briefly investigated.

Therefore, given this review of the literature, it is clear that a need exists for a study that looks at the effects of school size and years of funding of a federal reform initiative on students perceptions of their educational experience.

CHAPTER 3: METHODS

Chapter three establishes the methods and procedures utilized in this study to assess the effect of the size of the school district and the number of years of federal funding on student perceptions of their educational experience as it is affected by the tech-prep initiative in Wyoming. The research questions, variables, survey instrument, data collection, sample, and analysis utilized are described.

The research problem is two-fold; a measure of the students perception of their educational experience as it is affected by first the size of the school district and second, the number of years of federal funding received by tech-prep consortium that influenced their classes. The educational experience perceptions as reflected in the application of coursework, learning aids in classrooms, self reported grades, and career counseling, will be analyzed.

Variables

The independent variables for this study are all attribute. The key independent variables are the size of the school district and the number of years the consortium has received federal tech-prep funding. The size of the

school district offering the tech-prep program were grouped into two categories, small, 3,500 students or less and large, 7,000 students or more. Years of funding were grouped as three years or less and six years or more.

Size was established using data provided in the Wyoming Education Directory as developed by Judy Catchpole (1999), Superintendent of Public Instruction, Wyoming Department of Education. Operationally, small districts were defined for this study, as the 45 districts with less than 3,500 students and large districts were restricted to the three districts with over 7,000 students. The researcher imposed these size categories after reviewing the size of districts in the state and the number of students that would be available to survey.

The number of years of funding for the consortium offering the articulated program is also grouped into two categories, new and old. New consortia were defined as those that had received federal funding for three years or less, with old consortia defined as those that had received funding for six or more years. This decision was also based on the number of students available to survey and with the intent to remove the middle population allowing for differences to be more pronounced.

The dependent variables that were investigated are: (a) student self-reported grades for the school year (2000-2001), high school overall (1999-2000), and the change in the past two years; (b) perception of the students concerning the "real world" application of mathematics, science and English/communication classes, measured by several questions on a five

point Likert scales; (c) the use of teaching/learning aids in the classroom, (used to indicate more applied teaching methods); (d) the students' perception of the "helpfulness" of the instructors concerning class assignments and enthusiasm; and (e) career counseling experiences. All of the questions are utilized in a between groups design.

Population and Sampling

The population for this research was the tech-prep students in the state of Wyoming. The Wyoming Department of Education provided the researcher with a list of active consortia in Wyoming and the number of years that each consortia had received federal funding. This list was utilized to determine which consortia fit the description as to years of funding. Six consortia were selected; four having received funding for three years or less and two that had received funding for six or more years. The director of each selected consortium was contacted to obtain a list of school districts that participate in the activities of the consortium as well as a list of teachers who are active in the consortium. Eight school districts were identified, three large districts and five small districts. The researcher contacted the superintendent of the districts selected to request and obtain permission to conduct the research in the district. Identified teachers were contacted and asked to participate or allow the researcher to come to the classroom and administer the research questionnaire.

Eighteen teachers were contacted and agreed to assist in the study, however only nine ultimately offered assistance. Teachers willing to participate or allow the researcher to come to the class were asked to provide an estimate of the number of potential students to be surveyed. All teachers overestimated the response by a factor of over 50 percent. All students enrolled in classes were asked to participate in the study. They were informed that they must provide the researcher with parental consent and student assent prior to receiving a questionnaire. The classes to be surveyed were identified by the school administration of meeting the requirement of tech-prep, that is, an articulated program from the high school to a community college or apprenticeship. This definition includes the elements of the tech-prep initiative, two years of secondary training leading to two more years at a post-secondary institution. This definition will provide a sample of students from both the 11^{th} and 12^{th} grade that are pursuing a educational path that culminates in an associate degree or certificate and models the 2+2 design as envisioned by Parnell (Hull & Parnell, 1991) This sampling technique can be classified as a stratified cluster design.

Once the number of students in articulated tech-prep programs at various high schools was established, this information was utilized to establish the number of schools needed for the study. Classes were chosen from the list of classes that met the imposed requirements to provide nearly equal samples of students in old versus new consortia and large versus small districts. A sample size of 28 students from small schools, 98 from

large schools, 70 students from school that had received funding for three years or less and 56 from schools that had received funding for six or more years of funding was collected.

Once classes were identified to be in the study, the researcher forwarded by mail the parental consent forms mandated by the Human Subjects of Research Committee (HRC) to the instructor for distribution to the students. The response rate varied by instructor, in two classes all students responded; in other classes the response rate was as low as one student in 27. The classroom instructor explained the purpose of the consent form and asked the students to participate in the study, explaining to the students that participation in the study is voluntary. Only students providing parental and student assent were involved in the study. A large number of the theoretical population chose not to participate in this study at least in part due to getting parental consent. As the study was approved by the HRC the researcher had little control on whether the notes actually made it home to parents or not.

The setting for administering this survey was the technical classroom or laboratory where the student would be expected to complete assignments. The instructor in two instances introduced the researcher and then the researcher offered a brief discussion of the research and the advantages of offering accurate and complete answers, working to establish a rapport with the students. In all other classes the instructor asked to be allowed to administer the questionnaire and return the questionnaires by return mail.

The questionnaire took less than ten minutes to complete; brief enough that the student should be able to remain focused and not become bored and begin offering random answers.

Research Questions

The research questions for this study were: How are students' perceptions of their educational experience affected by the tech-prep initiative? Specifically, analysis will focus on, the size of the school district and on the number of years of funding that the consortium has received from the initiative.

Questions were asked of students enrolled in classes supported by tech-prep in the following areas:

1. If students are assigned to a counselor and the frequency of visits to the counselor.
2. Self reported grades for the current and previous year
3. Perceptions of mathematics classes as to interest and application
4. Perceptions of science classes as to interest and application
5. Perceptions of English/Communications classes as to interest and application
6. Perceptions of teaching methods
7. The use of learning aids in the classroom
8. The career counseling and investigation they have experienced.

Open responses questions were asked about most/least useful classes; likes and dislikes of school and the relevance of high school.

The results of the questionnaires will be evaluated to determine the following differences:

1. Are there any differences in the educational experience for tech-prep students that attended large (over 7,000 student) school districts compared to those attending small (under 3,500 student) school districts?
2. Are the educational experiences for tech-prep students different for those students attending classes supported by a consortium that has received federal funding for over 6 years than for the student attending a class that has received support for less than three years?
3. Is there an interaction of the main effects of size and years of funding?

The responses to each item were evaluated individually, additionally the questions of English, science, and mathematics interest and application were summated for evaluation. The use of each learning aid was compared using both independent variables and then the sum of the learning aids usage, the calculator, newspapers, internet usage as a research tool and a communication tool, technical journals, maps, blueprints and charts, measurement devices, and computer software packages were calculated and compared using both independent variables.

Instrument

The project utilized a self-reported questionnaire that the student completed during class time. The instructor or the researcher gave a brief explanation of the study, the value of the study, and the need for accurate results. The classroom instructor or the researcher was in the class during the completion and collection of the questionnaire. As the questionnaire was distributed the instructor or the researcher answered questions and continued to do so throughout the completion and collecting of the questionnaire. The students' participation was acknowledged, then the instructor or the researcher thanked all participants for their input into the study. The questionnaire utilized in this study was developed by Colorado State University (Gloeckner & Lyons, 2000) for a prior study conducted in 1998-1999. The questionnaire was revised for use in the 1999-2000 Colorado study. The "About Your Classes" portion of the questionnaire for the 1998-1999 study was a three specific answer design, this was revised for later studies to a five-point Likert scale. In the initial instrument, these questions were responded to utilizing a. The revised design was again used in Colorado for the 2000-2001 school year. The revised design was utilized in this study. This questionnaire was used in Colorado to establish differences in student perception of tech-prep versus non-tech-prep students over a three-year period.

The instrument as developed by Gloeckner and Lyons (1998) was provided to the directors of all Colorado tech-prep consortia and to the

Community Colleges of Colorado system staff for review and revision, this group provided the input for the revision after first year. Prior to use in this study the instrument was again provided to the Wyoming tech-prep consortium directors at the Wyoming tech-prep conference and again at the Wyoming Association of Career and Technical Educators conference for their review and comments. No revisions were offered and the original instrument as revised by the Colorado group was utilized.

Statistics

This study utilized a between groups 2X2 factorial design: large district versus small district and three or fewer years of funding versus six or more years of funding for the consortium. An analysis of the interaction between years of funding and size was included. The first independent variable is dichotomous, large school district versus small school district. The second independent variable was also dichotomous, three years or less years of funding versus consortia with six or more years of funding.

Gender and ethnicity are nominal variables that will be utilized to establish that the sample groups are comparable to the population on these demographic variables. Thus, we looked for no statistical differences between the four groups on these variables.

The difference questions were analyzed using several independent sample t-tests to look at the dichotomous questions of size and years of funding testing the means of both populations for significant differences.

Nominal responses will be evaluated for differences using chi-square and phi statistics. A 2X2 factorial ANOVA was conducted on several of the responses to look at sample mean differences on the district size and years of funding question to determine if an interaction exists between the two main effects. The series of questions that refer to the students perception of their teachers use of labs and projects and the teachers helpfulness in explaining assignments and providing information as to the requirements to pass the class and learn are measured were ordinal data, therefore a Mann-Whitney test was utilized to evaluate results.

Several open ended descriptive questions were asked and reviewed to determine the consistency of the responses. Questions were asked of the students as to which classes were the most/least helpful, the things about school the student likes/dislikes and of the relevance of the high school experience.

CHAPTER 4: FINDINGS

Data were collected using the questionnaire developed for the Colorado State University study (Gloeckner & Lyons, 2000). Questionnaires were received from 126 students, representing 98 from large districts, those with over 7,000 students and 28 from small districts those with fewer than 3,500 students. These data represented six consortia, two having received funding for more than six years with four having received funding for three years or less, 56 and 70 students respectively. There were 27 females and 99 males from grades 10, 11, and 12 that responded (See Table 1).

Table 1

Demographics of sample collected.

	M	F	Less Than 3,500	More Than 7,000	3 years or less	6 years or or more	10th	11th	12th
Gender	99	27							
Size			28	98					
Years funding					70	56			
Grade							3	54	69

The ethnic diversity of the respondents was primarily Caucasian, with 87 percent of the students reporting to be of Caucasian, non-Hispanic origin. The minority representation was split between five other groupings (see

Table 2). The respondents described an ethnic diversity similar to demographic data collected for the entire student body in Wyoming. Wyoming reported the entire student body make-up as described in the 1998-1999 school year (Wyoming, Archived information, 2000) with 88.6 percent white, 6.7 percent Hispanic, 1 percent Black, and 2.9 percent American Indian/Alaskan Natives.

Table 2.

Ethnicity of sample and Wyoming entire student body.

	Respondent		Wyo. student body percent
	Frequency	%	
Am Indian or Alaska native	3	2.4	2.9
Black, African American, not Hispanic origin	1	0.8	1.0
Caucasian/White, not Hispani origin	110	87.3	88.6
Hispanic, Chicano, Cuban, P Latino, Mexican American	4	3.2	6.7
Other	6	4.8	0.8
Missing	2	1.6	
Total	126	100	100

Part 1: About yourself

The first item to be evaluated for size and years of funding was if the student was assigned a counselor, these data were subjected to chi-square analysis and at the .05 level resulted in a significant result, the size of the district has a statistically significant effect on whether a student is assigned a counselor. Large districts were more likely to have assigned students a counselor (chi-square = 10.25, df 1, $p<.001$).

When the data was reviewed as to the number of years of tech-prep

funding, the assignment of a counselor, a significant result was also found (chi-square =7.44, df 1, p=.006). Predictably, the programs that had received funding for six or more years were more likely to have assigned the students to a counselor. Both of these results demonstrate a small to medium effect (Cohen, 1988) phi =.287 and .245 respectively.

The next question on the questionnaire asked the number of times the student met with a counselor. The number of times the student met with the counselor was broken into four ranges; 1-3 times, 4-6 times, 7-9 times, and over 10 meetings a year. The means were compared using independent sample t-test and it is noted that the small schools meet more often with the counselor and the students in consortia that had received funding for three years or less had more meetings with the assigned counselor as reported in table 3, both of these results demonstrate a large effect (Cohen, 1988).

Table 3

Number of times student met with counselor.

	N	Mean	Std dev	Df	T	Sig.	Effect
Small >3,500	28	3.46	1.88	120	3.59	.00**	.77
Large <7,000	94	2.17	1.61				
3 years or less	70	3.04	1.85	119.18a	4.79	.00**	.84
6 years or more	52	1.69	1.26				

** Significant at the .01 level
a. Levene's test for equal variance was significant (F=30.859, Sig. .000) reported equal variance not assumed results.

The next three questions posed to the student were about the student's grades, the student was asked to report high school grades, as to mostly "A", mostly "B/A", mostly "B", mostly "B/C", mostly "C", mostly "C/D", mostly "D", or mostly "D/F". This format was used for high school grades overall and grades for the year (2000-2001). The third statement was: In the past two years have your grades, remained the same, improved or gotten worse.

These data demonstrate a significant difference when analyzed using years of funding as the independent variable in all three questions. The students enrolled in programs that have received funding for six or more years reported that their high school grades are higher, and that their grades this year are higher. These results demonstrate a medium effect (Cohen, 1988) as noted in Table 4. Students in programs that have received funding for three years or less were more likely to respond that their grade had improved in the past two years. A significance of .043 was calculated with an effect of .36, recognized as small to medium.

When these data were analyzed using size of school district as the independent variable, only the third question indicated significance, the students from small schools reported that their grades had improved in the past two years ($t= 2.067$, df 121, $p=.041$) Effect size= .36, small to medium (Cohen, 1988).

Table 4

Students' grades for high school, this year in school and change in past two years.

	N	Mean	Std. Dev.	df	t	Sig.	Effect
High school grades							
3 years or less	70	5.66	1.5	123	4.53	.00**	.51
6 years or more	55	6.4	1.38				
Grades this year							
3 years or less	57	5.74	1.71	104	-2.84	.01**	.45
6 years or more	49	6.45	1.43				
Change in grades past 2 years							
3 years or less	68	.44	.78	117.28a	2.04	.04*	.36
6 years or more	55	.20	.52				

** Significant at .01 level
* Significant at .05 level
a. Levene's test for equal variance was significant (F=9.032, Sig. .003) reported equal variance not assumed results.

When these data were reviewed for an interaction between size of district and years of funding with students' current grades as the dependent variable, a significant F was found (F,(1, 102) =4.536, p=.036 eta=.207) with a small to medium effect (Cohen, 1988). Self-reported grades in schools that received funding for three years or less were significantly lower than those students in small districts that had received funding for six or more years see Figure 1.

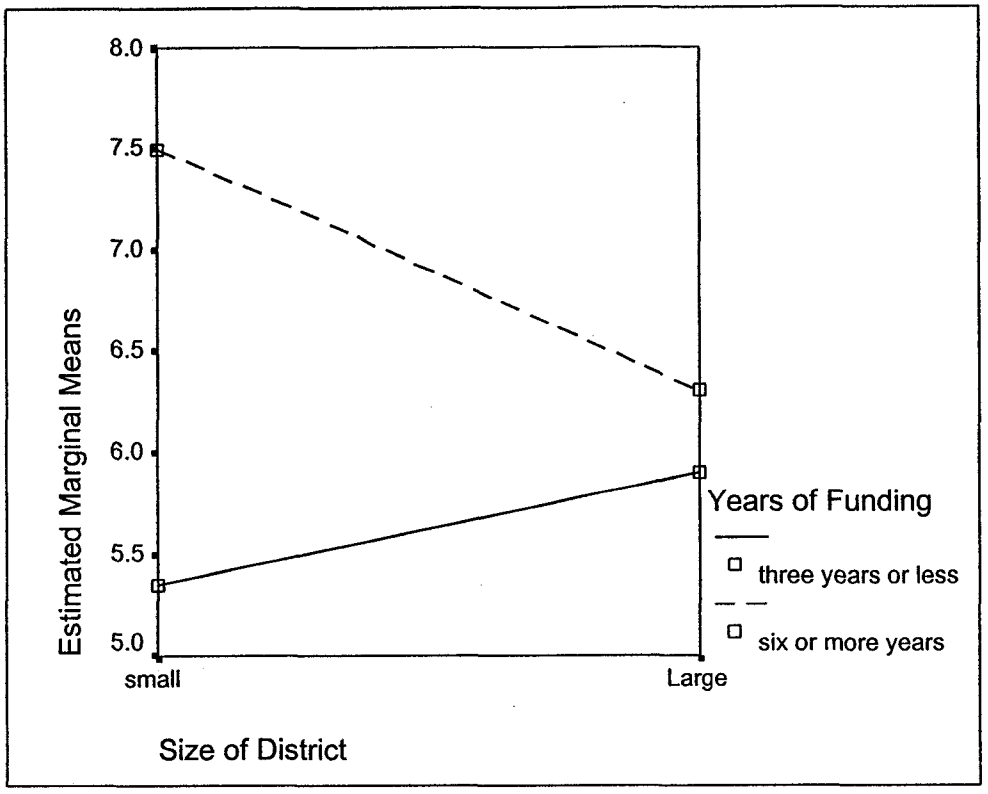

Figure 1.

Estimated marginal means of high school grades (current year)

The students were asked " In general, I enjoy school" on a three-point scale; always, sometimes, and never, the means reported for these difference data were compared using independent sample t-test and no significant difference was demonstrated, using either independent variable; size of district (t=.298, df 32.098, Levene's assumption of equal variance violated, p=.768) or years of funding (t=-1.223, df 119, p= .224).

The next data to be evaluated related to employment. The student was asked to respond to the statement; "I presently have job:" yes/no, and

"this job is related to my career interests:" yes/no. These data were compared, using both independent variables of this study, size of district (chi-square =1.845, df 1, sig. .174 and chi-square=.825, df 1, sig. .364 respectively) and years of funding (chi-square= 1.678, df 1, sig. .195 and chi-square= 3.362, df 1, sig. .067, respectively) utilizing non-parametric techniques, no significance was demonstrated.

Part 2: About your classes

This section of the questionnaire, polled the students perceptions of the relevance of the coursework they were experiencing in mathematics, science, and Communications/English/Language Arts classes. The students were asked to respond to statements on a five-point scale; from frequently to seldom for the items: classes have been: (a) Interesting to me, (b) Related to the "real world", (c) Helpful to me in my personal life, (d) Helpful to me at school, and (e) Helpful to me at work. The means were compared using an independent sample t-test, for both independent variables, years of funding and size of school district. Additionally, the data were summated to determine if there was an accumulation effect.

These data when reviewed using the years of funding as the independent variable, demonstrated no significant difference in the means. Using the independent variable size of district, two of the statements resulted in a significant difference in response; Communications/English/Language Arts classes were interesting to me (t=2.688, df 123, p=.008), Effect =.59 or a

medium effect according to Cohen (1988), the students enrolled in smaller districts reported a mean of 3.63 while the students enrolled in the larger districts reported a mean of 2.98. Similar results were reported to the statement; Communication/English/Language Arts classes were helpful at school (t=2.532, df 123, p=.013). Effect size= .56 or large (Cohen, 1988), with students enrolled in small districts reporting a mean of 4.19 and those students from larger districts reporting the mean to be 3.58. It should be noted that all of the responses to these questions, with the exception of science being helpful at work, were above the mean of 2.5. These data demonstrated no significance when analyzed using the number of years of funding.

These data from the "about the classes" section were evaluated for interaction between the two independent variables, years of funding and size of district; two questions resulted in a significant interaction. The student response to the statement of mathematics being helpful to me in personal life resulted in an F (1,120) =5.861 p=.017 eta =.22 a small to medium effect (Cohen, 1988) (see Figure 2). Students from small districts that had received funding for three years or less reported that mathematics are significantly more helpful in personal life, those students from small districts that have received funding for six or more years find mathematics the least helpful in personal life, neither of the main effects, size of district or years of funding, demonstrated a significance.

The student responses to the statement: communications/English/ language arts classes are helpful to me in personal life (see Figure 3) resulted in a significant interaction, F(1,122)=5.85, p=.017 eta = .21 or a small to medium effect (Cohen, 1988). Students from small districts receiving funding for six or more years reported communications/English/language arts classes significantly more helpful in personal life.

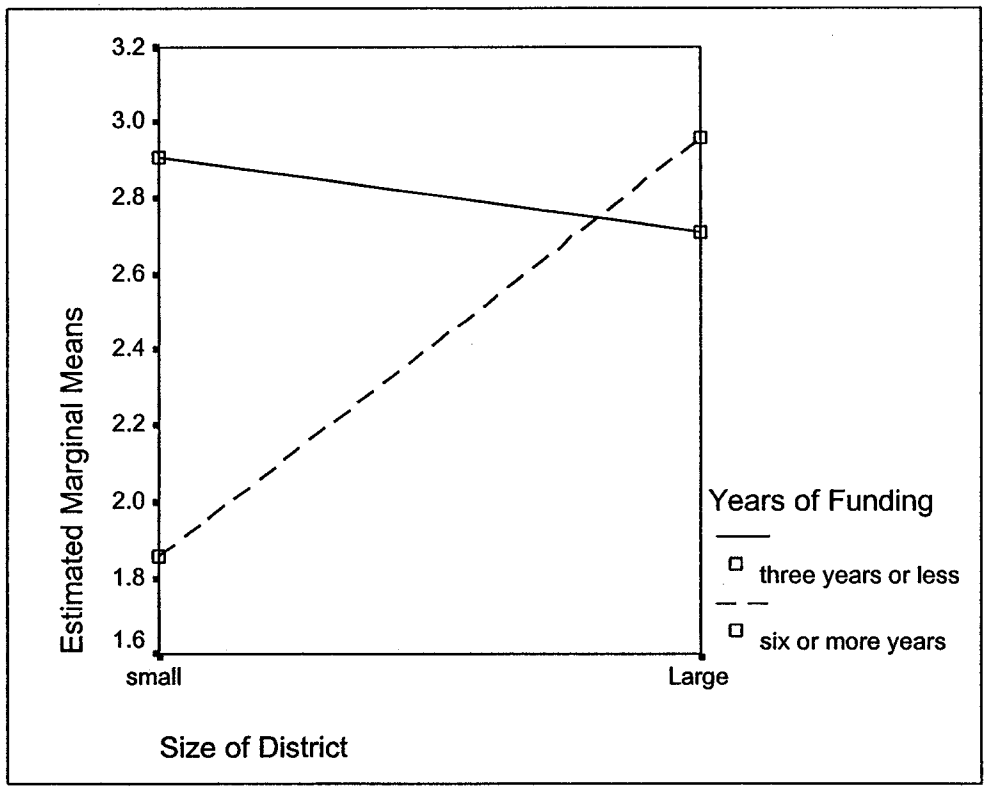

Figure 2

Estimated marginal means of math helpful in personal life

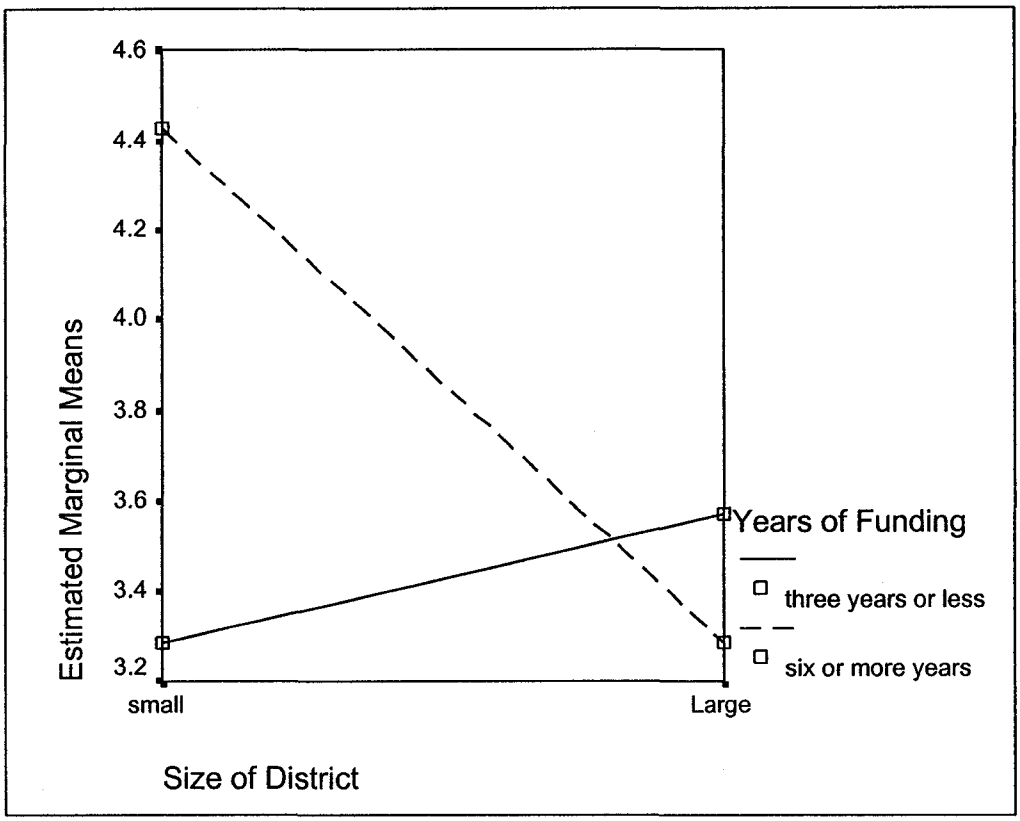

Figure 3

Estimated marginal means of Comm/Engl/Lang arts helpful in personal life

The next items were the students' perception of their teachers, the questionnaire requested data on a three point scale; "always", "sometimes", and "never", the statement read "My teachers:" (a) Use different activities and ways of teaching in my class, (b) Take time for me when I have a problem or need assistance, (c) Help me understand my class assignments, (d) Help me

understand what class work I must complete in order to learn and receive a passing grade, (e) Use projects and labs as part of our grade, and (f) Are enthusiastic about their subject. The means were compared using a Mann-Whitney test. The results outlined in Table 5 report a significant result for four of the sub-questions and the summation of the results (Mann-Whitney U= 892.00, sig.=.018). The respondents from small schools were more likely to feel that the teachers took more time for problems, (Mann-Whitney U=988 sig.= .019), the teacher helped the student to understand the assignment (Mann-Whitney U=889 sig.=.007), the teacher was willing to take time to help students understand what class work they must complete in order to learn and receive a passing grade (Mann Whitney U=932.5, sig.=.007). (See Table 5). These same data were evaluated using the years of funding as the independent variable with none of the mean comparisons demonstrating a significant difference at the .05 level.

Table 5

Size of District comparisons of teachers' methods, helpfulness and enthusiasm,

	Size	N	Mean Ranks	Z	Asymp. Sig.
My teachers:					
Use different activities	Small	27	57.11	1.14	.29
	Large	96	63.38		
Take time with problems or offer assistance	Small	28	74.21	5.54	.019*
	Large	95	58.40		
Help understand class assignment	Small	28	76.75	8.75	.003**
	Large	94	56.96		
Help me Understand requirements to learn or receive a passing grade	Small	28	76.20	7.39	.007**
	Large	95	57.82		
Use projects or labs	Small	28	63.21	.06	.813
	Large	95	61.64		
Are enthusiastic about their subjec	Small	28	67.29	1.07	.30
	Large	95	60.44		
Summation of above data	Small	27	74.96	5.62	.018*
	Large	94	56.99		

** Statistically significant at .01 level
* Statistically significant at .05 level

Question 19 of the questionnaire contained a five point Likert scale and asked the student to report the usage of learning aids from frequently to seldom. The learning aids utilization requested was: (a) calculator, (b) newspapers, (c) internet as research tool to access information, (d) internet as a communication tool, (e) technical journals, (f) maps, blueprints and charts, (g) measurement devices, and (h) computer software packages. These data were evaluated using an independent sample t-test for both of the independent variables.

The analysis using years of funding resulted in three significant results (see Table 6). The use of calculators, (t=-2.07, df. 121.39, sig. .041) Effect size, d=.36 a small effect (Cohen, 1988) the use of technical journals (t=-3.45, df 119, sig. .001) Effect size, d=.63 a medium effect according to Cohen (1988), and the summation of the results (t=-2.05, df. 116, sig. .042) Effect size, d=.38 or a small effect (Cohen, 1988). The students responding from schools that had received funding for six or more years have utilized the listed learning aids more often. The analysis resulted in no significant differences at the .05 level when these data were evaluated using the independent variable, size of district.

Table 6

Years of funding analysis of utilization of learning aids.

Learning Aid:	Years of funding	N	Mean	Std. Dev.	t	df	Sig.	Effect
Calculator	3 years	69	3.84	1.28	2.07	121.39a	.041*	.36
	6 years	55	4.25	.95				
Newspaper	3 years	68	2.35	1.14	1.35	121	.18	
	6 years	55	2.62	1.01				
Internet for research	3 years	68	4.06	1.02	.436	121	.644	
	6 years	55	4.15	1.04				
Internet for communication	3 years	66	3.05	1.67	1.96	118.76a	.053	
	6 years	55	2.49	1.45				
Technical journals	3 years	67	2.07	1.16	3.45	119	.001**	.63
	6 years	54	2.83	1.26				
Map, blueprints charts	3 years	68	2.40	1.24	1.79	121	.076	
	6 years	55	2.78	1.12				
Measurement devices	3 years	68	3.41	1.33	1.31	120.83a	.193	
	6 years	55	3.69	1.03				
Computer software	3 years	68	3.16	1.41	1.53	120	.13	
	6 years	54	3.54	1.27				
Above data summated	3 years	65	3.01	.737	-2.05	116	.042*	.38
	6 years	53	3.28	.693				

a. Levene's test for equal variance was significant reported equal variance not assumed results.

** Statistically significant at .01 level two tailed test

* Statistically significant at the .05 level two tailed test

Part 3: About your future

The students were asked whether or not they were currently enrolled in a class at a community college, using years of funding as the independent variable significance was established at the .05 level (chi-square=3.914, df 1, sig. .048) phi value is -.178 or a small effect (Cohen, 1988). The students enrolled in programs that have received funding for three years or less are more often currently enrolled in classes at a community college.

Part three of the questionnaire related to the student's future plans, what information had been gathered, and who had provided the information. The students were asked to respond yes or no to the following statements: My teachers and counselors: (a) have given me information about careers that I may want to explore after I graduate from high school, (b) have given me information about community colleges that I may want to attend after I graduate from high school, (c) have given me information about four year institutions that I may want to attend after I graduate from high school, and (d) have given me information about apprenticeship and/or internship opportunities.

The students were asked to respond similarly to the following statements: (a) I have visited at least one community college, (b) I have visited at least one four-year college, (c) I have participated in apprenticeship and/or internship opportunities. Lastly the student was asked to respond yes or no to: I have started to develop my career/school plan; (a) with the assistance of teachers and counselors, (b) with the assistance of my

parents/guardian, or (c) on my own. These data were evaluated using chi-square tests and phi to establish strength of the relationship. The only question demonstrating significance was: I have participated in apprenticeship and/or internship opportunities(chi-square=5.67, df 1, p= 017). Phi is -.213 indicating a small to medium effect (Cohen, 1988). The students enrolled in programs that have received funding for three years or less are more likely to have been involved with apprenticeship/internship opportunities. The questions as to whom, parents, teachers/counselors or self, had helped to advise the student of future career/school plans were not found to be significantly different when tested using both independent variables.

The open-ended questions offered consistency across the groups, students from all groups felt: the classes that they liked were the ones that were relevant to their future plans or had good teachers. The classes they disliked were those that they perceived to not have real world relevance or bad teachers. The students for the most part found high school to be fun, socialization was very important to all groups, they did not like long hours, homework or mean teachers and administrators. High school was relevant to all groups as it prepared them for future learning and occupations.

Summary

The two primary questions that were reviewed for this project were of the tech-prep students' perceptions of their educational experience, as it was

affected by the size of the school district and the number of years that the consortium has received funding. These data were also analyzed for any interaction between the two variables. With respect to the size of the district question several significant results were reported. The number of students that were assigned a counselor was affected by school district size; the students in larger schools were more often assigned a counselor, but students in districts with less than 3,500 students reported more frequent visits to the counselor. Students enrolled in small schools reported more that English/communication classes were more interesting and that the classes were helpful at school. The teachers were more helpful with problems, more helpful in assisting the students in understanding the problems, and in providing information to help student understand what is required for a passing grade at smaller schools. The students from smaller schools also reported that their grades have improved in the past two years.

The items that demonstrated significance when evaluated with respect to years of funding were again the assignment of a counselor with the consortia that have received funding six years or more reporting a larger number of students' assigned a counselor, however the students in consortia that had received funding for under three years reported more visits to the counselors. It was reported that fewer students were taking classes at community colleges in the groups that had received six or more years of funding. The participation in apprenticeship and internship opportunities was again significant with the increased number of participants from groups that

had received funding for three years or less. The reported grades in the past two years were reported to have improved in the consortia that had funding for three or less years. The students from programs that have been receiving funding for six or more years reported the current year grades as well as high school grades were better than those that had received funding for three years or less. The students' in consortia that had received funding for six or more years reported more use of the learning aids, calculators, and technical journals.

The interaction of the two independent variables was significant in three instances. Students reported higher grades from consortia that had received funding for six or more years and being from small school districts. There were two disordinal interactions, students from large districts that had received funding for six or more years found mathematics to be more useful in their personal lives, conversely students from small districts that had received funding for six or more years found Comm/English/Language arts classes more helpful in their personal life.

CHAPTER 5: SUMMARY AND DISCUSSION

Summary

The State Department of Education provided the researcher with contact information on 11 tech-prep consortia that were currently receiving federal funding in the State of Wyoming. The consortia were sorted to those that had received funding for six or more years and those that had received funding for three or fewer years. This reduced the population to six consortia that fit the design of the study. The contacts were then sorted to the size of school district they represented, those with over 7,000 students and those with 3,500 or less students. Seven school district superintendents were contacted for permission to talk to teachers about the possibility of requesting students to complete questionnaires about their educational experience. Permission was granted and 25 teachers were contacted to request access to the teachers' classes that represented the tech-prep students. Eighteen responded, however only nine actually participated. The researcher requested permission to come to the teachers' classroom and administer a questionnaire that had been developed for a somewhat similar study conducted in Colorado (Gleockner & Lyons, 2000). The teachers responded that the researcher need only send the questionnaire and the teacher would be glad to administer the survey and send the questionnaires back to the researcher, additionally the researcher went to two classes and administered

the questionnaire after the instructor had collected the consent forms. The required human subject release and questionnaires were sent to the teachers with written directions as the purpose of the study and the need for the parents signature prior to the student being allowed to participate in the study. The researchers appreciation was indicated in the cover letter. Nine responses were received, with the teacher's apology for student's lack of interest and the inability to obtain parental consent.

Data were received from 126 secondary students representing seven school districts and six tech-prep consortia. Three large school districts responded, those with over 7,000 students, and four small districts, those with less than 3,500 students. Two groups of students responded from consortia that had received federal funding for six or more years with four groups from consortia that had received federal funding for three or less years. These data were analyzed to determine if differences in the students' perceptions of their educational experience were significantly different when comparing size of the school districts and the number of years of federal tech-prep funding the schools had received. Student responses were collected on questions that represented the effects of the tech-prep initiative. The students were polled as to their experience with many aspects of the initiative, career counseling, use of applied learning techniques, and the application of mathematics, science, and English/communication classes. The students were asked to respond to questions about career plans and what career planning assistance they had received. The students were asked

to report their grades this year (2000-2001), for their high school career, and the perceived change in their grades over the past two years.

Size of District

The student responses were reviewed with respect to the size of the school district in which the student was enrolled, those with fewer than 3,500 students were labeled small and those with over 7,000 were determined to be large. Several significant differences in the responses were recognized; was the student assigned a counselor or not, how often the student visited the counselor, the students' grades over the past two years, the interest and usefulness of English/Communication classes and the teachers demonstrated helpfulness in problems and instructing the student on class assignments.

When the students responded to statements about the assignment of a counselor and about the frequency of visits to the counselor, some contradictions were reported; those students enrolled in large school districts were more likely to report that they were assigned a counselor; however, the students responding from small school districts met with the counselor more frequently. This may be explained using the staffing concerns of small schools, often large schools have more counselors and therefore assign each student to a specific counselor, whereas in small schools only one counselor is employed: therefore, no student is assigned a counselor because they all have only one choice. This would be consistent with the

researcher's experience in small rural schools and research on the topic by Ramirez (1989). The students enrolled in small school districts reported a higher frequency of visiting the counselor however, when responding to the career guidance statements as to information received from their teacher/counselor, there was no difference with respect to the size of district.

The students responded to statements about their classes in mathematics, science and English/communications with respect to the usefulness in school, work, or the student's personal life, the interest in the class, and the relation of the class to the real world. While the students enrolled in small school districts reported that the English/communications classes were interesting and helpful at school more often than the students from large school districts, it should be noted that all averaged responses were above the mean. This result demonstrates support for the success small schools are enjoying in implementing the applied approach of instructing English/communication classes.

Students in small schools reported that the teachers took more time for their problems. When asked if the teacher took time for them when they had a problem or needed assistance and again when asked if the teacher helped the student to understand what class work must be completed to learn and receive a passing grade students from small schools responded positively more often than the students responding from the larger school districts. When the data collected about teachers' style and enthusiasiam were summated, the cumulative answers were again significant, with the

students from the small schools scoring their teachers more helpful and enthusiastic. These responses may be due to the class size: that is, in rural schools often the enrollment in career technical classes results in a low student to teacher ratio and promote a more personal relationship between teacher and student.

Years of Funding

The data were compared using the number of years of federal funding for the consortium through the tech-prep initiative, those having received funding for three years or less and those having received funding for over six years. The statements referring to if the students were assigned a counselor were significant, with schools that had received funding for over six years having more students responding that they have an assigned counselor: however, when asked for an estimated frequency of meeting with the counselor, the students enrolled in consortia that had received funding for three years or less reported more frequent meetings with the counselors. This could be explained consistent with the prescriptions of the tech-prep initiative, in that the schools that had worked the program for more years had gotten more students assigned to counselors and career programs in place, with the newer programs requiring the students to meet more often to get career plans established and agreed upon. The students were asked to report their grades for last year, this year, and a perception of what the grades have done over the past two years. Had they improved, gotten worse,

or remained the same? The responses offered some support for the tech-prep initiative having a positive impact if allowed some time to affect change. The students from programs that have had funding for over six years reported higher grades both last year and this year; however, the students from programs having received funding for less than three years reported that their grades had improved in the past two years. This would support the initiative as the students who have had the benefit of the federal funding longer have better grades while those who are now impacted by the initiative for less years reported that their grades are better this year than last.

When the students were asked to report the frequency of the teacher utilizing learning aids in the classroom, significant differences were again reported. The students enrolled in schools that have received federal funding for over six years reported the use of calculators and technical journals more frequently in the classroom or to complete assignments. When the responses of both groups were compiled, again the students from programs having received funding for over six years reported a significantly more frequent use of learning aids. This is consistent with the application of the tech-prep funding, over years more learning aids can be purchased and incorporated into the classroom instruction. Additionally, the longer the program has offered funding potentially more faculty have had the opportunity to become involved in professional development that would promote the use of increased learning aids.

While this study finds some increased utilization of learning aids in the classroom of consortia that have received funding for six or more years, it is important to note the lack of significant increase in usage of most of the listed learning aids: the internet for research and communication, the newspaper, maps, blueprints, and charts, measurement devices, and computer software.

When the students were asked if they were currently attending a class at a community college, those students enrolled in schools that have received funding for less than three years were more likely to be enrolled in classes at community colleges. In another section of the questionnaire, the students were asked if they were participating in apprenticeship or internship opportunities. The students from programs that been funded for three years or less were more likely to participate; however, it should be noted that only 18 students from those programs offered a positive response.

Discussion

The results from this study would support the research completed by Hershey et al. (1998), in that little consistency of the effects of the tech-prep initiative are reported. In the Hershey study, one of criticisms of the implementation of the tech-prep initiative was the variety of designs. Hershey et al. offered three forms of implementation, a structured plan of coursework, an enhancement to existing trade or vocational programs, and programs that introduced one or two elements without targeting any particular group of students. This was evident in Wyoming in talking to consortium project

managers that both the enhancement to existing vocational and trades programs and the non-focused implementation design are utilized. Some of the managers utilize funding to provide classroom-learning aids, while others focus on personnel salaries to offer career guidance, and others emphasize national conferences for professional development. The results of this study reflect the variety of consortium emphasis, as did the Gloeckner and Lyons (2000) study in that there is a lack of consistent differences in the student perceptions between tech-prep and non-tech-prep students.

The Hershey et al. (1998) study indicated that the tech-prep initiative had increased the number of applied offerings, and this study would be somewhat consistent with that outcome. Schools that had received funding for six or more years were statistically higher in the use of calculators and technical journals than those that had received funding for three years or less. This difference may be a result of increased professional development in the use of learning aids in the classroom or a result of the increased funding for classroom supplies. The mean for consortia that have received funding for six or more years in the learning aids questions was consistently above the mean of the schools that had received funding for three years or less, with the exception of internet communication. These data would support Hershey et al. (1998) in the assertion that the tech-prep consortia were offering the student a more "hands-on" approach to learning.

The Bragg (2001) study was in agreement with several of the findings of this study. Bragg reported a shortcoming of reaching the intended

audience, the neglected majority as Parnell (1985) described the roughly 40 percent of the high school student population, needing career and technical training, beyond high school yet less than a four-year degree. In Wyoming approximately 5,000 students are recognized as tech-prep, a much smaller percentage than the initiative was designed to serve. This study mirrored the Bragg study in the increased awareness of counseling, as the larger schools with more than one counselor had assigned the students to a counselor and those from consortia that had received funding for three years or less were visiting the counselor more often, presumably to develop and refine career plans. Bragg also reported an increase in integrated study; this project found the use of learning aids was significantly higher in schools that had received funding for six or more years. This increased use of learning aids supports the increase in applied learning opportunities and the use of funding for professional development to provide teacher training in the development and offering of more applied coursework.

In the study by Ramirez (1989) the focus was on school size, one difference noted in the study was reinforced in this study. The question was posed to students regarding whether they were assigned a counselor and next how many visits the students made to the counselor to request assistance with their classes. In large schools, those districts with over 7,000 students, the students' response was significantly higher stating that they had been assigned a counselor; however, the students from smaller districts, those with fewer than 3,500 students, reported making more visits to the

counselor. This would support findings similar to Ramirez, in that large schools have more counselors; however, the small schools have a lower student to counselor ratio.

The Gloeckner and Lyons (1999) study was a longitudinal study to evaluate differences in students' perceptions between tech-prep and non-tech-prep students. This study utilized the same questionnaire to seek further knowledge to discover if the years of funding or the size of the school district the student attended had an effect on the perceptions the students held of their educational experiences. This study found that in the first year of the study that significant differences occurred in the career and college counseling, specifically that the tech-prep students received more information on community colleges, career counseling and internship opportunities while the non-tech students received more information on four-year schools. Also, tech-prep students were more likely to have visited a community college and been involved in internship opportunities, and the non-tech student was more likely to have visited a four-year college. The differences noted in the career-counseling component of the questionnaire indicated that the tech-prep student was more likely to receive information from teachers or counselors, while the non-tech-prep student was more likely to receive information from their parents or on their own. This study also reported that the tech-prep student spent a significantly larger amount of time both performing volunteer work and participating in clubs and organizations. This study concluded that the tech-prep initiative had achieved its goal because the students were as

successful as their non-tech-prep counterparts, and the alternative methods were allowing for this success. The subsequent years of this study reported that in the use of learning aids, tech-prep students use computer software more than the non-tech-prep students, whereas the 1998 data indicated the tech-prep student used the internet for research more often. The second year of the study did not indicate a significant difference. The career counseling section remained consistent, with the tech-prep students getting more career and internship information from teachers and counselors and being more likely to have visited a community college. The tech-prep students reported to have more career related jobs in the 1999-2000 data. The portion of the questionnaire related to the usefulness and application of the coursework revealed that the tech-prep students felt that their mathematics classes were more helpful at work than the non-tech-prep students.

This study indicates that tech-prep is working. The grades of students involved in consortia that have received funding for three years or less are improving according to the students' response. The grades of students in consortia that have received funding for six or more years are better than the grades of students in the newer consortia, indicating that the effects of the tech-prep funding are, given time, raising the students' grades. The use of learning aids, summated data, was reported to have increased in consortia that have received funding for six years or more, which again demonstrates that given adequate time for change the students are being offered a more integrated "hands-on" learning experience. The category of whether a

student was assigned a counselor or not and the number of visits to the counselor would reflect that possibly the tech-prep initiative is working, because in the larger schools more students are assigned counselors, and in the consortia that have received funding for three years or less the number of visits to the counselor is higher. This result is consistent with the intent of the tech-prep funding, since more students are to have counseling available to them, and in the early development of the students' career plans more visits would be expected. Other results that are consistent with the intent of the funding are the use of learning aids more often in classes that have received support for six or more years, a demonstration that either the funding is used to purchase classroom aids or to provide professional development opportunities to encourage teachers to offer more applied or integrated curriculum.

Suggestions for Further Study

The most significant results this study offers is the students' reported improvement in grades in the consortia that have received funding for six or more years, and the reported improvement of grades over last years for students in the consortia that have received funding for three years or less. That is to say that after allowing time to affect change, there is an indication that tech-prep raises student grades. This result should be verified with the use of transcript grades as opposed to students' self-reported grades. However, the self reported grades may be equally important, as significant as

the improvement in grades is, the increased self-esteem created by the belief that grades are better is also a positive result.

The design of this study, one to measure the effects of the size of the district and the number of years of funding of the reform should be conducted in other states. These data can be utilized to establish patterns of success based on the states implementation design and student demographics. The Gloeckner and Lyons (2000) study could be replicated to determine if the results are consistent. The results would be expected to be similar as both states administer the tech-prep funds in a similar manner, with consortia competing for grant funding. Program directors could be polled to establish the format of the consortium, using the three designs offered in the Hershey et al. (1998) study. Then research similar to this could be conducted based on the design to establish differences in the perceptions of the students affected. It appears that it may be time to move tech-prep research from the career/ technical teachers to the academic teachers and establish the resistance or acceptance of an integrated curriculum; in other words, why is it that the studies demonstrate a lack of the use of more applied instruction?

More research should be performed with a focus on determining the length of time required to gain evidence that change has occurred. Since this study reflects that some changes occur between the third and sixth year of an initiative, more research could help to determine the length of time required and the elements that need to be present to facilitate change. Initiatives similar to tech-prep and others that reach a broader student

population and receive greater funding could be studied in a longitudinal fashion to establish the timing, and other components required for implementation of change.

Lessons Learned

This project provided the researcher with considerable experience and provided an appreciation of the difficulties of obtaining voluntary information from secondary students. The researcher had intended to visit the classrooms of the target population and request the students' complete the questionnaire. All of the teachers that were contacted (and whom permission was requested to visit the classroom), indicated that they, the teachers, would rather administer the questionnaire and return them to the researcher. To comply with the teachers' wishes, the researcher sent packets of the required human subject consent form and the student questionnaire, with a cover letter and return postage paid envelope to each teacher that had indicated a willingness to assist in the data gathering process. After the packets were sent, the researcher maintained contact with the teachers via e-mail and telephone. The teachers responded that the consent forms were distributed with a request from the teachers to obtain permission to participate in the study. The teachers then responded to the researcher, that most of the students were not bringing the consent form back, several of the teachers indicated that they had sent home the consent form as many as four or five times, to attempt to increase the response rate. The researcher

was invited to two classrooms to request participation. This was completed and response rate went up slightly in these instances, however the response from the classes that agreed to participate was disappointing. In talking to the teachers, the difficulty was with the required human subject consent form.

The other impact on the response rate was the nine teachers that originally offered to be in the study but later chose not to be involved in the study. Some of this was due to the small rural schools often do not have students that meet the definition of tech-prep in the state of Wyoming. Other difficulties that lowered the response were teachers that at first indicated interest in assisting the study, however when the questionnaires were received and follow-up contact made the teachers indicated that they would administer the study, subsequent follow-up resulted in the teacher indicating that they had let the study rest on their desk and just let the semester get away before they requested the students to respond. The enthusiasm of the teachers may have sent the wrong signal to the students.

The definition of a tech-prep student in Wyoming is a student that is enrolled in the second technical course, a course that is articulated with a community college. This restrictive definition limits the number of students that receive the designation of tech-prep, and many of the teachers are not aware of the definition, thus creating some confusion of who could be included in the study.

The most alarming lesson learned was the lack of interest the students demonstrated. They refused to return the consent form and

therefore were eliminated from the study. As the study was designed to provide information as to the students' perception of their educational experience, the researcher was equally disappointed in the lack of the teachers' interest in the results. Most of the teachers demonstrated a lack of interest. None of the teachers that participated in the study contacted the researcher to obtain the results of the study, and the lack of student participation can be in part placed on the teachers' manner in requesting participation.

On another issue, the lack of relevant literature caused the researcher difficulty. None of the studies found provided any conclusive information on the length of time required to obtain evidence of change, the only study with a definitive timeline was on the implementation of the "new math", a change that was mandated to be completed in one year. Difficulty was experienced in the tech-prep literature as each state is allowed to administer the federal funds per the state plan. Each being different from the others, therefore no direct comparisons are relevant as each state uses different guidelines to fund consortia. That being said, the majority of the studies that were found on the evaluation of tech-prep are of a qualitative design, offering no numerical results for comparison, with the exception of the Gloeckner and Lyons (2000) study that was utilized in this project. The Gloeckner and Lyons study looked at the difference between tech-prep and non-tech-prep students without regard to size of district and years of funding. The majority of the literature that was found discussing the effects of class size is in relation to the

concept of a school with-in a school or the advantage of small class size. In the state of Wyoming many of the schools are small due to the distance between towns, that make the school classified as small, however the funding base is also small, creating a difference in small rural schools and the small schools identified in much of the literature.

Recommendations for Practice

The most significant finding in this study was the results of the questions about student grades. The students enrolled in classes that have been receiving federal funding for over six years were reported to be higher than those of students enrolled in classes that have received funding for three years or less. This was further supported by the question of "what have your grades done in the past two years," with students in consortia that had received funding for three years or less reporting that their grades had gotten better. This finding supports the initiative in both instances. One tech-prep is making a difference, as those students involved in classes that have received funding for three years or less are getting better grades now than before indicating the impact of the initiative, and two the change, given time, will result the students receiving better grades, as those students enrolled in classes that have received funding for six or more years are reporting better grades.

The state of Wyoming should conduct research to determine what aspects of the initiative are being implemented in the consortia that have

received funding for six or more years impacting students' grades. Once the components that are being implemented to change grades is identified, the state can disseminate this data and with concentration the consortia that have not received funding for as many years could duplicate the consortia that have improved student grades.

Other findings that indicate the number of years of funding contribute to a difference in the students' educational experience are indicated in the questions related to the use of learning aids in the classroom. The students that are enrolled in classes that have received funding for six or more years reported increased use of calculators and technical journals and the summation of learning aids in class. This finding indicated that over time the use of applied teaching techniques increases, further supporting the indication that given time the tech-prep initiative has made a positive difference in the students' educational experience.

This research would indicate that federal initiatives should be funded for several years rather than the current vision of the programs becoming self-sustainable in three to five years, as the state of Wyoming supports. This finding would encourage research into the evolution of implementation of change, many reforms are proposed and not given sufficient time to effect change.

The effect of the size of school district was significant in several areas. The students enrolled in districts with less than 3,500 students reported that English/communication classes were interesting and helpful at school more

often than those students from school districts with over 7,000 students enrolled. This was again demonstrated when the students were asked to rate their teachers on time allowed for problems or assistance and efforts to assist students in understanding class assignments. These findings support the position of Kennedy (1914) that small school size improves student performance. These findings would encourage further research as to the effect of the rural setting in school size, as opposed to much of the research done in urban settings. The finding would support the resistance to the consolidation of small schools for economic concerns.

This study offers support to the belief that the tech-prep initiative is working. The students that are enrolled in programs that have received federal funding for six or more years are getting better grades, and those students enrolled in classes that have received funding for three years or less are getting better grades this year. The results indicate that to recognize change, several years are required. The small schools are initiating change at a faster rate than their larger counterparts, if the student perceptions of the mathematics and English classes being more helpful in personal life can be attributed to the tech-prep activities.

REFERENCES

American Vocational Association. (1998). *The official guide to the Perkins Act of 1998.* Alexandria, VA: Author.

Beeson, E., & Strange, M. (2000). *Why rural matters: The need for every state to take action.* Washington, DC: Rural School and Community Trust.

Boesel, D., & McFarland, L. (1994). *National assessment of vocational education; final report to congress.* Washington, DC: U.S. Department of education, Office of research.

Bragg, D. D. (1991). *The leadership challenge: Planning and implementing Tech-Prep.* St. Louis, MO.: Paper presented at the National Association for Vocational Education Program Improvement.

Bragg, D. D. (January 1997). *Educator, student, and employer priorities for Tech-Prep student outcomes.* University of California at Berkeley, Berkeley CA: National center for Research in Vocational Education.

Bragg, D. D., (2001). *Promising outcomes for Tech-Prep participants in eight local consortia: A summary of initial results.* University of Minnesota,St. Paul, MN: National Center for Career and Technical Education.

Bragg, D., & Layton, J. (1995). The role of the community college in educational reform, *Education and Urban Society,* 27(3), 294-312.

Brustein, M., & Mahler, M. (1998). *One-stop guide to the Perkins Act of 1998.* Washington, DC: Brustein & Manasevit.

Carnevale, A. P. (1991). *America and the new economy*, Alexandria, VA: American Society for Training and Development. ERIC Document Reproduction Service No. ED 333 246.

Cohen, J. (1988). *Statistical power and analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawerance Erlbaum Associates.

Commission on the Skills of the American Workforce. (1990). *America's choice: High skills or low wages,* Rochester, NY: National Center on Education in the Economy.

Congressional Record, 105th Congress 2nd Session. (1998). *The Carl D. Perkins Vocational and Technology Act amendments of 1998.* Washington, DC:

Connell, T. & Mason, T. (1995). School to work transition: Issues and Strategies for evaluation and program improvement. San Francisco, CA.: Paper presentation at the annual meeting of the American Educational Research Association.

Corson, W., & Silverberg, M. (1994). *The school-to-work/youth apprenticeship demonstration preliminary findings.* Washington, D.C.: U.S. Dept. of Labor.

Congressional Record, 101st 2nd Session. (1990 September 25). *The Carl D. Perkins Vocational and Applied Technology Act Amendments of 1990.* Washington, D.C.:

CORD, Center for Occupational Research and Development. (1991). *2+2 Tech-Prep Articulation: a "win-win" experience*. Waco, TX: Author.

Cubberley, E. (1922). *Rural life and education: A study of the rural-school problem as a phase of the rural-life problem (rev. ed.).* New York: Houghton-Mifflin (ERIC Document Reproduction Service No. ED 392559)

DeYoung, A. J. (1987). The Status of American Rural Education Research; An Integrated Review and Commentary, *Review of Educational Research, 57 (2)* 123-148.

Dornsife, C. (1992). *Beyond articulation: The development of Tech-Prep programs.* Berkeley CA: National Center for Research in Vocational Education, University of California at Berkeley.

Ford, W. (1991). *The Tech-Prep education act: Meeting tomorrows competitive challenges (Policy Briefs 14):* North Central Regional Educational Laboratory.

Fullan, M. (1993). *Change Forces*. London: The Fulmer Press.

Gloeckner, G. & Lyons, L. (July 1999). *Tech-Prep evaluation for the state of Colorado.* Ft. Collins, CO: Colorado State University.

Gloeckner, G. & Lyons, L. (July 2000). *Tech-Prep evaluation for the state of Colorado.* Ft. Collins, CO: Colorado State University.

Grubb, N. W. (1996). *Working in the Middle.* San Francisco, CA: Jossey-Bass.

Haller, E., Monk, D., Spotted Bear, A. Griffith, J. & Moss, P. (1990). School size and comprehensiveness: Evidence from High school and beyond, *Educational and Policy Analysis, 12 (2)* 109-120.

Hammons, F. T. (April 1992). *The first step in Tech-Prep evaluation: the identification of program performance indicators.* Virginia Polytechnic Institute and State University: Unpublished doctoral dissertation,

Hershey, A. M., Silverberg, M. K., Owens, T., & Hulsey, L. K. (1998). *Focus on the future: The final report of the national Tech-Prep evaluation.* Princeton, NJ: Mathematica Policy Research, Inc.

Hoerner, J. L., Clowes, D.A., & Impara, J. (1991). *Identification and dissemination of articulated Tech-Prep practices for at-risk students.* Berkeley, CA: NCRVE at University of California.

Howley, C. (1996). *Ongoing dilemmas of school size: A short story.* ERIC digest, EDO-RC-96-6.

Hull, D., & Parnell, D. (1991). *Tech-Prep associates degree: A win/win experience.* Waco, TX: Center for Occupational Research and Development.

Jennings, J. F. (1997). The good and not so good news about American schools. *MCReal, Fall 1997, 1-7.*

Kennedy, J. (1914). *Rural life and the rural school.* New York: American Book Company. (ERIC Document Reproduction Service No. ED 392 561)

Layton, J., & Bragg, D. D. (1992). *Initiation of Tech-Prep by the fifty states.* Berkeley, CA: National Center for Research in Vocational Education, University of California at Berkeley.

Lee, V. E., & Smith, J. B. (1995). Effects of High School restructuring and size on early gains in achievement and engagement. *Sociology of Education, 68(4), 241-270.*

Lewis, M. V., Gardner, J. A., & Seitz, P. (1983). *High school work experience and its effects.* Columbus, OH: National Center for Research in Vocational Education Ohio State University.

Love, A. R., Jr.(2000). *Accountability, Assessment, and Teacher Commitment.* Albany, NY: State University of New York Press.

Manpower Development Research Corporation. (1995). *Career Academies.* New York, NY: Author

Mendel, R. (1994). *The American school-to-career movement: A background paper for policymakers and foundation officers.* Washington, D.C.: American Youth Policy forum.

Miller, B. A., & Hahn, K. J. (1997). *Finding their own place: Youth in three small rural communities Take part in instructive School-to-Work experiences.* Charleston, WV: Appalachia Educational Laboratory.

Monk, D. H. (1986). *Secondary school enrollment and curricular comprehensiveness.* Ithaca NY: Cornell University.

Nachtigal, P., (1995). *Culture, Community, and the Promise of Rural Education.* South Dakota: ERIC document #ED388464.

National Alliance of Business. (1996). *Workforce development trends.* Washington DC: Author.

National Assessment of Vocational Education. (1994). *Interim report to Congress.* Washington, DC: U. S. Department of Education, Office of Educational Research and Improvement.

National Center for Educational Statistics, (1980). *Digest of Educational statistics.* Washington DC: U.S Department of Education.

National Commission on Excellence in Education. (1983). *A nation at risk: The imperative for educational reform.* Washington, DC: U. S. Department of Education.

National Occupational Information Coordinating Committee (1989). National career development guidelines: Trainers guide. Washington DC: Author.(ERIC Document Reproduction Service Number ED317 874

National School to Work Office. (1996B). *School-to-Work glossary of terms.* Washington, DC: Author.

Nolan, J. Jr. & Meister, D. G. (2000). *Teachers and educational change.* Albany, NY: State University of New York Press.

Parnell, D. (1985). *The neglected majority.* Washington, DC: Community College Press.

Ramirez, A. (1989). High School Size and Equality of educational opportunity. *Journal of Rural and Small Schools, 4(2), 12-19.*

Reich, R. (2000). *The future of success.* New York: Knopf.

Roegge, C.A., Leach, J. A., & Brown, D.C. (1993). Stakeholder's perceptions of major themes and priority areas of Tech-prep in Illinois, *Journal of Vocational Education Research, 18 (3) 77-96.*

Roelke, C. (1996). *Curriculum adequacy and quality in high schools enrolling fewer than 400 pupils.* ERIC Digest EDO-RC-96-7.

Rojewski, J. W. (2002). *Preparing the workforce of tomorrow: A conceptual framework for career and technical education.* Columbus, OH: National Dissemination Center for Career and Technical Education, Ohio State University.

Roth, G. L. (2000). Tech-Prep and the Rural Context. *Journal of Vocational and Technical Education, Volume 12 no. 2.*

Rural School and Community trust. (September, 2000)*Rural Policy Matters.* Washington D C: Author

Sarason, S. B. (1996). *Revisiting" The culture of the school and the problem of change".* New York, NY: Teachers College Press.

Salant, P., & Dillman, D. (1994). *How to conduct your own survey.* New York: John Wiley and Sons.

Silverberg, M. K. (1996). *The continuing development of local Tech-Prep initiatives.* Princeton, NJ: Mathematica Policy Research Inc.

Silverberg, M. K., Hulsey, L. K., & Hershey, A. M. (1997). *Heading students toward career horizons: Tech-Prep implementation progress 1993-1995.* Princeton, NJ: Mathematica Policy Research Inc.

Smith, C., & Rojewski, J. W. (1993). School-to Work transition, alternatives to Educational reform. *Youth and Society,* 2(25) 222-251.

Stern, D., Finkelstein, N., Stone, J. R., Latting, J., & Dornsife, C. (1994, March). *Research on School-to-Work transition programs in the United States.* National Center for Research in Vocational Education. Berkeley, CA: University of California, at Berkeley, School of Ed.

Stiefel, L., Iatarola, P., Fruchter, N., & Berne, R. (1998). *The effect of size of student body on school costs and performance in New York City high schools.* New York NY: Institute for Educational and Social policy, New York University.

U.S. Department of Commerce. (1996). *Statistical abstract of the United States* Washington, D.C.: Author.

U. S. Department of Commerce. (1999). *Bureau of the census current population reports series P-60.* Washington DC: Author.

United States Department of Education Office of Vocational and Adult Education. (1991, January 18). *Estimated allocations under the Perkins Act as amended for program year 1991-92.* Washington, DC: Author.

U. S. Department of Labor. (2000). *Bureau of labor statistics,* Office of Employment and Unemployment statistics, Washington DC: Author.

U. S. General Accounting Office (1991). *Transition from School to Work: Linking education and worksite training (GAO/HRD-91-105).* Washington, D.C.: Government Printing Office.

U. S. Dept. of Education and U.S. Dept. of Labor. (1990, May 15-17). *The school to work connection.* Paper presented: The Quality Connection: Linking Education to Work. Washington, D.C.: Author.

Veum, J. R., & Weiss, A. B. (1993). Education and the work histories of young adults, *Monthly, Labor Review, 116 (4),* 11-20.

William T. Grant Foundation Commission on Work, Family, and Citizenship. (1988). *The forgotten half: Non-college youth in America.* Washington, D.C.: Author.

Whitford, B. L., & Jones, K. (2000). *Accountability, assessment, and teacher commitment: Lessons from Kentucky's reform efforts,* Albany New York: State University of New York Press.

Whitman, D., Shapiro J.P., Taylor, R. A., Saltzman, A & Auster, B.B. (1989). The forgotten half, *U.S. News and World Report, 45-53.*

APPENDIX A

Questionnaire

HIGH SCHOOL STUDENT QUESTIONAIRE

School District: _____
Tech-prep Consortium: _____

Thank you for taking the time to complete this questionnaire. The information gathered from this questionnaire will be used to evaluate your academic achievement and preparedness for further education and/or work as a result of the education you have received.

PART 1: About yourself

Directions: Place an "x" in the appropriate box unless otherwise indicated.

1. Gender Female Male

2. Grade 11 12

3. Ethnicity (choose the one you identify with most)
American Indian or Alaskan Native
Asian, Pacific Islander, Hawaiian, Japanese, Chinese, Vietnamese, Korean, Filipino
Arab American, of Middle Eastern origin
Black, African American, not of Hispanic origin
Caucasian/White, not of Hispanic origin
Hispanic, Chicano, Cuban, Puerto Rican, Latino, Mexican American
Other_____

4. Are you assigned to a counselor? Yes No

a. If yes, how often during the school year do you meet with your counselor when you need assistance with classes?
1-3 times/year 4-6 times 7-9 times 10 or more times

5. My high school grades are: mostly 'A' mostly 'B/A' mostly 'B' mostly 'B/C' mostly 'C' mostly 'C/D' mostly 'D' mostly 'D/F'

My grades This year are: mostly 'A' mostly 'B/A' mostly 'B' mostly 'B/C' mostly 'C' mostly 'C/D' mostly 'D' mostly 'D/F'

6. In the past 2 years my grades have: remained the same improved gotten worse

7. My parent/guardian's education level is:

father's mother's guardian's

hasn't finished high school
graduated high school/GED
attended some college
graduated college
holds advanced degrees (Master/Doctorates)
I'm not sure/don't know

8. In general. I enjoy school. Always Sometimes Never

9. In addition to taking classes, my school activities include:

Sports	_____ hours per week
Volunteer activities	_____ hours per week
Music, theater and/or other arts	_____ hours per week
Student clubs/organizations	_____ hours per week
Newspaper/Yearbook	_____ hours per week
Other: _____	_____ hours per week

10. I presently have a job. Yes No. If yes,
a. This job is related to my career interests. Yes No

PART 2: About your classes

Circle the appropriate number:

Seldom			**Frequently** ← →		
11. Math classes have been:					
a. Interesting to me	5	4	3	2	1
b. related to the "real world"	5	4	3	2	1
c.Helpful to me in my personal life	5	4	3	2	1
d.Helpful to me at school	5	4	3	2	1
e.Helpful to me at work	5	4	3	2	1
12. Science classes have been:					
a.Interesting to me	5	4	3	2	1
b.Related to the "real world"	5	4	3	2	1
c.Helpful to me in my personal life	5	4	3	2	1
d.Helpful to me at school	5	4	3	2	1
e.Helpful to me at work	5	4	3	2	1
13. Communication / English / Language Arts classes were:					
a.Interesting to me	5	4	3	2	1
b.Related to the "real world"	5	4	3	2	1
c.Helpful to me in my personal life	5	4	3	2	1
d.Helpful to me at school	5	4	3	2	1
e.Helpful to me at work	5	4	3	2	1

14. During this past year, the most useful classes I've taken were (state reason and how they were useful):

15. During this past year, the least useful classes I've taken were:

16. My teacher:

	Always	Sometimes	Never
a. Use different activities and ways of teaching in my class			
b. Take time for when I have a problem or need assistance			
c. Help me understand my class assignments			
d. Help me understand what class work I must complete in order to learn and receive a passing grade			
e. Use projects and labs as part of our grade			
f. Are enthusiastic about their subject			

17. The things I like about school are (state reason): _____

_____

18. The things I dislike about school are: _____

_____

because _____

_____

19. Which of the following have you used in your classroom or to complete assignments? (Circle the appropriate number.)

Seldom ← Frequently →					
Learning Aids					
Calculators	5	4	3	2	1
Newspapers	5	4	3	2	1
Internet as research tool to access info	5	4	3	2	1
Internet as communication tool (e-mail, chat room, etc.)	5	4	3	2	1
Technical journals	5	4	3	2	1
Maps, blueprints, charts	5	4	3	2	1
Measurement devices	5	4	3	2	1
Computer software packages	5	4	3	2	1

20. Have you or are you currently taking classes at a community college? Yes No

---

PART 3: About your future

21. My teachers and counselors:

a. Have given me information about careers that I may want to explore after I graduate from high school	Yes	No
b. Have given me information about community colleges that I may want to attend after I graduate from high school	Yes	No
c. Have given me information about four-year institutions that I may want to attend after I graduate high school	Yes	No
d. Have given me information about apprenticeship and/or internship opportunities	Yes	No

22. I have visited at least one community college. Yes No

23. I have visited at least one four-year college. Yes No

24. I have visited participated in apprenticeship and / or internship opportunities.
Yes No

25. I have started to develop my career/school plan

a. with the assistance of teachers and counselors. Yes No

b.with assistance of my parents/guardian. Yes No

c. on my own Yes No

26. Upon graduation, I plan to: (mark all that apply):

Attend a 2-year community college

Attend a four-year institution

Work full-time

Work part-time

Enter the military

Other _____

27. Has high school been a relevant part of your life? Yes No

Explain:

APPENDIX B

Student Consent Form

District Consent Letter

COLORADO STATE UNIVERSITY

INFORMED CONSENT TO PARTICIPATE IN A RESEARCH PROJECT

TITLE OF PROJECT: The Tech-Prep Initiative and the Quality of the Educational Experience for Targeted Students

NAME OF PRINCIPLE INVESTIGATOR: Gene Gloeckner, Ph.D

NAME OF CO-INVESTIGATOR: Mark Steinle

CONTACT NAME: Mark Steinle (307) 268-2411

SPONSOR OF THE PROJECT: Dissertation project, Mark Steinle

PURPOSE OF THE RESEARCH:

The public high school students in the state of Wyoming are being asked to answer questions about their educational experience so the effectiveness of high school programs can be measured. For the purposes of this study, these programs prepare students for further education or employment opportunities in certain careers. Examples include areas such as computers, auto mechanics, electronics, and medicine. This preparation is dependent on specific courses and actual hand on experiences through apprenticeships and internships. Thus it may include working with experienced individuals who are employed in the specific career.

Mark Steinle and the dissertation committee will review the students' answers to determine whether these programs have benefited the students. This includes success in classes taken and how well students are prepared for either a job or more education at a college.

METHODS TO BE USED:

The researcher will choose participants in a stratified cluster manner, selected students will be asked to answer the questions. This means each cluster of students has an equal chance of being selected.

If the student chooses to participate then the parents are asked to sign this agreement, which is a consent form. Participating students complete a questionnaire that asks for personal history and educational experiences. The questionnaires will be collected by the researcher.

RISKS INHERENT IN THE PROCEDURES:

There are no known risks. It is not possible to identify all potential risks in an experimental procedure, but the researchers have taken reasonable safeguards to minimize any known and potential, but unknown, risks.

BENEFITS:

There are no direct benefits to the high school students, except to possibly influence the manner in which Tech Prep continues in Wyoming schools. The benefit to others from this project may be to help inform policy makers, school administrators, teachers, students, parents and general public regarding the outcome of program efforts in Tech Prep.

CONFIDENTIALITY:

No one will be told the names of participating students. Only the researchers will review the answers to the questions. The final report describes participants' answers as a group. Anyone reading the report cannot figure out the names of the students who answered the questions.

LIABILITY:

The Colorado Governmental Immunity Act determines and may limit Colorado State University's legal responsibility if an injury happens because of this study. Claims against the University must be filed within 180 days of the injury. Questions about subjects' rights may be directed to Celia S. Walker at (970) 491-1563.

STUDENT/PARENT INITIALS: _____ DATE: _____

PARTICIPATION:
Your participation in this study is voluntary. If you decide to participate in the study, your may withdraw your consent and stop participating at any time without penalty or loss of benefits to which you are otherwise entitled

Your signature acknowledges that you have read the information stated and willingly sign this consent form. Your signature also acknowledges that you have received, on the date signed, a copy of this document containing 1 Page front and back.

_____
Participant name (printed)

_____ _____
Paticipant signature Date

_____ _____
Investigator or co-investigator signature Date

PARENT SIGNATURE FOR MINOR

As parent or guardian you authorize _____(print name) to become a participant for the described research. The nature and general purpose of the project has been satisfactorily explained on the first page and you are satisfied that proper precautions will be observed.

_____
Minors Date of Birth

_____
Parent/Guardian name (print)

_____ _____
Parent/Guardian signature Date

STUDENT/PARENT INITIALS _____ DATE_____

(School District Letterhead)

Celia Walker, Director
Regulatory Compliance Office: Human Research Committee
410 University Services Center
Colorado State University
Fort Collins, CO 80523

Dear Ms. Walker,

The _____ School District supports the research project entitled: The Tech Prep Initiative and the Quality of the Secondary Education al Experience for Targeted Students to be conducted in the spring of 2001. We understand that the purpose of surveying approximately one hundred (100) of our district's students is to help determine to what extent Tech Prep has positively affected student achievement and student satisfaction.

The research project meets the guidelines to protect human subjects as established by this district. We look forward to participating in this research effort.

Sincerely,

_____
Superintendent (*or most appropriate/designated human subjects review person or committee of the district)*

_____ School District

APPENDIX C

Student responses to open ended questions

APPENDIX C

Answers to open ended questions:

14. During this pat year, the most useful classes I've taken were(state reason and how they were useful):

Small district, three years or less funding:

1. Ag class-revolves around my home life
2. Geography-different countries of the world.
3. all of them
4. Welding
5. Outdoor ed. Knowledge in search and rescue.
6. Welding. how to build things
7. Physics-program more realistic games
8. Business Math- I can actually use it
9. Welding-I can help my dad
10. Auto-I know stuff about my car now.
11. English-That I know what they are saying more
12. Welding-It will help get through college for welding
13. Ag mechanics
14. English has helped me become a better writer
15. English-It has me improve my writing skills
16. Ag. Ed. Because that what I am going to major in college

17. Child development- because I am going to major in elementary education
18. Math-you use it everyday
19. English- we need to know how to write things
20. Math, because I enjoy math and like to cook
21. Foods- I want to major in culinary arts
22. Woods, I build a lot of stuff
23. Art-because I like to draw
24. Algebra- I love math
25. Music

14. During this pat year, the most useful classes I've taken were(state reason and how they were useful):

Small district, six or more years of funding:

1. College bound English-because that's what I like
2. Independent living- helped me in real world
3. Woodshop- will help me move out
4. Anatomy/Phys. I liked the teacher
5. Woodshop
6. Math because I use math at work
7. Nothing
8. Multimedia, taught me to work with computers
9. College bound English, I love to write
10. Business math, helps with my checkbook
11. Computer, I use the computer in my personal life
12. Newspaper, taught me responsibility
13. Gifted English, I will need it in college
14. American Lit. It introduced me to some culture
15. Business communications, It helped me learn to write
16. Math/science/English, because they they taught me to communicate
17. Auto-cad, helps you grasp views of things

14. During this pat year, the most useful classes I've taken were(state reason and how they were useful):

Large districts, three years or less funding:

1. Networking, chemistry, biology
2. Networking, future job in networking
3. networking-it is interesting
4. English 10- I learned a lot of writing skills
5. Science classes, because I want to be a marine biologist
6. Journalism, because it relates to "real world"
7. English –real world stuff
8. Computer programming-planning on computer science major
9. PE helped me get in shape
10. Chemistry helped me advance in science
11. Conditioning to get stronger
12. Electronics- I love computers and technology
13. ROTC prepared me for military career
14. Woodshop, I learned to build things
15. Welding, I will be able to use the information later in life
16. Drafting, my job choice is to be an architect
17. Math, I like math with work and checkbook
18. Construction tech, it is making me smarter for my future career
19. Construction is fun
20. Math, helps with construction

21. My math and English because they prepare me for the future

22. Woodshop because I could build myself furniture

14. During this pat year, the most useful classes I've taken were(state reason and how they were useful):

Large districts, six years or more funding:

1. Auto-work on cars
2. Automotive-my future career will be automotive, this gives me a jump on what I'll be doing
3. Vocational: because I'm good with my hands
4. Wood tech and auto dynamics
5. Auto, English
6. Auto diagnostics, I'm going to be a mechanic, or Machine tool, if I don't go into auto I will go into production
7. Auto tech- I learned how to work on vehicles
8. P.E. keeps me in shape
9. English-improved my reading and writing
10. Money management, it helps me control money in all situations
11. Speech, prepared me for formal introductions used at work
12. ROTC, leadership teamwork and helps me in the Navy
13. Math and science, they are related to my interests
14. Auto, for career opportunities
15. Math, I use math everyday at work
16. Welding, because they helped me decide a career
18. Psychology, this class teaches you about human behavior

19. Auto tech, because everyone has automobiles

20. Vo-ag., interested me, related to almost everything I do

15. During this past year the least useful classes I've taken were:

Small district, three years or less funding:

1. none
2. English Math Science
3. none
4. Critical reading and writing (English)
5. History/ geography
6. GEL, relationships, English
7. Math-not enough information to understand
8. English, we don't do anything
9. Mail
10. Government- didn't really learn much things I did learn were not useful
11. Government- I don't plan to further my education on government
12. Sports nutrition it's not going to help me in life
13. Government
14. Choir- you not need to use in everyday life
15. Computers, because I don't use them to much
16. Pre-algebra-when are you going to use equations in life?
17. Foods I never cook
18. PE/health, English
19. English I didn't learn a lot because it was boring
20. PE sports are unethical

15. During this past year the least useful classes I've taken were:

Small district, six or more years of funding:

1. Chemistry- I am not going into the field
2. Government- not helpful
3. Physical education
4. PE
5. History
6. Applied physics
7. English
8. CAD, fun but not in my profession
9. Art
10. Auto-Cad-it will not pertain to my major
11. Algebra II it didn't pertain to common knowledge
12. Chemistry, Algebra II
13. Physics
14. Science, social studies, and math

15. During this past year the least useful classes I've taken were:

Small district, six or more years of funding:

1. Algebra
2. Senior comp, because they were things I already knew
3. Money management because I never have any money
4. English
5. P.E. just take it for credit
6. English-the teacher is really mean to our class
7. British Literature
8. English
9. Reading, because i don't read much
10. Speech
11. English/Lit, because I will never use that information
12. Electronics, all we do is play games
13. Science
14. Sociology, Physics
15. Internet connects, we did book work all day

15. During this past year the least useful classes I've taken were:

Large districts, six years or more funding:

1. History
2. English, most of the work has no real world applications
3. Pre-Calc, this complicated version of math is not very useful
4. Science
5. Computer tech
6. Chemistry, I don't think I'll use it again
7. Math, science, I will cook and work on vehicles as a hobby
8. Spanish
9. English, social studies
10. English, learn the same stuff year after year
11. English, ecology

17. The things I like about school are:

Small district, three years or less funding:

1. me learning
2. agricultural ed
3. time w/ friends
4. It's giving me the education that all that needed
5. Science and math, they are fun and useful metal shop is relaxing
6. Being able to see my friends, my classes aren't very hard
7. The activity that we get at school
8. The welding, I want to be a welder
9. sleep
10. Getting to socialize and be in extra-curricular activities
11. Friends-help you get through school
12. Ag, because I get to weld and do vet tech stuff
13. socializing
14. We have different classes to chose from
15. The teacher and the way they like to have fun
16. doing project research
17. My friend
18. Friends, bonding
19. The teachers care

17. The things I like about school are:

Small district, six or more years of funding:

1. Sports physical release, computer labs
2. away from home
3. Freedom learning
4. 4 day school week
5. Learning
6. Socialize
7. seeing others
8. Socializing and art class
9. I enjoy learning new things
10. being around other people
11. there are some excellent teachers
12. I learn a lot
13. Lunch and PE
15. I like sports
16. Get to be with my friends
17. Women, lunch and woodshop
18. The pop machine

17. The things I like about school are:

Small district, six or more years of funding

1. I get to learn a lot
2. Getting an education. To provide a future for myself
3. New experiences, writing and learning
4. Hanging out with my fiends
5. Teachers that care about students and enjoy teaching
6. People are fun to be around, running the "coffee company
7. Socializing
8. Friends
9. Friends and teachers are helpful
10. Knowing that I will graduate from high school
11. If I didn't go to school I would be a dumb-but
12. Meeting new people
13. Lots of friends, nice teachers, good education
14. Most of the people
15. Friends
16. Students after school activities
17. Women-there's lots of them, sports are fun
18. Socialization
19. Women
20. Girls

17. The things I like about school are:

Large district, six or more years of funding:

1. Socialize
2. The amount of hand on work we are allowed to do
3. Some of the teachers are nice and encourage you
4. Vocational
5. The people are fun to be around
6. It is helping me for the real world
7. Meeting people
8. Friends and you have fun with friends
9. Vocational classes, welding auto, and machine tool
10. Social life, that a lot of fun
11. All of your friends are there, you can plan the weekend
12. Friends and Auto, it makes school interesting
13. The socialization
14. I just like the tech classes
15. My elective classes
16. Kills time and a great place to meet friends
17. Early release
18. Friends, getting ready for college
19. Fun teachers, fun classes, and friends
20. Meeting and socializing with people

18. The things I dislike about school are:

Small district, three years or less funding:

1. The time it takes
2. Everything
3. Nothing
4. The number of people
5. The work that does not make any sense
6. It gets pretty boring most of the time, I don't like some of the teachers
7. No pillows
8. The way things are ran and how things and people are treated unfairly
9. The teachers and school aren't run right, of the principal
10. Some teachers some don't help us
11. The way things are ran there is no consistency in roles
12. How things are ran
13. The class scheduling
14. The long class period and some of the teachers
15. Horrible teacher
16. Some of the homework
17. Teachers
18. I have to go

18. The things I dislike about school are:

Small district, six or more years of funding:

16. The kids they are all mean
17. The people
18. Long hours
19. Homework and some classes
20. Some of the teachers
21. Bad teachers
22. Too much to do in too little time
23. Teachers that don't put time or effort into teaching
24. Social influences and overload of homework
25. Sometimes it can be boring
26. How people are mean, sometimes teachers are one-sided
27. Getting up in the morning and cross and unfair teachers

18. The things I dislike about school are:

Small district, six or more years of funding:

1. How long it is
2. Waking early, sometimes boring
3. How useless it is, and how long it takes
4. Learning, I don't like it
5. English, I have a mean teacher
6. The favoritism amongst administrators, it is ridiculous
7. Class work, it sucks
8. Faculty, some could care less about you
9. too many student standing in the road, takes forever to leave school grounds
10. Homework, starts to early, I work and have things to do, sometimes don't have time to do it all
11. People that think they are better than everybody else
12. Busy work, some teachers give work just to stay busy, I don't like that
13. Some of the rules
14. Work, I'm lazy
15. Math classes that don't do anything but talk to you for 90 minutes
16. Teachers that need to retire

17. Homework, I have other important things to do at home and don't get enough sleep

18. The things I dislike about school are:

Large district, six or more years funding:

21. Too many school hours

22. Teachers that don't teach well

23. Mornings, teachers who don't care

24. My time being wasted by fools

25. Homework

26. Teachers, they are mean

27. Parking in the front

28. Too long, sometimes boring, sometimes stressful

29. How boring it gets

30. Some of my teachers, they're mean

31. Homework

32. Core classes

33. The classes that I will never use

34. The administrators have lost focus on what's important, they are on a power trip

35. The streets are safer than the schools

36. Homework and stupid assignments, if it doesn't relate I don't want to do it.

37. Too many credits to graduate

38. It's long boring and tiring

39. Stupid rules, our school is too strict

40. Parking

41. Teaching styles of some teachers

27. High school has been a relevant part of your life, explain:

Small district, three years or less funding:

1. yes, prepares me for college and for jobs in between
2. I have grown a lot
3. learning experience
4. because without it I would never make it anywhere in life
5. It has allowed me to have access to higher education
6. It's relevant because I learn all the things I need to know
7. By getting up early in the morning and by thinking about the homework that I have to do
8. Without I wouldn't have my education
9. Sports have taught me a lot throughout school. I have learned some valuable info. from a select few of my classes
10. You establish yourself during high school for the rest of your life
11. I have learned lots
12. Yes sports are very important in my life and high school has helped me find what I want to major i n
13. Because you learn everything that you will need after you graduate
14. I most of the time look forward to coming to school and learning as much as I can
15. Yes cause I am there
16. Because I am working for my
17. Fun

27. High school has been a relevant part of your life, explain:

Small district, six or more years of funding

1. I hated all the social things because kids are awful, but for the most part the education was good
2. It teaches you the fundamentals
3. Because it taught me a lot, and I have made friends
4. I have learned a lot it has been interesting
5. Public school prepares you for life
6. I will always remember high school and the people here
7. I have learned a lot and it's been fun
8. High school helped me start preparing for college
9. Without it I wouldn't have friends
10. Because it allowed me to spend time with my friend
11. Because it helped me decide on what I want to be in the future
12. It is my life outside of home
13. I learned a lot
14. It's been my life thus far
15. Help me get ready for the real world
16. It took 12 years
17. School is an important part of my life

27. High school has been a relevant part of your life, explain:

Large district, three years or less funding:

1. It will help me get into a good college
2. It has helped me decide what I want to do with my life
3. I plan to learn from my negative experience and move on
4. This is a stupid question
5. High school gets people ready for life
6. I enjoy the people of my high school
7. I need a diploma to go to the Navy
8. I believe that without education the U. S. would not be world power
9. High school has helped me to learn about personal responsibility
10. High school has been the most fun years of my life
11. Because it is part of the "growing–up" process
12. It was an experience
13. To help me on my own
14. It develops me for college
15. It has helped me and taught me many things
16. Has done many things to help me gain interest in my future
18. It's just a social event
19. I met strange and unusual people and learned from them

27. High school has been a relevant part of your life, explain:

Large district, six or more years funding:

1. It's just part of it
2. I believe that will help me in life
3. Learned lots
4. I have met many new people
5. I have nothing else to do but school
6. It's part of everyone's life
7. It is how I learn
8. I feel it has helped prepare me for college
9. Takes up a lot of time
10. I get to learn everyday
11. I am here all the time and have to pass to get into college
12. I've learned to grow a lot
13. What I learned in high school will carry on into the Army
14. Friends
16. It has prepared me for college
17. I have learned some new trades
18. It gets me out of the house everyday
19. I have learned a lot
20. It will help me in the long run
21. Because I need to graduate so that I can get a decent job
21. It's one of those steps in life you have to take

22. W/o it I wouldn't be interested in Auto or anything mechanical
23. It has been a major learning experience and it was fun sometimes
24. W/o an education people don't get very far
25. It has prepared me for what comes afterwards
26. It has helped me find out what I'm going to do in life
27. I need it to improve my social skills
28. I learned a lot on careers I am considering
29. High school has taught me very many valuable skills on life
30. I have learned things that on the job training could not teach me