INPUT AND ENVIRONMENTAL VARIABLES INFLUENCING COMMUNITY COLLEGE STUDENT SATISFACTION WITH TECH PREP PROGRAMS IN TEXAS

by

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ABSTRACT

Tech Prep has emerged recently as a major reform in career/technical education. As with any educational initiative, the means of evaluating that program became important. The main problem considered in this study was the lack of reported research on community college students' satisfaction with Tech Prep programs in Texas. Using Astin's (1991) I-E-O model, an evaluation of student satisfaction with Tech Prep programs was undertaken.

The three main purposes for the study were:

1. to determine which, if any, of the input and environmental variables affected student satisfaction with Tech Prep programs in Texas;
2. to identify policies and practices that enhanced student satisfaction; and
3. to make recommendations concerning policies and practices to increase community college student satisfaction with Tech Prep programs in Texas and the nation.

The methodology included the development and statewide distribution of a questionnaire. Twenty-five hundred questionnaires were distributed to 53 community college campuses. A total of 500 surveys for students over the age 18 were returned for a usable response rate of 20%. Both descriptive and inferential statistical methods were used to analyze the data. Blocked stepwise multiple regression analyses were used to answer the research questions. These regression analyses allowed the researcher to formulate equations to predict student satisfaction with three dependent satisfaction variables.

The major findings were as follows. In formulating an equation to predict student satisfaction with vocational aspects of Tech Prep, 10 of 43 independent variables were found to be significant. In formulating an equation to predict student satisfaction with academic aspects of Tech Prep 10 of 43 independent variables were found to be significant. In formulating the equation to predict students' overall satisfaction with Tech Prep, 11 of 43 independent variables were found to be significant. Furthermore, the data revealed that the Tech Prep students in this study were very satisfied with the program.

Policy and procedure recommendations were made based on these findings.

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CHAPTER I
INTRODUCTION

The introductory chapter presents the conceptualization of the study. This chapter is divided into twelve sections: (1) a brief history of Tech Prep, (2) statement of problem, (3) purpose of the study, (4) research questions, (5) need for study, (6) delimitations, (7) limitations, (8) assumptions, (9) definition of terms, (10) anticipated findings, and (11) organization of the dissertation.

A Brief History of Tech Prep

Foundations of Tech Prep

In 1983 the National Commission on Excellence in Education (NCEE) published A Nation at Risk: The Imperative for Educational Reform that stated that the American educational system was failing to prepare the nation's youth. In the wake of A Nation at Risk, many educational reforms were proposed, including Tech Prep. In the spring of 1984, a small cadre of educational reformers including Dale Parnell, President of the American Association of Community and Junior Colleges (AACJC); Dan Hull, President for the Center for Occupational Research and Development (CORD); Gene Bottoms, Executive Director of the American Vocational Association (AVA); and Leno Pedratti, Senior Vice President of CORD met to plan a national strategy for fostering changes in vocational and technical education (Hull & Parnell, 1991).

Stemming from this and other meetings, Parnell and others called for a comprehensive overhaul of the educational system. They urged the adoption of a national movement to establish and develop a rigorous

course of technical preparation--Tech Prep--as a valid and significant educational reform. These educational leaders began a campaign to bring Tech Prep to the foreground. They conducted workshops describing Tech Prep at the December 1984 national meeting of the American Vocational Association and again at the April 1985 American Association of Community and Junior Colleges' meeting.

In the wake of these meetings in the spring of 1985, Parnell completed The Neglected Majority, a book that echoed the sentiments contained in A Nation at Risk (NCEE, 1983). Parnell (1985) highlighted the inability of the present educational system to produce a competent workforce. The Neglected Majority revealed that the middle fifty percent of the students graduating from public schools met minimum graduation requirements. These general track students were not prepared to enter either college or the work force.

American businesses have spent billions of dollars annually in training and retraining for basic skills. In 1985, employers invested $210 billion in training (Vaughn, 1991). David Kerns, chairman of Xerox, called this training "the product recall work for the public education system" (cited in Vaughn, 1991, p.448).

Tech Prep offered a change in preparation of American youth. The Tech Prep reform proposed that learning would be enhanced through the use of applied academics, working from concrete to abstract concepts. Integration of academic with vocational curricula would create meaningful and memorable learning for all students (Kolde, 1991). The Tech Prep program also called for an integration of academics with various vocational and technical areas. The intent was not a loss of academic rigor but rather an excellence arising from direct application of

academic concepts (Combining School and Work: Options in High Schools and Two-year Colleges, 1991; Hammons, 1992; Hoerner, 1991; Hull et al., 1991). As envisioned by Parnell, Hull, Bottoms, and Pedratti, Tech Prep hoped to produce high school graduates capable of entering the work force as skilled technicians, continuing to community colleges for an additional two years of education and a certificate or an associate degree, or continuing for a baccalaureate degree. The transition within the educational system was to be a seamless educational advancement from secondary schools to higher education or to employment in a skilled workforce (Hull et al., 1991; Merkle-Keller, 1992).

Tech Prep Precursor

The concepts of integrated curriculum (Kolde, 1991) and a seamless educational advancement were not untried educational processes. In 1969, the Electrical Academy at Thomas Edison High School in Philadelphia opened. The project was designed to prepare students for employment (Neubauer, 1986). The program forged a direct link between the classroom and business and a connection between vocational and academic studies.

This first academy was successful enough to warrant establishing similar programs within the Philadelphia system (Neubauer, 1986). The Philadelphia model was then adapted and spread to other areas of the United States. For example, two academies based on the Philadelphia model began in California in 1981 (Combining School and Work, 1991). Each program demanded that academic and vocational teachers coordinate their curriculum (Neubauer, 1986). Although most academies were limited in scope, usually including only one technical area, the

Philadelphia academies may have provided a philosophical foundation for an integrated curriculum with attempts at coordinating academic and technical education.

Graduates from the 1984 class of the two original California academies were matched with comparison groups from the same two high schools. After 15 months, contact with members from these two groups revealed that 62% of the academy graduates were enrolled in postsecondary education institutions (Combining School and Work, 1991). In a comparison with the control group made 27 months after graduation, a higher percentage of the academy program students expected to complete four-year degree programs. Furthermore, more of the graduates from academies were likely to be employed by "blue chip" companies (Combining School and Work, 1991). The results were well beyond the original intent to "keep students in school and to prepare them for employment" (Neubauer, 1986, p. 16).

Tech Prep Beginnings

The Philadelphia and California academies served as models for the more expansive Tech Prep programs. The cooperation with local businesses foreshadowed the extensive involvement desired between business, industry, labor, government, and education (Parnell, 1985). The cooperation demanded of academic and vocational instructors in curriculum coordination preceded Tech Prep's focus on an integrated curriculum. The success of the academies provided a foundation for the validity of Tech Prep reform.

In light of the success of the academies and as a result of the concerted efforts of leaders like Parnell, Hull, and Bottoms, a Tech Prep

pilot project was established in North Carolina in 1985 (Hoerner, 1991). The North Carolina project included cooperation with local business and industry, an integrated curriculum, and articulation agreements with postsecondary institutions (James, 1991; Hoerner, 1991; Hull et al., 1991). The articulation agreements provided a commitment between institutions to provide a non-duplicated, seamless advancement in the students' education. The National Center on Education and the Economy Report (1989) entitled America's Choice: High Skills or Low Wages? highlighted the success of the North Carolina pilot project.

North Carolina, however, was not alone in creating pilot Tech Prep projects in the 1980s. In South Carolina in May 1987, the Partnership for Academic and Career Education (PACE) was formed (Walter, 1992). PACE involved business, industry, and public education to raise entry level work force skills for students. In 1990, PACE staff began developing advanced technology certificates with postsecondary institutions. This cooperation enabled Tech Prep high school graduates to complete advanced certification in the time it would have taken them to complete an associate's degree (Walter, 1992). Tech Prep was proving to be successful in both North and South Carolina.

Tech Prep in Texas

Texas was not immune to the educational problems highlighted in A Nation at Risk (NCEE, 1983). In 1984, the Texas Legislature passed House Bill 72, which brought major changes in the Texas educational system. Among these changes was a directive to the State Board of Education to develop a Master Plan for Vocational Education (The Master Plan for Career and Technical Education, draft, 1993).

In 1986, Tech Prep began in Texas. The Leander Independent School District (ISD), working in conjunction with Austin Community College, received federal funding for a 2+2 program in Instrumentation and Control Technology. The 2+2 program was an early Tech Prep design. The Leander ISD - Austin Community College project was the first of eleven federally funded pilot 2+2(+2) projects in Texas between 1986 and 1990 (Request for Proposals: Planning for Implementation of Tech-Prep Applied Technology Programs, 1991). The 1989-1990 school year saw another pilot project in Paris, Texas. The Paris pilot project provided for implementation of an eleventh-grade curriculum for health occupations (Ingram, 1991). Health-career curricula were competency based. The health-career cluster was particularly amenable to multiple exit points, offering a flexibility desired in Tech Prep programs.

In 1987, the Texas Education Agency (TEA), the Texas Higher Education Coordinating Board (Coordinating Board), and the Texas Department of Commerce (TDOC) formed a partnership called the tri-agency. The express purpose of the tri-agency was to support efforts of employers and educators to provide a skilled and educated workforce. TEA asked postsecondary institutions to develop curricula integrating vocational/technical and academic content. The tri-agency also established Quality Work Force Planning Committees (QWFPC) in 1987 to identify targeted occupations for local, regional, or state employment needs (Butler, Andrade, & Boyd, 1992). The curricular items were to provide a concrete link between academic areas and QWFPC targeted occupations. Preparations were being made to implement Tech Prep programs across Texas.

The stage was set in the United States and in Texas for educational reform. In 1990, the Carl D. Perkins Vocational and Applied Technology Education Act, Title III, Part E funded Tech Prep education. Motivations were present in terms of a national initiative, federal funding, and state support for implementation of Tech Prep programs. After the Carl Perkins Act of 1990 and following the preparation begun in Texas in 1987, the tri-agency met in early 1991 to discuss issuing a call for grant proposals. On March 28, 1991, the Coordinating Board issued a request for proposals to fund the writing of a Tech Prep implementation grant (Request for Proposals: Planning for Implementation of Tech-Prep Applied Technology Programs, 1991). This request included a three month time period in which to prepare the initial proposal. In an extremely constrained time-line, decisions were made in a few months that affected students across the state. Carl Perkins funds spawned the creation of Tech Prep consortia as functioning entities in the education of students across Texas.

Statement of Problem

Mandate for Assessment

The Carl D. Perkins Vocational and Applied Technology Act of 1990 included a mandate for assessment of Tech Prep programs at both state and local levels (Merkel-Keller, 1992; Pullin, 1994). The evaluation of Tech Prep programs and processes was left to the states, with minimal federal requirements beyond basic guidelines (Congressional Record, 1990). Limited requirements might have contributed to the dearth of research in assessment or evaluation of emerging Tech Prep programs. In 1991, when reviewing the initial three-year plans for Tech Prep programs,

the U. S. Department of Education noted a serious problem with program assessment (Pullin, 1994). The evaluations that had been conducted were inconsistent in the evaluation process in terms of status of the program and accountability.

In 1991, therefore, amendments to the Carl D. Perkins Act were made by Public Law 102-103, 105 Statute 497 (Federal Register, 1992). Although these amendments provided more flexibility in the implementation of Tech Prep programs, the changes imposed new requirements on both states and grant recipients concerning accountability for improving vocational education. These amendments included stronger guidelines for assessment of impact on vocational education and required states and recipients of Carl Perkins funds to be evaluated annually concerning the effectiveness of projects, services, and activities (Federal Register, 1992).

Many of the early studies in Tech Prep research explored opinions and perspectives of stakeholders, other than students, concerning strengths, weaknesses, goals, attitudes, and quality indicators of and for Tech Prep programs (Hammons, 1992; Pollard, 1990; Roegge, Wentling, Leach, & Brown, 1993). Other studies attempted to describe existing programs (Penkowski, 1991-1992; Watkins, 1988), styles of articulation (State University of New York, 1991), or academic faculty views of vocational faculty (Coorough, 1992). Several studies (Decision Information Resources, 1994; James, 1991) reviewed the numbers of students enrolled in Tech Prep programs, the number of programs (North Carolina State Department of Community Colleges, 1992, 1993), or the impact on special populations (Tech Prep Implementation: Self-

assessment Inventory, 1992). Students were counted not contacted for input.

Although students were the focus of the Tech Prep initiative, few studies included student perspectives in Tech Prep program evaluation. Raulf and Ayres (1987) wrote concerning program evaluation:

> Program quality and content relevance are two key factors to assess in evaluation of a new occupational curriculum. The need for continual updating of curricula is critical. Several groups and phases should be involved in the process. (p. 21)

Raulf et al. (1987) included students as a critical source of information for evaluation and development of occupational curriculum. They wrote, "The students are the consumers of our programs; their input must not be taken lightly" (pp. 21-22). The importance of soliciting students' perspectives was echoed in the writings of Heipp and Huffman (1994) when they wrote, "Student's perceptions of an educational program provide valuable insights for assessing that program's effectiveness and determining its future direction" (p. 207). Scholars and researchers such as Goodlad (1984), Raulf et al. (1987), Heipp et al. (1994), and Astin (1991, 1984) have indicated the importance of including student's insight in evaluating and adapting or changing educational programs.

Research Problem

The general problem facing the field was the lack of reported research on students' satisfaction with vocational education. To increase the knowledge base in this facet of assessment, student satisfaction was selected as the dependent variable because of its value as an alternative measure for evaluating schools or programs (Astin, 1991; Bane & Jencks, 1972; Johnson, 1981a, 1981b). Consequently, program evaluation from

the students' perspectives emerged as the essence of this study. The main problem this study sought to address was the lack of reported research on community college students' satisfaction with Tech Prep programs in Texas.

Model for Assessment

Astin's (1970a, 1970b, 1991) Input-Environment-Output Model (I-E-O Model) was used to determine which input and environmental variables influence community college students' satisfaction with Tech Prep programs in Texas. The I-E-O Model carried an underlying theoretical basis in what Astin called involvement theory. Astin (1984) defined student involvement as the amount of physical and psychological energy that the student devotes to the academic experience. Involvement theory has five basic postulates:

1. Involvement refers to the investment of physical and psychological energy in various objects. The objects may be highly generalized (the student experience) or highly specific (preparing for a chemistry examination).
2. Regardless of its object, involvement occurs along a continuum; that is, different students manifest different degrees of involvement in a given object, and the same student manifests different degrees of involvement in different objects at different times.
3. Involvement has both quantitative and qualitative features. The extent of a student's involvement in academic work can be measured quantitatively (how many hours the student spends studying) and qualitatively (whether the student reviews and comprehends reading assignments or simply stares at the textbook and daydreams).
4. The amount of student learning and personal development associated with any educational program

is directly proportional to the quality and quantity of student involvement in that program.

5. The effectiveness of any educational policy or practice is directly related to the capacity of that policy or practice to increase student involvement. (Astin, 1984, p. 298)

The theory of student involvement linked intended student outcomes to the program's ability to elicit sufficient student investment of effort and energy to achieve the desired result. Virtually every institutional, administrative, instructional, and curricular policy and practice can affect the manner and amount of effort, time, and energy a student expends in the institution or program (Astin, 1984). By viewing student satisfaction through Astin's (1970a, 1970b, 1991) I-E-O Model, the researcher hoped to determine current students' satisfaction with Tech Prep in Texas (see Figure 1.1).

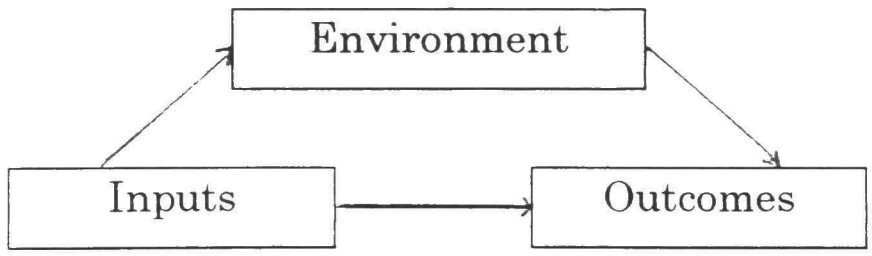

Figure 1.1 Astin's Model of the Relationship Among Input, Environment, and Outcome Variables. (Astin, 1991, p. 18)

Purpose of the Study

Tech Prep program evaluation in Texas is in its infancy. In addressing the mandate for program assessment and in considering the importance of soliciting students' perspectives concerning the impacts and benefits derived from Tech Prep programs, this study sought to obtain and

analyze the perceptions of students who were enrolled in community college Tech Prep programs in Texas. Since few evaluations of Tech Prep programs in Texas have been conducted, obtaining student perspectives was considered to be an essential component of Tech Prep program evaluation. For this study, the 'value' of Tech Prep was couched in terms of student satisfaction. The importance of utilizing students' input in program evaluation was indicated by John Goodlad (1984) when he wrote that students "are at the very heart of the process and undoubtedly have insight into what is going on" (p. 101).

The purpose of this study was to evaluate community college students' satisfaction with Tech Prep programs in Texas. Previous evaluations of Tech Prep programs in Texas, however, have not included affective student outcomes, such as students' satisfaction. This localized absence of student input in evaluation reflected the general pattern in evaluation research. This study proposed to explore this neglected area and evaluate student satisfaction with Tech Prep programs in Texas through the students' perspectives. The following three main purposes for the study emerged:

1. to determine which, if any, of the input and environmental variables affect student satisfaction with Tech Prep programs in Texas;
2. to identify policies and practices that enhance student satisfaction; and,
3. to make recommendations concerning policies and practices to increase community college student satisfaction with Tech Prep programs in Texas and the nation.

To accomplish these three objectives, the researcher held the precept that "A fundamental purpose of assessment and evaluation, it should be

emphasized, is to learn as much as possible about the structure of the educational environments so as to maximize talent development [student outcomes]" (Astin, 1991, p. 18).

I-E-O Model Variables

Astin (1991) wrote, "Nothing in human experience is intrinsically an input, an output, or an environment. How we assign these labels depends entirely on what aspects of experience we choose to study and how we formulate the questions we wish to answer" (p. 22). In short, the determination of which variables to consider in each of these categories depended on the focus of the research.

Astin's model underscored the relationships existing among the input, environmental, and outcome variables (see Figure 1.2).

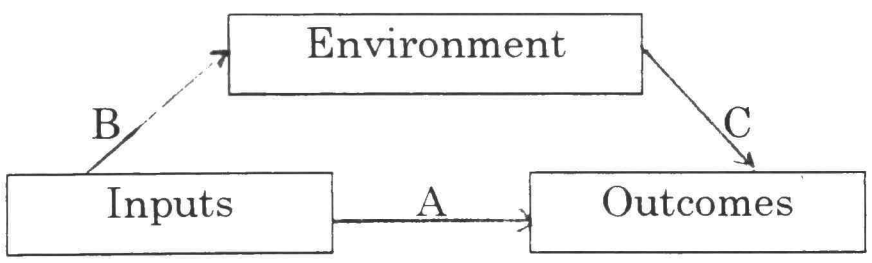

Figure 1.2 Lines of Influence for the Relationship Among Input, Environment, and Outcome Variables. (Astin, 1991, p. 18)

For instance, input variables may impact outcome variables directly, indicated by line A, or indirectly, indicated by line B (Astin, 1991). The indirect effects of input variables arose from interaction of input and environmental variables that influenced outcome variables. Environmental variables may influence outcomes alone, in concert with input variables, or be tempered by intermediate outcomes. Those

environmental variables that influence outcome variables directly, illustrated by line C (Astin, 1991) can emerge through statistical analysis.

Student input variables referred to those personal qualities that a student brings with him or her to the college or program (Astin, 1991). The student input variables were those factors that the researcher believed would influence the student outcomes without taking into account the specific environment (Norton, 1992). These input variables, according to Astin, were important in establishing a basis for determining the effect of the college or program environment. Astin (1991) wrote, "It is very difficult, if not impossible, to learn how our educational policies and practices affect student outcomes in the absence of input data on the entering student" (p. 64).

Other input variables pertained to a student's motivation or intent when entering a college or program. Since the purpose of this study was to ascertain students' satisfaction with community college Tech Prep programs through the use of the I-E-O model, Astin's (1991) belief that satisfaction measures were outcome variables that cannot be pretested was important. The problem of outcome variables that have no obvious pretest at the input stage was surmounted by ascertaining the "students' *predictions* or *expectations* with respect to the output measure in question" (Astin, 1991, p. 65). Students' expectations have been reasonably accurate in predicting what will happen to them in college (Astin, 1991; Hackman & Dysinger, 1970).

The environmental variables referred to the totality of the experience that happened during the course of an educational program (Astin, 1991; Norton, 1992). The environmental variables considered could include aspects of courses taken; individual instructors;

instructional styles; interactions with instructors and peers; physical environment; modern equipment; support services; and curriculum content, objectives, and sequencing. Environmental variables were considered to be those elements in a college or program that may influence student outcomes.

Student outcomes were those aspects of the student's cognitive or affective development that the institution or program either influenced or attempted to influence through its educational programs and practices (Astin, 1991, p. 38). Outcome measures were to be made after a period of time in the environment had elapsed, preferably after the program had been completed.

The student, however, may have experienced 'intermediate outcomes', outcomes that occur some time between initial entry and final evaluation (Astin, 1991). These intermediate outcomes may have resulted from influence exerted by input variables by way of environmental variables or directly from environmental variables. Astin (1991) suggested that these intermediate outcomes (student created environmental variables) be included with the environmental variables for analysis purposes.

The decision to use the I-E-O model was based on the flexibility of the model in defining input, environmental, and outcome variables; the simple tracing of the lines of influence among and between the variables; and the grounding of the model in student involvement theory. Involvement theory connected institutional policies and practices to the influence of input and environmental variables on outcome variables. Analysis of the input, environmental, and output variables selected using Astin's (1970a, 1970b, 1991) model allowed the researcher to satisfy the

three purposes of the study: (1) to determine which input and environmental variables are predictors of student satisfaction with Tech Prep, (2) to identify policies and practices that enhance student satisfaction, and (3) to make recommendations concerning policies and practices to increase community college student satisfaction with Tech Prep programs in Texas and the nation.

Variables Considered in this Study

Based on Astin's (1970a, 1970b, 1991) I-E-O model, variables were categorized as input, environmental, or outcome variables. For ease of discussion, variables were grouped into clusters within the three categories. Each independent variable is discussed in "Operational Definitions." See Figure 1.3 for an illustration of the study variable clusters.

Seven input variables clusters were created. The first six input variables or variable clusters were considered to be background or defining variables. The seventh cluster, Expectancy, referred to the student's self-reported intent or expectations for himself or herself. The following were the seven input variable clusters which included the fifteen input variables considered in this study:

"I" Input Variables

1. Age
2. Sex
3. Ethnicity
4. Academic Preparation

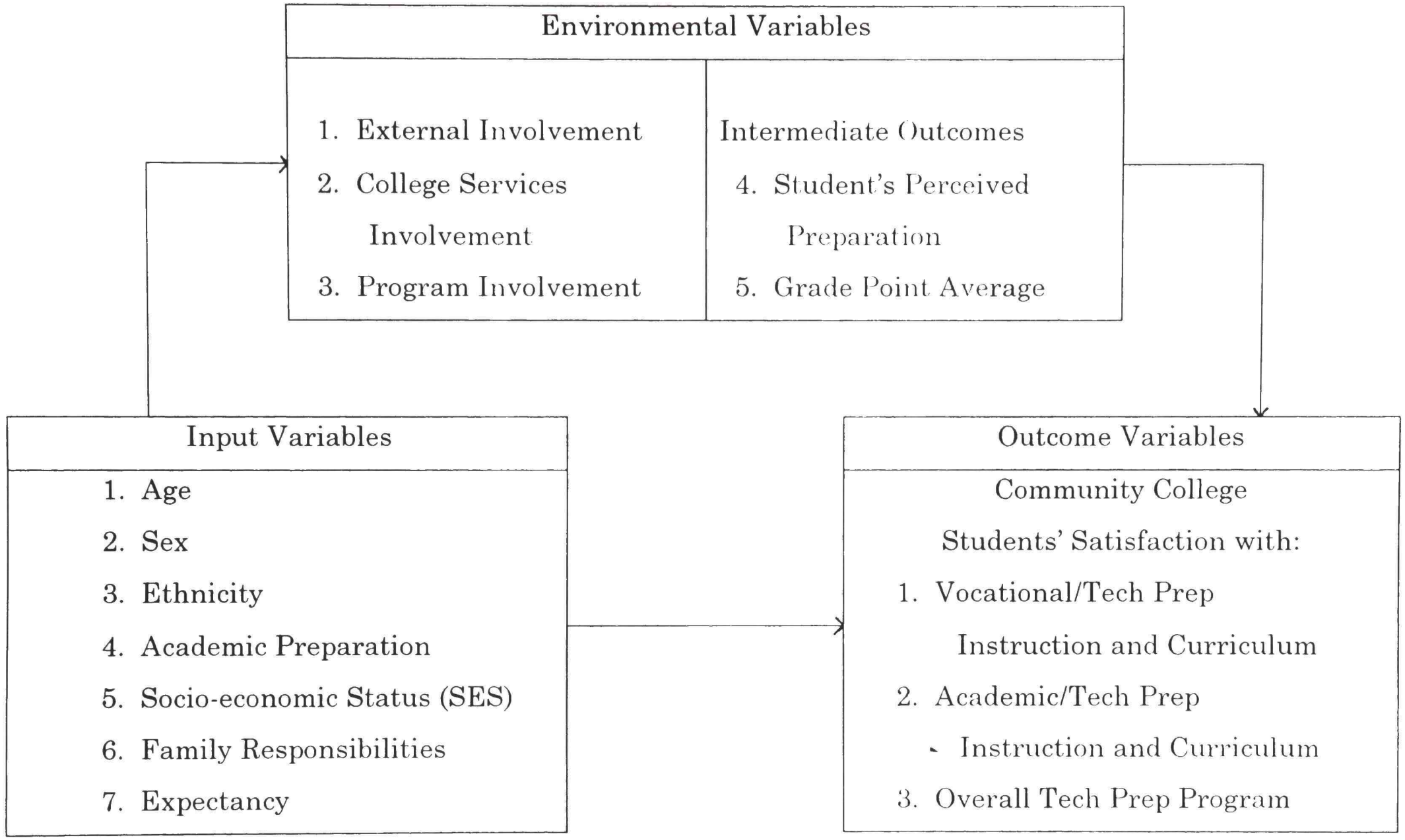

Figure 1.3 Input, Environmental, and Outcome Variables Considered in this Study.

5. Socio-economic Status (SES)
6. Family Responsibilities
7. Expectancy

The study considered twenty-eight environmental variables. Again, for ease of discussion, the variables were grouped into five clusters. The first three of the five environmental variable clusters represented aspects of student involvement with the temporal environment a student may have experienced during his or her tenure in a Tech Prep program. The other two environmental variable clusters, student's perceived preparation and GPA, were intermediate outcome variables.

The following were the five environmental variables clusters which included the twenty-eight environmental variables considered in this study:

"E" Environmental Variables

1. External Involvement
2. College Services Involvement
3. Program Involvement

Intermediate Outcomes:

4. Student's Perceived Preparation
5. Grade Point Average (GPA)

Intermediate outcomes occurred at some point after entry into the college or program. These variables both may have resulted from the environment and may have acted as a part of the ongoing environment to influence other outcomes (Astin, 1991). Using an intermediate outcome, for example GPA, may lead to ambiguities in interpretation (Astin, 1991): Were students with high GPAs more satisfied or do students who were more satisfied achieve higher GPAs? A similar question could be asked

regarding students' perceived preparation: Were students who perceived themselves as better prepared more satisfied or do students who claimed to be satisfied perceive themselves as better prepared? Astin suggested that these intermediate outcome variables be treated as environmental variables except that they be entered into the regression analysis at the final stages (Astin, 1991).

To complete the I-E-O model, the researcher considered the influence of the input and environmental variables on the following three outcome variables:

"O" Outcome Variables

1. Community college student satisfaction with vocational/Tech Prep instruction and curriculum;
2. Community college student satisfaction with academic instruction and curriculum; and,
3. Community college student overall satisfaction with Tech Prep programs.

Research Questions

All research questions referred to input, environmental, and outcome variables defined using Astin's (1970a, 1970b, 1991) college impact model, the I-E-O model.

Research Question 1. Which input variables, if any, affect community college students' satisfaction with Tech Prep programs in Texas?

Community college students' satisfaction with Tech Prep programs in Texas considers three dependent variables, students' satisfaction with vocational/Tech Prep instruction and curriculum, students' satisfaction

with academic/Tech Prep instruction and curriculum, and students overall satisfaction with Tech Prep programs in Texas. After controlling for the effects of input variables, consideration of the effects of environmental variables on these three dependent variables prompted the following research questions.

Research Question 2. Which environmental variables, if any, affect community college students' satisfaction with vocational/Tech Prep instruction and curriculum in Texas?

Research Question 3. Which environmental variables, if any, affect community college students' satisfaction with academic/Tech Prep instruction and curriculum in Texas?

Research Question 4. Which environmental variables, if any, affect community college students' overall satisfaction with Tech Prep programs in Texas?

Need for Study

In the 1993-1994 academic year, Decision Information Resources, [D.I.R.], Incorporated conducted the first state-wide evaluation of Tech Prep in Texas. The final report D.I.R. (1994) submitted to the tri-agency contained the following statement:

> In accordance with the original request for proposal... D.I.R. evaluation goals included:
>
> - design and implementation of an evaluation plan which addresses the evaluation needs and requirements of the consortia, the tri-agency staff, and the national evaluation contractor while incorporating appropriate and objective procedures, instruments, and analysis methods;
> - describe and summarize statewide and local Tech Prep programs and activities by examining the processes and results of program planning, implementation, and administration;

- identify best practices and effective approaches of local systems and programs;
- assist regional grant administrators and tri-agency Tech Prep staff in instituting self-evaluation and improvement activities; and
- assist state and regional staff in cooperating with national evaluation process. (p. 4)

D.I.R. (1994) reviewed materials, literature, and reports provided by consortia, the Texas Education Agency (TEA), the Texas Higher Education Coordinating Board (Coordinating Board), and the national evaluation contractor, Mathematica Policy Research (MPR), Incorporated. Researchers visited each of the twenty-five consortia in Texas. They interviewed consortia, state, and federal agency personnel (D.I.R., 1994). Questionnaires were received from three hundred thirty (330) consortia committee members. The D.I.R. (1994) study produced an overview of Tech Prep in Texas.

The D.I.R study did not ascertain input from students. John Goodlad (1984) wrote, "They [students] are at the very heart of the process and undoubtedly have insight into what is going on. We have tended to overlook this rich source of intimate experience in seeking to know what goes on in the classroom" (p. 101). Ball (1981), Astin (1991), and Bane and Jencks (1972) emphasized the importance of including student perspectives to understanding and evaluating schools and programs.

Educational evaluation in Texas lacked research involving student satisfaction with Tech Prep programs. This localized absence of student input in evaluation reflected the general pattern in evaluation research. In general, this study hoped to provide another dimension in evaluating the effects of Tech Prep programs on community college students in

Texas. This study was dedicated to the importance of identifying policies and practices that influence community college students' satisfaction with Tech Prep programs in Texas.

This study proposed to look at this neglected area and evaluate student satisfaction with Tech Prep programs in Texas through the students' perspectives. This investigation was important because students are participants in the process of schooling. Their views were and are important and necessary if educators are to understand and refine processes. This study was important in expanding the limited body of knowledge relating community college environmental variables to student satisfaction.

Delimitations

This study was reduced in scope to include only:

1. The population surveyed included those community college students in Texas community colleges who have been identified as Tech Prep students.
2. The survey instrument was administered in intact vocational/Tech Prep college classrooms.
3. The target population will be college freshmen and sophomores (13th and 14th grades) in state-approved Tech Prep programs. "The Coordinating Board defined a Tech Prep student as any student enrolled in a state-approved Tech Prep program" (D.I.R., 1994, p. 32).
4. Surveys were administered once, at a single point in time. This one time survey gave a "snap shot" of community college students' satisfaction.

5. This survey was administered in the late spring of 1995.

Limitations

Inherent in an investigation of this nature were factors that limit the generalizability of the results of the study. Among these factors were:

1. Since surveys were administered to intact classrooms, the findings may not reflect satisfaction for or with all Tech Prep programs in Texas. Some programs may have been missed, under-represented, or over-represented.
2. Using intact classrooms for the survey placed a constraint on the system because data from dropouts were not obtained. The reasons for departure from a program were not obtained. This may have biased the results because a student may have dropped out because he or she was not be satisfied with the program.
3. Since entry into a Tech Prep program may have occurred at any point in the student's college education, the student surveyed may not have had extensive experience with a Tech Prep program upon which to base satisfaction decisions.
4. Important variables influencing satisfaction may have been overlooked.
5. Since only students in Texas community colleges were surveyed, the results may not be generalizable to other states.
6. Since Tech Prep programs may vary program to program, institution to institution, consortium to consortium, or state to state, student satisfaction may vary greatly from program to program or institution to institution.

7. Since the study received only a 20% response, conclusions may not be generalizable across the state.
8. A "snap shot" study did not include a mechanism for determining if the results improved a program.

Assumptions

As with any study, it was important that the researcher entered the investigation with a core of assumptions:

1. From Astin's fourth postulate for involvement theory, the assumption was made that the amount of student learning and personal development (satisfaction) associated with any educational program was directly proportional to the quality and quantity of his or her involvement in that program.
2. Astin's I-E-O model was an appropriate model for examining student satisfaction with Tech Prep.
3. One or more of the environmental variables considered would affect the student satisfaction outcomes.
4. The students would respond truthfully to the questionnaire.
5. The questionnaire used in the study was administered at a time when external events would not influence student response.
6. A need existed to determine student satisfaction with Tech Prep programs in Texas.
7. A major avenue for improving program policies and practices was to ask students, as consumers, to evaluate programs.
8. Involvement led to satisfaction.

Definition of Terms

Operational Definitions

Variables were selected based on the I-E-O model. The fifteen input, twenty-eight environmental, and three outcome variables for consideration in this study were defined as follows. (See Appendix A for scales of variables and measures.)

"I" Input Variables

Input variables were considered to be those variables outside the direct control of an institution or program. A student brings these characteristics with him/her. Age and sex were single measure variables. Ethnicity was a single variable that allowed multiple responses. Socio-economic status (SES), academic preparation, family responsibilities, and expectancy represented clusters of input variables that were considered separately.

Age--Students self-reported age as his or her age on December 31, 1995. However, since some community college classes contained students who were not eighteen years of age, only surveys for adult students, those students who were eighteen or older, were analyzed. Minors, those respondents under the age of eighteen, needed parental permission to participate in the survey.

Sex--Students self-reported sex as male or female.

Ethnicity--Ethnicity was measured by the student's self-reported ethnic group or groups. Multiple responses were accepted. The percentage for response were over 100%, as was possible when multiple responses were accepted.

Academic Preparation--Academic preparation was a variable cluster that solicited the student's responses to items related to the following variables:

- High school completion date,
- English as a native language,
- Problems with English, and
- Problems with math.

Socio-economic status--SES was a variable cluster that solicited the student's responses to four items related to the following variables:

- Father's educational level,
- Mother's educational level,
- Eligibility for or receipt of a PELL grant, and
- Eligibility for or receipt of aid to families with dependent children (AFDC).

Family Responsibilities--Family Responsibilities was a variable cluster that included two variables. Students self-reported responses to questions related to the following variables:

- Marital status, and
- Number of dependent children.

Expectancy--Expectancy was a variable cluster that included variables related to expectations that a student held for himself or herself (Astin, 1991). Expectancy included the following variables:

- Purpose at time of enrollment, and
- Intent to complete program.

"E" Environmental Variables

Environmental variables were grouped into five clusters. Three of the environmental variable clusters represented involvement variables.

The other two environmental variable clusters included intermediate outcome variable(s).

Astin (1984) defined involvement as the amount of physical and psychological energy a student devotes to his or her academic experience. With this definition in mind, the following were the definitions and measures used for involvement variables.

External Involvement--External involvement was defined to be the amount of physical and psychological energy a student devotes to his or her life outside the vocational or academic experience. These might be called de-involvers for educational experiences, such as Tech Prep programs. The external involvement cluster contained four variables. These four variables and measures were:

- Residence--selecting from two on-campus, two off-campus, and one 'other' location of residence responses,
- Employment status--selecting from full-time, part-time or not employed,
- Location of employment--selecting from on-campus or off-campus, and
- Employment--selecting relationship to Tech Prep career choice.

Involvement with College Services--College services were defined as those services related to advising, counseling, and student support afforded the vocational student. This cluster contained nine variables in two groups, Counseling/Advising and Support Services.

a. Counseling/Advising referred to personal interactions between students and faculty or staff members. These four environmental variables were measured based on a three-point Likert scale for self-reported frequency of use for each of the following:

- Academic advising/course planning,
- Vocational/career counseling,
- Counseling related to Tech Prep, and
- Counseling related to internship/apprenticeship.

b. Support Services referred to student's use of five support services. The following five variables were measured based on a three-point Likert scale for self-reported frequency of use for each of the following:

- Financial aid services,
- Veterans services,
- College sponsored tutorials,
- Student employment services, and
- Job placement services.

Program Involvement--Program involvement followed Astin's involvement definition more closely because it represented a student's investment of time, effort, and energy in his or her program. The Program Involvement cluster included ten variables. The following eight variables were measured by student selection of a range representing number of classes or hours pertaining to:

- Receipt of advanced credit,
- Hours completed in the Tech Prep program,
- Enrollment status, full- or part-time (Part-time students were those who were enrolled in fewer than 12 credit hours during the semester. Full-time students were those students who were enrolled in 12 or more credit hours during the semester.),
- Number of hours in class,
- Number of hours in lab or clinicals,

- Number of hours in preparation for class,
- Number of hours with vocational instructor outside class or lab/clinical settings, and
- Number of hours with academic instructors outside class.

The other two variables in the Program Involvement cluster were:

- Program choice--Students self-reported the program in which they were enrolled from a list of eleven choices, including an 'other' response.
- Point of entry--Students self-reported where they were before entering this vocational/Tech Prep program by selecting from seven possible choices.

The intermediate outcome variable clusters included the following:

Student's Perceived Preparation--Student's perceived preparation variables were measured by a self-reported level of agreement (strongly agree to strongly disagree) to statements pertaining to the following four variables:

- Vocational preparation to enter workforce,
- Vocational preparation to continue education,
- Academic preparation to enter workforce, and
- Academic preparation to continue education.

Grade Point Average (GPA) was measured by the student's self-reported average grade in his or her college program. The measure was made by the student selecting a grade range to indicate his or her GPA based on a four-point scale.

"O" Outcome Variables

Student outcomes were those aspects of the student's cognitive or affective development that the institution or program either influenced or

attempted to influence. Three outcome variables related to students' satisfaction with Tech Prep were defined. Each of these variables contained multiple measures which were scaled and combined to create the outcome variables for student satisfaction with:

- Vocational/Tech Prep instruction and curriculum,
- Academic/Tech Prep instruction and curriculum, and
- Overall Tech Prep programs in Texas.

Instruction and Curriculum--Cohen and Brawer (1991) provided the following two definitions of instruction: (1) an activity that implements a curriculum and (2) a sequence of events organized deliberately so that learning occurs (p. 161). These definitions forged a link between instruction and curriculum that this study utilized in evaluating Tech Prep programs.

Satisfaction--Satisfaction was defined as the feeling expressed by an individual that the educational environment was meeting his or her needs (Domer, Carswell, & Spreckelmeyer, 1980; Spada, 1988). Satisfaction with components of instruction and curriculum were measured by student-selected level of satisfaction for:

a. Vocational Instruction--Vocational instruction defined as the expertise, activities, policies, and practices an instructor brings to the course or program that may influence student satisfaction measured by self-reported level of satisfaction with the following measures:

- instructor's knowledge of the subject or field,
- instructor's use of varied instructional styles,
- instructor's ability to relate to students,
- instructor's availability outside of class, and
- overall quality of vocational instruction.

b. Curriculum--A Tech Prep curriculum was defined as a series of courses, integrating academic and vocational concepts, intended to prepare the student to enter the workforce or to continue his or her education (Parnell, 1991). For this study, vocational/Tech Prep curriculum included course content and structure and the physical environment.

1. Content--Students' satisfaction with content and structure facet of curriculum was measured by self-reported level of satisfaction with:

- course sequencing,
- course objectives,
- content relevance,
- balance of theoretical and practical,
- academic content in vocational coursework, and
- balance of class and laboratory time.

2. Physical environment-- Students' satisfaction with physical environment referred to space, equipment, and jobsite conditions and availability. Students' satisfaction with the physical environment was measured using self-reported level of satisfaction with:

- laboratory/workshop space,
- available equipment,
- jobsites for internships or clinicals, and
- overall learning environment.

c. Academic/Tech Prep Instruction--Academic instruction was the expertise, activities, policies, and practices an instructor brings to the class that may influence students' satisfaction. Satisfaction with academic/Tech Prep instruction was measured using self-reported level of satisfaction with:

- instructor's knowledge of the subject,
- instructor's use of varied instructional styles,
- instructor's ability to relate to the student,
- instructor's availability outside of class, and
- quality of academic instruction.

d. Academic/Tech Prep Curriculum--Academic/Tech Prep Curriculum referred to those academic courses, required for a Tech Prep program, that focus on an integrated curriculum, that is a curriculum stressing vocational applications of a particular academic subject or discipline. Satisfaction with academic curriculum was measured using self-reported level of satisfaction with:

- course objectives,
- balance of theoretical and practical,
- vocational/Technical content applications in academic coursework, and
- content relevance to career area.

Overall Satisfaction with Tech Prep Programs--Overall satisfaction was measured by student-selected level of agreement that:

- he or she would take the program again, if starting over,
- he or she would recommend program to a friend, and

his or her level of satisfaction with:

- the Tech Prep program,
- vocational preparation to enter the workforce,
- vocational preparation to continue for a four-year degree,
- academic preparation to enter the workforce, and
- academic preparation to continue for a four-year degree.

Definitions Related to the Study

Advanced placement--Any agreement or plan between educational institutions, or any method of recognizing student achievement, that enables students to receive credit for or bypass courses in a higher education program (Definitions Subcommittee, 1992, in press).

Articulation--A planned process linking educational institutions and experiences to assist students in making a smooth transition from one level of education to another without experiencing delays or duplication of learning (Definitions Subcommittee, 1992, in press).

Certificate--A formal award, less than an associate degree, indicating mastery of a prescribed series of competencies with defined employment outcomes (Definitions Subcommittee, 1992, in press).

Concurrent credit (dual credit)--A system whereby a student takes a course at one institution and upon enrollment at a second institution of a different level receives credit for that course as well (Definitions Subcommittee, 1992, in press).

Consortia--Groups of institutions with signed program articulation agreements. Tech Prep consortia must be composed of a minimum of one public institution of higher education and one [if enrollment is sufficient] or more independent school districts (ISD) with enrollment sufficient to support a Tech Prep program. Consortia must show evidence of involvement with business and industry, the Private Industry Council (PIC), and the Quality Work Force Planning Committee (QWFPC) (Definitions Subcommittee, 1992, in press).

Exit points--Specific points in the sequence of courses in a technical education program at which a student may exit the program, receive a

certificate or be defined as a marketable skills achiever (Definitions Subcommittee, 1992, in press).

Quality Workforce Planning Committee (QWFPC)--One of the twenty-four regional planning groups formed in 1987 (Butler, Andrade, & Boyd, 1992) comprised of representatives from local education and training providers, business, industry, and labor. The QWFPCs were formed to analyze labor market information, identify targeted occupations, and develop a service plan for vocational and technical education in their particular regions (Definitions Subcommittee, 1992, in press).

Tech Prep program--An articulated educational program of at least two years of high school and two years of postsecondary preparation that includes a common, integrated, core of math, science, communications, and technologies designed to lead to a certificate or an associate degree in a specific career field. The design can be 2+2 [two years high school and two years postsecondary education], 4+2 [four years of secondary and two years of postsecondary education], 2+2+2 [two years secondary, two years of community/technical college and two years college or university education], or other patterns (Hoerner, 1991, p. 2).

Tech Prep Associate in Applied Science degree program--The Texas interpretation of the at least two years of secondary school and two years of postsecondary education resulted in a "cooperatively developed, competency-based six-year program of study in high school and which results in an Associate of Applied Science degree with advanced skills from a community or technical college or an associate-degree granting institution" (Definitions Subcommittee, 1992, in press).

Tech Prep student--Defined by the Texas Higher Education Coordinating Board, any student enrolled in a state-approved tech prep program (cited in D.I.R., 1994).

Anticipated Findings

In accordance with Astin's I-E-O model, it was anticipated that one or more input variables (incoming student characteristics) would influence students' satisfaction with Tech Prep programs in Texas.

After controlling for input variables, it was expected that one or more environmental variables would significantly influence students' satisfaction with each of the outcome variables: vocational/Tech Prep instruction and curriculum, academic/Tech Prep instruction and curriculum, or overall Tech Prep programs.

It was anticipated that effective policies and practices that currently enhance student satisfaction with Tech Prep programs could be identified based on results of this study. Areas in which policies and practices needed to be amended to enhance satisfaction would also surface.

In summary, this study attempted to identify variables that influenced students' satisfaction and make recommendations concerning changes to current policies and practices in Tech Prep programs based on these findings.

Organization of the Dissertation

This dissertation is divided into five chapters, a reference section, and appendices. Chapter I, the introduction, includes a brief history of Tech Prep, statement of problem, purpose of the study, research questions,

and discussion of the need for this study. It also includes delimitations, limitations, assumptions, and definitions that are important to the conceptualization and understanding of the study. Chapter I closes with anticipated findings for the study.

Chapter II contains three sections. The first section discusses the historical and legal foundations of vocational education leading to the Carl Perkins (1990) legislation that funded Tech Prep. This section also includes summaries of the research related to Tech Prep. The second section includes an overview of some of the theoretical and sociological models used in college impact studies including a comparison of Astin's I-E-O model with three other models. Finally, the third section of Chapter II discusses research related to student satisfaction.

Chapter III contains the methodology used in this study. This chapter contains seven sections: introduction, general research design, instrumentation, sample population, data collection, data analysis, and summary. The introduction includes a restatement of both the research problem and purposes. The general research design includes the model. The other sections include discussions of the instrumentation, sample population, data collection processes and response rate, and statistical methods for data analysis.

Chapter IV reports the findings of this study. This chapter includes four sections: introduction, sample population, regression analyses, and summary.

Chapter V includes major findings, implications for policy and practice, implications for theory, recommendations for future research based on these findings, and conclusions.

CHAPTER II
REVIEW OF LITERATURE

This review of the literature explores the foundations and research that undergird this study. This chapter is divided into four sections: (1) historical foundations, (2) theoretical models, (3) satisfaction, and (4) summary.

Historical Foundations

The history of vocational education spans the history of the United States. The course of vocational education is impacted by the needs of both individuals and society. This history is highlighted by several pieces of landmark legislation.

In the eighteenth century, Benjamin Franklin established an academy with curricula that included both classical and avocational subjects (Willis, Schubert, Bullough, Kridel, & Holton, 1993). In writing about students, Franklin penned,

> it would be well if they could be taught everything that is useful, and everything that is ornamental: but art is long and their time is short. It is therefore proposed that they learn those things that are likely to be most useful and most ornamental. Regard being had to the several professions for which they are intended. (1749/1993, p.21)

Franklin's comments concerning students and education created little change during his time (Willis et al., 1993). Perhaps educating for those several positions for which students were destined had little impact in Franklin's day because children had other opportunities, outside of formal classrooms, for vocational training. For instance, many children received

training within their families, as apprentices, or while indentured servants (Benavot, 1983; Gallinelli, 1979; Spada, 1988). Although Franklin's comments had little impact in the eighteenth century, his philosophy anticipated two of the most important developments in nineteenth century educational thought: the importance of social usefulness in determining curricula and the use of student choice in determining what was to be studied (Willis et al., 1993).

In the nineteenth century, the common school movement came to the forefront of educational thought and organization (McClellan, 1977; Pullin, 1994; Willis et al., 1993). Proponents for the common school movement included some of the better known educators of the early nineteenth century such as Henry Barnard and Horace Mann. The common school movement was an effort to "democratize American education by making the same kind of schooling available to all" (Willis et al., 1993, p. 39). Barnard and Mann perceived the economic value of education as a purveyor of a common sense of order and thrift but not as a source of vocational education (National Center on Education and Employment [NCEE], 1989). "The vast majority of nineteenth-century Americans learned their trades on the job rather than in schools" (NCEE, 1989, p. 2). The common school ideology, therefore, helped keep vocational training out of most classrooms.

The earlier, carefully controlled scope of public education was reaffirmed by post-Civil War Reconstructionist educators (McClellan, 1977). McClellan (1977) wrote that Reconstructionist educational thought

> disguised a profound social development that would eventually raise new and troubling questions for Americans concerned with public education. That development was the growing domination of the American economy by mechanized production. (p. 223)

While many educators held fast to the democratic ideals expressed in the common schools, the nation and the Western world was becoming ever more mechanized. This mechanized production engendered a demand for workers with greater skills. Countering the need for more advanced skills was the idealized jack-of-all-trades view of Americans able to learn necessary skills in any given situation. Despite growing demand for more skilled workers, beliefs relating the purposes of the common school and the perceptions of Yankee ingenuity and adaptability dampened expansion of 'useful knowledge', that knowledge directly related to a trade in the curricula (Gallinelli, 1979; McClellan, 1977; NCEE, 1989).

McClellan (1977) wrote,

> Although the call for practicality was the most persistent theme in the educational rhetoric of the late nineteenth century, educators found it extraordinarily difficult to translate their quest for vocational relevance to specific reforms. (p. 224)

These programs met resistance from those accustomed to a classical approach to education.

After the Civil War, a small number of program changes began at some of the major institutions. For example, Langdell introduced case study to the Harvard Law School and at Cornell, Robert Thurston introduced a curriculum organized around the sciences for Silby College, the engineering school (NCEE, 1989). Calvin Woodward of St. Louis also noted the need for manual training. Woodward persuaded Chancellor William G. Eliot to establish a prepatory school for Washington University's Polytechnic School (McClellan, 1977; NCEE, 1989). Vocational preparation was encroaching.

These innovations met, however, with resistance from educators accustomed to a classical approach to education. In particular, Harvard's Charles William Eliot, a proponent of the sciences and electives, dampened any idea that Harvard educate workers (NCEE, 1989; McClellan, 1977). Eliot held that colleges were to train leaders not workers (NCEE, 1989). The determination of which curricula was more appropriate confounded and eluded educators. Manual training continued outside school environments. Vocational training continued to occur on the job or in reform schools (Evans, 1971; NCEE, 1989). A small number of technical institutes also emerged independent of established universities. These institutes offered training days and evenings in one- or two-year courses of study. These institutes, as precursors of technical colleges, filled a void in the educational system (McClellan, 1977; NCEE, 1989).

The nineteenth century closed with a call for practicality in education (McClellan, 1977) founded on a tradition of useful knowledge (NCEE, 1989). Outside the educational arena, economic conditions helped shape the vocational enterprise. Vocational education itself had powerful sponsors emerge with the new century. These sponsors included industrialists wishing to minimize training costs (Benavot, 1983). Industrialists together with political and economic supporters forged a link between public education with national economic development, a precursor to the human capital concept. John Dewey emerged as an educational philosopher who was an ardent supporter of school curricula designed to promote economic and political self-sufficiency (Pullin, 1994).

Educators like Dewey and Woodward and members of the American Federation of Labor were concerned that programs offered by employers

met only short term needs (Evans, 1971; Spada, 1988). Industrial leaders, working through the National Association of Manufacturers, felt that industry should not be responsible for providing vocational training that would benefit the general public (Evans, 1971). As a result, powerful supporters united to influence lawmakers (Benavot, 1983) to pass laws that added vocational education to the curriculum of public schools (Spada, 1988).

Legislation

Beginning in the nineteenth century, a tradition of useful knowledge through vocational training or vocational education has existed in the United States (NCEE, 1989). This tradition and the history of vocational education have been highlighted by several pieces of landmark legislation, including the Morrill Act of 1862; the Smith-Hughes Act of 1917; the Vocational Education Act of 1963; the Vocational Education Section (Title II) of the Education Act Amendments of 1976; and, more recently, The Carl D. Perkins Vocational and Applied Technology Education Act of 1990 (NCEE, 1989; Pullin, 1994; Spada, 1988). Each of these acts has had a profound impact on the direction of vocational education in the United States.

The 1989 NCEE address reported that the Morrill Act of 1862:

> authorized the federal government to set aside public lands to "promote the liberal and practical education of the industrial classes in the several pursuits and professions of life" by "teaching of such branches of learning as are related to agriculture and mechanic arts." (p. 3)

The Morrill Act of 1862 established land-grant colleges, a top down educational attempt to infuse vocational training into the system. With

the Morrill Act, the federal government became involved with public education. However, Morrill did not establish specific curricular goals for vocational education (Evans, 1971; Gallinelli, 1979).

The late 1800s witnessed an increased interest in industrial education that culminated in the Smith-Hughes Act of 1917. Intensive lobbying by a coalition of businessmen, labor leaders, and academicians influenced the passage of the Smith-Hughes Act of 1917 (Benavot, 1983; Pullin, 1994). Smith-Hughes (1917) brought funding for vocational programs in public schools. Pullin (1994) wrote of this landmark legislation:

> The Smith-Hughes Act of 1917 was the first effort by the U. S. Congress to influence vocational education, and a rare foray by the federal government into regulation of elementary and secondary education through a large program of categorical aid. (p. 33)

This 1917 Act extended federal government involvement in the educational system. Smith-Hughes (1917) prescribed specific programs, established administrative procedures, and promoted vocational education efforts (Gallinelli, 1979; Pullin, 1994; Wolf & Zoglin, 1980).

Since the Morrill Act of 1862 and the Smith-Hughes Act of 1917, vocational programs have been influenced by federal legislation, legislation that forged inroads for both funds and regulations into the educational system (Wolf et al., 1980). But each of these acts promoted a narrow view of vocational education. For instance, Smith-Hughes (1917) maintained the singular belief that the purpose of vocational education was to integrate labor groups into the economic system (Pullin, 1994).

Thus, a cycle was established in the history of vocational education. A need arose and government was made aware of that need. The

government then responded to that need, and with the governmental response came funding, rules, and regulations. Education became the characteristic American mode of reform (Pullin, 1994), and government responded to a societal need by passing legislation linking reform to education.

After World War II, the needs of a increasingly more diversified, technological industrial system demanded a more flexible vocational education (Pullin, 1994; Spada, 1988). In 1961, the need for change in vocational education prompted President John F. Kennedy to advise Congress that the changes in technology that had occurred in recent years called for a review, re-evaluation, and modernization of the Smith-Hughes Act (1917) (Spada, 1988). Kennedy urged the Secretary of Health, Education, and Welfare to convene an Advisory Board to review, evaluate, and recommend changes to the national vocational education acts.

The Advisory Board recommended an improved and expanded vocational education. The Advisory Board also found that vocational education must be available to all individuals who would benefit from such instruction and that such education should be correlated with the possibility of employment (Spada, 1988).

What Kennedy sought in 1961 emerged in the Advisory Board's recommendations. During President Lyndon B. Johnson's administration, these recommendations led to the development of the Vocational Education Act of 1963. "[F]ederal legislation took center stage as a major component of President Johnson's War on Poverty" (Pullin, 1994, p. 33). Vocational educational offerings were broadened and diversified (Gallinelli, 1979; Pullin, 1994; Wolf et al., 1980). The 1963 legislation and

its amendments in 1976 prompted increased access to academically disadvantaged individuals as well.

The Vocational Education Act Amendments (1976) required establishment of local advisory boards or councils. These local councils, with a suggested membership to include members from business, industry and labor, were tasked to provide advice on current job needs, skill requirements, relevancy of course offerings and programs, and state-of-the-art equipment (Raulf et al., 1987).

The impact was felt in both secondary and post-secondary educational environments. Despite the effort exerted through the Vocational Education Act of 1963 and its amendments in 1976, the gap between educational accomplishments and societal needs broadened. As Willis et al. (1993) noted,

> In the 1980s, the lack of rigor in schools was seen as the main cause of American economic decline....The Commission [the National Commission on Excellence in Education] concluded that poor schooling was what put the nation at risk economically and socially, and that rigorous standards were necessary to alleviate the problem. (p. 401)

In 1983, the Commission published A Nation at Risk: The Imperative for Educational Reform. Less than one year after A Nation at Risk (1983) was published, more than 260 blue ribbon commissions had been established to attack the problem of failing schools (Willis et al., 1993). In an address delivered to State Teachers and Principals of the Year, Elizabeth Dole (1989) said,

> Throughout American history, the key that has unlocked tomorrow's door of opportunity has been found in our schoolhouses. Today, however, many of our young people are discovering that the locks have changed.... the key they received in our schools doesn't fit. (p. 1)

Educators, business leaders, and politicians looked for answers. One act at a time, the stage was set for educational reform. The ensuing reform came, once again, in the form of new legislation. The Carl D. Perkins Vocational and Applied Technology Education Act of 1990 initiated a major reform of federal influence in vocational education (Pullin, 1994). The Carl Perkins Act (1990) provided funds to plan and implement Tech Prep programs under Title III, Section E. These Tech Prep programs were to emphasize competence in mathematics, science, and communication (Bragg, 1993; Pullin, 1994; Wilcox, 1991) through a sequence of technical and integrated academic courses (Parnell, 1985; Pullin, 1994). Tech Prep was envisioned as a college parallel curriculum that "engages a high-school student in a four-year (2+2) or six-year (4+2) plan to gain the competencies (knowledge, skills, and values) required for technical careers" (Hull et al., 1991). (A brief history of Tech Prep was included in Chapter I.)

Once again, government responded to a definite societal need with legislation mandating educational reform. Under Title III, Part E (otherwise known as the Tech Prep Education Act), the Carl D. Perkins Act (1990) sought to alleviate the disparity in educational preparation and workforce needs. Now, Tech Prep was funded. Amendments to the Carl D. Perkins Vocational and Technical Education Act of 1990 were enacted in 1991, authorizing funding for Tech-Prep through fiscal year 1995. These amendments provided greater flexibility and required greater accountability. The legislation and its amendments authorized extensive funding, established specific guidelines, and included numerous regulations (Merkel-Keller, 1992; Pullin, 1994; Wilcox, 1991). Education,

generally, and vocational education, specifically, were impacted by this federal legislation.

Research Related to Tech Prep

The early evaluation of Tech Prep programs and processes was left to the states with minimal federal requirements beyond basic guidelines (Congressional Record, 1990), which might explain the limited research in assessment or evaluation of Tech Prep programs. Little research exists related directly to evaluation of Tech Prep programs (Hammons, 1992).

However, much of the limited, early research served to establish a foundation for future evaluation. To illustrate, Hammons (1992) attempted to determine program performance indicators necessary for successful Tech Prep programs from the perspectives of project and program directors or coordinators in the southeastern United States. Hammons' review of the literature found that performance indicators are necessary to determine the quality, effectiveness, and program goal attainment. Although Hammons' study did not include students, the directors and coordinators he did survey considered a 'student focus' component from Hammons' list of quality indicators as the most important indicator. The Tech Prep student completion rate was considered important by 100% of Hammons' (1992) respondents. This cohort also rated several student-focused indicators as being above 90% in importance. Among the 90%+ student-focused indicators were: student academic progress on grade level, student retention in Tech Prep programs, numbers of students continuing to postsecondary programs, student attainment of specific technical skills, student demonstration of job competencies, and student and alumni evaluation of Tech Prep

programs. The perspectives of the directors placed a strong emphasis on what happened with the students in Tech Prep programs.

Hammons' (1992) study was not alone in ascertaining the views of stakeholders, those individuals who make decisions concerning a program and those who are affected by a program and its evaluation. Pollard (1990) also conducted a national survey of vocational teacher education department chairs and postsecondary deans of instruction concerning their attitudes toward Tech Prep programs. Pollard found a high level of interest in Tech Prep programs, but each group expressed serious concerns as to the students' ability to master difficult technical concepts. They also expressed concerns related to vocational counselors, "Vocational counselors who are involved in counseling students in tech-prep programs need to obtain additional training" (Pollard, 1990, p. 41). Roegge, Wentling, Leach, and Brown (1993) conducted a study in Illinois, entitled Using Concept Mapping Techniques to Compare Stakeholder Groups' Perceptions of Tech Prep. The study was conducted two years into the development of Illinois Tech Prep programs. As with Hammons (1992) and Pollard (1990), students were not included. Roegge et al. (1993) found that student benefits ranked among the top priority clusters. "Fourteen statements were almost universally accepted by the major sub-groups an items of highest importance in the implementation of Tech Prep" (Roegge et al., 1993, p. 7), and ten of these fourteen items related directly to students improved skills and increased numbers graduating from both high schools and community colleges. The groups did have some differences related to collaboration, budgetary support, external funding, and leadership. Thus, many of the early studies, including the 1994 D. I. R. study in Texas, sought the opinions and perspectives of stakeholders,

other than students, concerning strengths, weaknesses, goals, and quality indicators of and for Tech Prep programs.

Other studies attempted to describe existing programs (Penkowsky, 1991-1992; Watkins, 1988), styles of articulation agreements (State University of New York, 1991), or academic faculty views of vocational faculty (Coorough, 1992). Many of these studies were localized in scope. Watkins (1993) used a Delphi approach to determine consensus agreement items to clarify positions on future directions of vocational education. The group agreed that items related to student focused programs or activities such as apprenticeships and Tech Prep were important. State University of New York (1991) found that 73% of the postsecondary institutions and 67% of secondary schools reported one or more collaborative agreements. Of those with Tech Prep programs, most cited a need for assistance with articulation agreements. On a different tack, Coorough (1992) surveyed academic and vocational faculty at Lewis-Clark State College in Idaho. Coorough's survey results showed that academic faculty viewed vocational faculty in a more positive light. These associations between academic and vocational faculty that occurred in establishing an integrated curriculum fostered a more positive view. Penkowsky (1991) also described three programs that had successfully integrated vocational and academic education.

Other studies (D.I.R., 1994; James, 1991) reviewed numbers of students enrolled in Tech Prep programs, number of programs (North Carolina State Department of Community Colleges, 1992, 1993), or the impact on special populations (Tech Prep Implementation: Self-assessment Inventory, Middle/High School Level, 1992). Often these

studies are final reports produced for states or to satisfy grant requirements and are descriptive in nature.

Theoretical Models

Background on Models of Student Change

In 1991, Pascarella and Terenzini published How College Affects Students: Findings and Insights from Twenty Years of Research. Their work reviewed research published from the late sixties through the eighties pertaining to how students change in college. In their book, Pascarella and Terenzini (1991) grouped the theories of student change into two broad categories--developmental theories (models) and environmental or "impact" theories (models).

Developmental theories followed designs similar to those in the research of Chickering or Kohlberg. At the heart of the developmental theories was the premise that individuals grow or progress through a hierarchical sequence or stages. The developmental model was viewed as linked to psychology. Pascarella et al. (1991) reported that most of the prominent contributors to developmental theories are psychologists.

The environmental or impact models, in contrast, concentrated on external factors influencing change. The consideration of external elements of change was viewed as more akin to sociology. Astin, Tinto, and Pascarella emerged as leaders in development of sociological models (Pascarella et al., 1991). Sociological models were useful in program evaluation because these models used the impact of the environment as one of the measurement components (Norton, 1992; Pascarella et al., 1991).

Ball (1981) categorized these sociological models into two basic forms, the "engineering" model and the "medical" model. In Ball's explanation of the two models, the engineering model emerged as focused on the input-output differences arising from a comparison of the average gains from two groups, one of which has been exposed to the treatment. He explained that this engineering model provided information necessary for overall significance or impact of the treatment. This input-output model, however, did not provide a breadth of knowledge base nor depth of understanding sufficient to permit program improvement (Ball, 1981).

Ball (1981) defined the medical model as a system approach that took into account the student's environment as well as his/her achievement. The medical model encompassed "several broad areas of concern--input, program, context, and outcome, and their relationships" (Ball, 1981, p. 74). The medical model, as outlined by Ball (1981), fostered an understanding of the process that allowed creation of a process for change in the treatment. Astin (1991) used the same medical model analogy in describing his input-environment-outcome model.

Pascarella et al. (1991), Ball (1981), and Astin (1991) all identified sociological models as appropriate models in evaluating effectiveness of institutions, treatments, or programs. These researchers and scholars saw the medical or I-E-O model as providing an important dimension to the evaluation process by ensuring "that affective/motivational/attitudinal goals and behavioral outcomes are not neglected in favor of cognitive/achievement goals" (Ball, 1981, p. 73).

Much of the early research in college impact also included studies of persistence and non-persistence. The variables affecting the decision to drop out were of special interest to a group of researchers like Spady

(1970), Tinto (1975), Pascarella (1980) and Bean(1982). Spady (1970) and Tinto(1975) studied social integration or the lack of social integration as influencing students' decisions to dropout; Pascarella developed a model emphasizing the importance of informal contact between students and faculty (Bean, 1982); Astin changed the perspective from decision to leave or dropout to a broader spectrum of student outcomes.

Spady's 1970 Model of Student Attrition

Spady's model drew on Durkheim's work with suicide and social integration to establish a dynamic to study students' decisions to remain or to leave an institution as a result of the social integration of students into the social structure of an institution (see Figure 2.1). Spady viewed the decision to drop out as a longitudinal process.

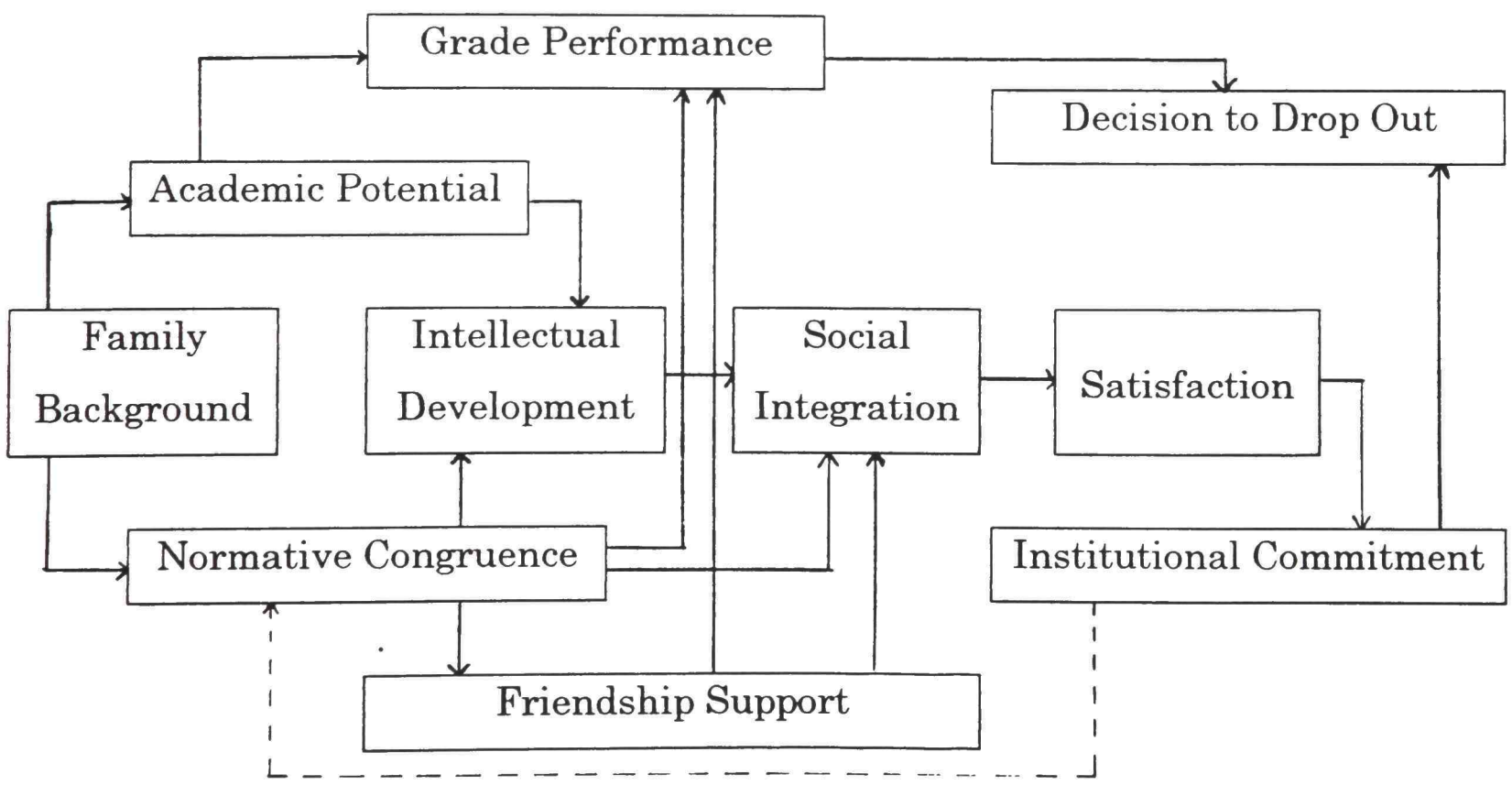

Figure 2.1: Spady's 1970 Explanatory Sociological Model of the Dropout Process (Spady, 1970, p. 79).

Spady's wrote of his model that the solid arrows implied "that either previous research or the theoretical ideas generated from Durkheim's work suggest the existence of a direct causal link between that pair of variables" (1970, p. 78). His system illustrated a complex dynamic with Spady seeing the arrow from grade performance to decision to dropout as an absolute. The broken arrow leading from institutional commitment back to normative congruence implied that the model is cyclical and flexible (Spady, 1970).

Spady identified background characteristics related to family background, academic potential, ability, and socio-economic status as influencing a student's decision to depart or to leave instruction (Bean, 1982). Normative congruence and friendship support were identified as important variables in his model. When grade point average and intellectual development were linked with normative congruence and friendship support, a social integration was created that fostered satisfaction. The engendered satisfaction, in turn, led to institutional commitment if the factors were sufficiently strong. Institutional commitment, then, negated dropping out (Bean, 1982; Spady, 1970).

Tinto's 1975 Model of Student Attrition

Tinto's model was a more explicit, sociological model. Tinto's model built on the work of Durkheim and Spady (Bean, 1982; Pascarella et al., 1991). Tinto theorized that students entered college with varying patterns of personal, familial, and academic characteristics. Extending Spady's incoming characteristics, Tinto included initial dispositions and intentions with respect to college and personal goals. These initial dispositions and intentions formed an early commitment to the institution or goal and

completion of a degree (Pascarella et al., 1991). Positive experiences fostered integration, which increased retention. Goal commitment led to higher grades, and institutional commitment led to greater interaction with peers and faculty (Bean, 1982), which led to social integration (see Figure 2.2).

Although Tinto's model was more complex than Spady's or Astin's sociological models, it contained the same elements as Spady's earlier model and comparable categories to Astin's (discussion to follow). In comparing with Astin's model, Tinto's underlying dynamic for social integration appeared similar to Astin's involvement theory but the initial goal commitments or educational plans differed from the institutional commitment that develops as a result of interaction with the environment of the institution (Bean, 1982).

Although Tinto focused on retention, his model has been used to study other student outcomes as well as retention (Norton, 1992; Pascarella et al., 1991).

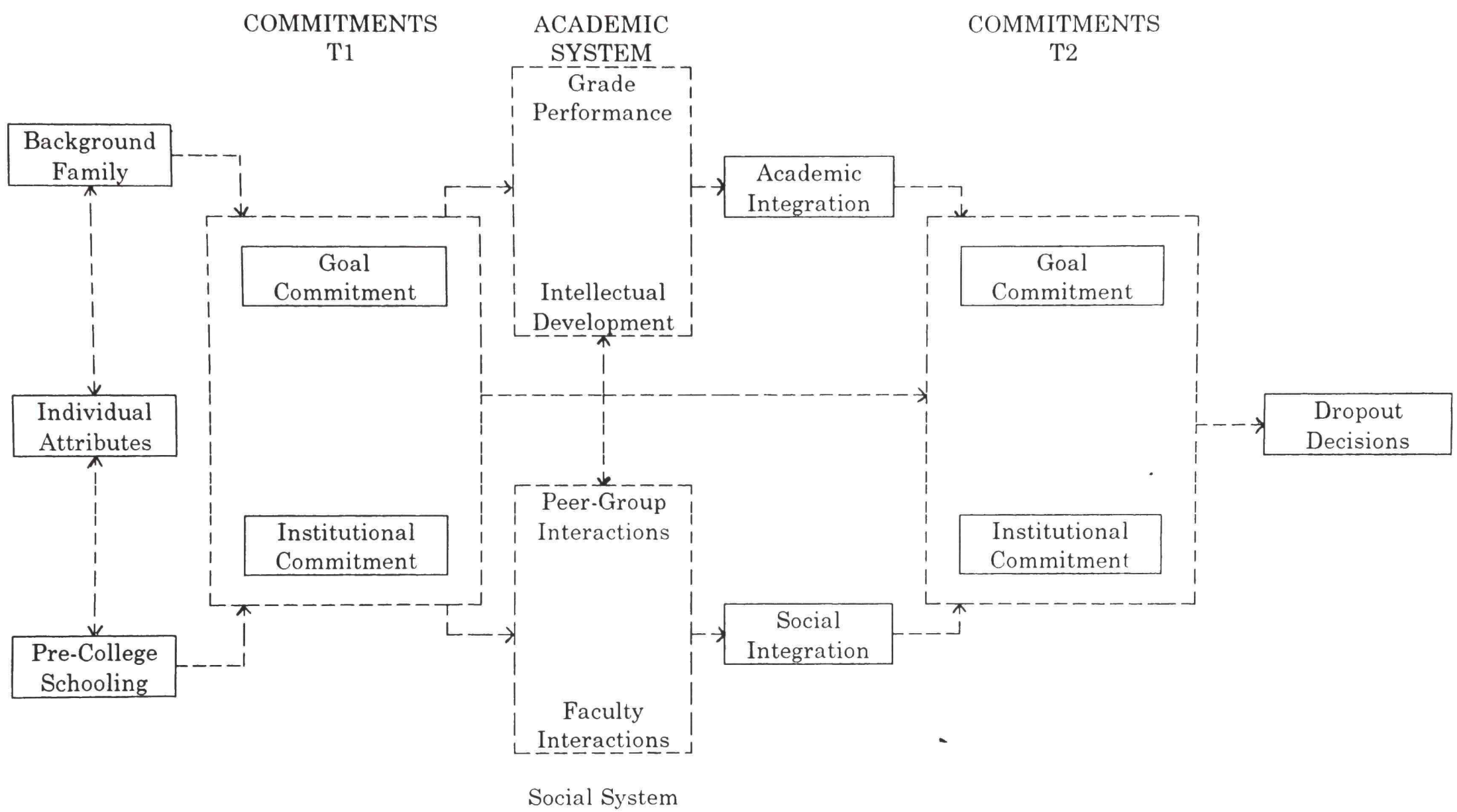

Figure 2.2: Tinto's 1975 Model of Student Attrition (Bean, 1982, p. 22).

Pascarella's 1985 Model for Assessing College Environments

Pascarella's general causal model for assessing the effects of college environments considered student background together with institutional structure and organization as working in concert to shape the institutional environment. These three clusters of variables, in turn, influenced the interactions a student experienced with faculty and peers (Pascarella et al., 1991). Background, institutional environment, and interactions with faculty and peers influenced the quality of student effort, learning, and cognitive development which include college satisfaction and institutional integration (Bean, 1982; Pascarella et al., 1991). Thus, satisfaction and social integration influenced a student's decision to persist or withdraw (see Figure 2.3).

Pascarella's model was appropriate for studying other student outcomes (Pascarella et al., 1991) as was Tinto's model. The background characteristics of a student influenced the way in which that student interacted with the college environment, which led, in turn, to educational and attitudinal outcomes. An attitudinal outcome may have included a student's decision to stay or to depart or other attitudinal outcomes of interest to the researcher.

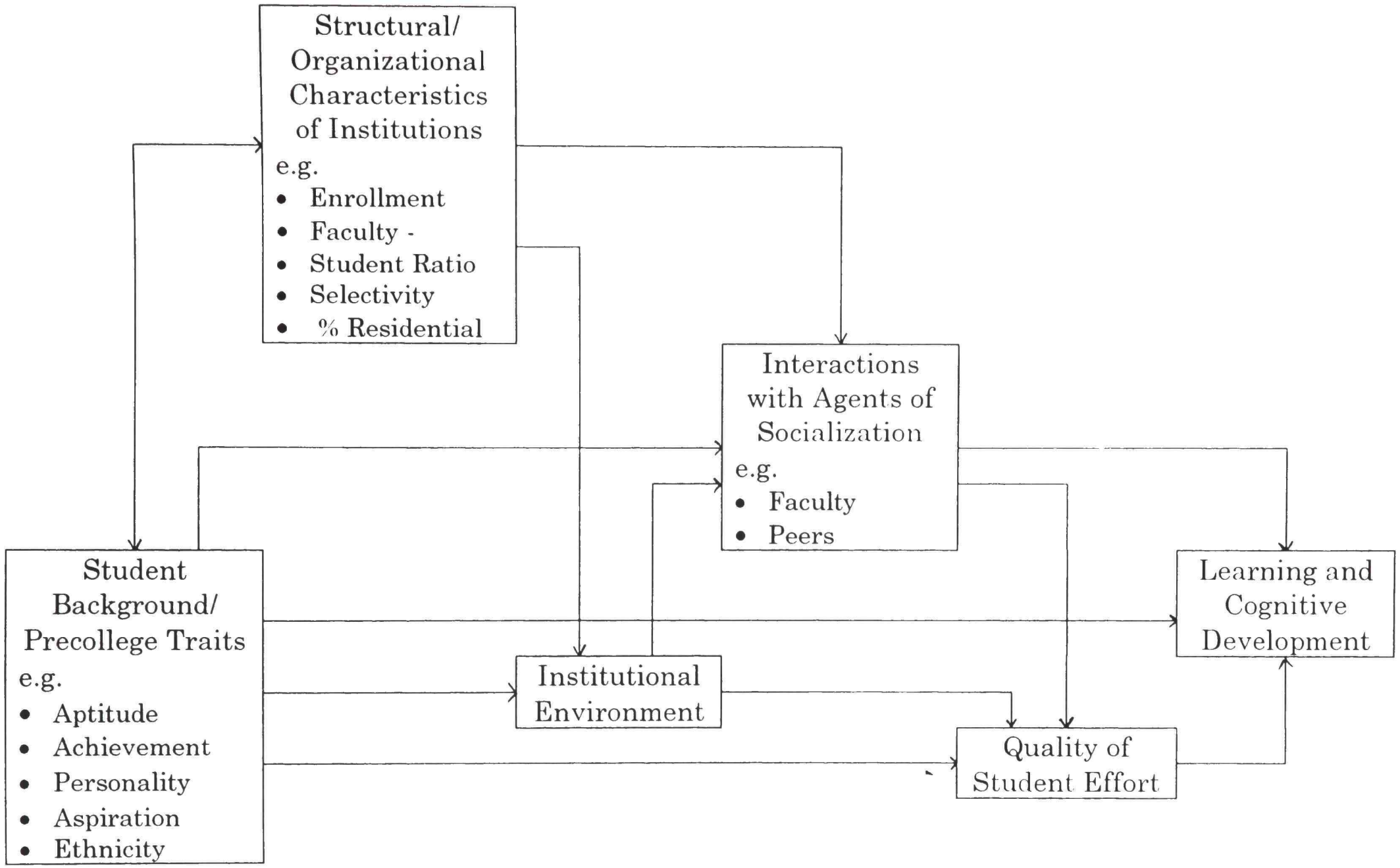

Figure 2.3: Pascarella's 1985 General Causal Model for Assessing the Effects of College Environments on Student Learning and Cognitive Development (Pascarella, 1991, p.52).

Astin's I-E-O Model

Astin proposed one of the earliest college impact models, the input-environment-outcomes model (I-E-O model) (Astin, 1970a, 1970b, 1991; Pascarella et al., 1991) developed from his research experience in mental health. "The basic purpose of the I-E-O design is to allow us to correct or adjust for such input differences in order to get a less biased estimate of the comparative effects of different environments on outputs" (Astin, 1991, p. 19). Astin has utilized this model for almost thirty years in studying college student development and outcomes (Astin, 1991; Norton, 1992) (see Figure 2.4).

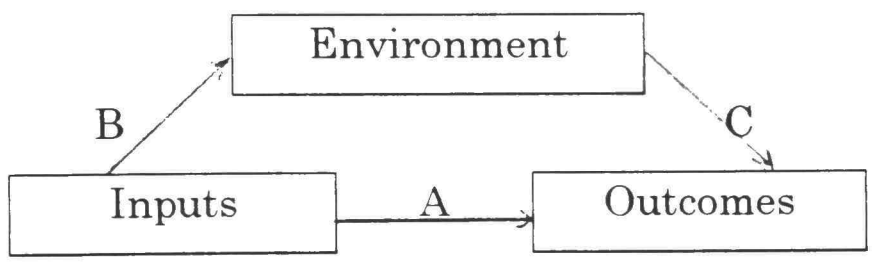

Figure 2.4 Astin's Model of the Relationship Among Input, Environment, and Outcome Variables. (Astin, 1991, p. 18)

Astin's I-E-O model, recreated in Figure 2.4, consists of three elements: inputs, environment, and outcomes (Astin, 1970a, 1970b, 1991; Norton, 1992). The three arrows depict the relationships among the three components of the model (Astin, 1991; Norton, 1992). The arrow between the inputs and outcomes components underscores the possibility that input variables may have a direct influence on the outcomes.

Inputs are viewed as those characteristics of the student at the initial entry in the institution. As initial conditions, input variables represent antecedent variables, independent variables or exogenous

variables (Astin, 1991): "Inputs could also be called control variables or pretests" (p.18).

Environment refers to the student's experiences in the institution, program, or course. Environmental variables are viewed as independent variables. In the I-E-O model, as with the medical model (Ball, 1981), the environmental variables are considered to be the treatments or educational experiences, programs, or interventions (Astin, 1991; Norton, 1992). After controlling the inputs, the impact of the environmental variables emerge as to be the focus of study.

Outcomes refer to the student's characteristic or characteristics after being exposed to the environment (Astin, 1991). The outcomes represent "talents" the program (environment) is designed to develop in the student (Astin, 1991). As a result of exposure to a given environment, the student characteristic (outcome) is considered to be a dependent or endogenous variable (Astin, 1991; Norton, 1992). Astin discussed the impact or influence of intermediate outcomes on the dependent variables. Student intermediate outcomes may become student created environmental variables (Astin, 1991). These intermediate outcomes may occur as a result of the interaction between input and environmental variables or from a direct influence of environmental variables. For example, grade point average may influence a student's actions in or interactions with the environment.

Astin created a dynamic for examining the influences of both input and environmental variables on student outcomes. By statistically controlling input variables in order to remove any bias those input variables might inject into the equation, the influence the environmental variables exerted on the outcomes could be determined.

Model Comparisons

Spady, Tinto, Pascarella, and Astin each viewed background and environmental variables as influencing students' decisions. The background variables determined the manner in which students interacted with the college environment (Bean, 1982). A comparison may be drawn between Spady's, Tinto's, and Pascarella's classifications of variables influencing social integration and Astin's involvement theory. Some of the models were more expansive in defining variables, but the variables covered related areas (Norton, 1992).

The models allowed the researcher to determine which incoming student characteristics influenced student decisions related to outcomes. These models also allowed the researcher to tell which academic, social, or institutional environmental variables influenced student outcomes. Figure 2.5 illustrates a comparison between components of Astin's model and those of Spady, Tinto, and Pascarella.

Astin's input characteristics (variables) corresponded to Tinto's pre-entry attributes of background/family, individual attributes and pre-college schooling, and the early (T1) goal commitment and institutional commitment of the student. Astin's input characteristics corresponded to Spady's family background and academic potential and to Pascarella's student background and precollege traits.

Astin's environmental variables corresponded to Tinto's institutional experiences with the academic system, social system, academic and social integration, and later goal and institutional commitments (T2). In a similar manner, Astin's environmental variables corresponded to Spady's intellectual development, normative congruence, friendship support, intellectual development, and grade performance.

	Astin		
	Input	Environment	Outcome
Tinto	Pre-entry Attributes Goal Commitments T1	Academic System Social System Academic or social Integration Goals and Commitments T2	Outcomes [persist or not]
Spady	Family Background Academic Potential	Grade Performance Intellectual Development Normative Congruence Friendship Support	Social Integration Satisfaction Institutional Commitment Decision to Drop Out
Pascarella	Student Background Pre-college Traits	Structural Organizational Characteristics of the Institution Institutional Environment Interactions Quality of Effort	Learning and Cognitive Development

Figure 2.5: Comparison of the Components of the Astin, Tinto, Spady, and Pascarella Models.

Astin (1991) referred to grade performance as an intermediate outcome and included it with the environmental variables in the last stages of evaluation. A similar designation of Spady's social integration, satisfaction, and institutional commitment as intermediate outcomes could be made. Pascarella's structural or organizational characteristics of institutions, interactions with socializing agents, institutional environment, and quality of effort could correspond to Astin's environmental variables, including quality of effort as an intermediate outcome of the ilk of grade point average.

The outcomes were less complex to draw relationships between the models. Astin's outcomes were more general than attrition or 'dropping out'. Tinto's and Pascarella's models have been used to examine outcomes other than attrition (Bean, 1982; Pascarella et al., 1991). The outcomes included the decision to drop out for Spady's 1970 model and Tinto's 1975 model as well as social integration, satisfaction, and institutional commitment in Spady's model . Astin's outcomes also corresponded to Pascarella's learning and cognitive development outcomes.

The decision to use Astin's model was based on the flexibility of the model in naming and categorizing the variables. Astin's model supported a study of student satisfaction well. As a comparison with other major models revealed, Astin's model was comparable to others in determining and including variables such as students' background and an institution's environment that influence student outcomes.

Astin's embedding of his model in involvement theory enhanced the use of the model as a way of categorizing variables that may affect student satisfaction. Involvement, the theoretical foundation of Astin's I-E-O model, has been linked to student outcomes (Friedlander & MacDugall,

1991). Every decision an institution, program, or instructor makes affects the manner and amount of energy a student invests in that institution, program, or class (Astin, 1991). Analysis of variables influencing student satisfaction ultimately allowed the researcher to make recommendations concerning policies and practices that could enhance student satisfaction.

Satisfaction

Introduction

For over thirty years, a wealth of research has been conducted on a diversity of topics related to educational change. The studies spanned topics ranging from funding to curriculum, teacher preparation, and college impact on students. The overriding questions concerning student change in college related to how, when, and why students change.

"Since the late 1960s and early 1970s ... and impressive number of formal theories of student change have been advanced" (Pascarella et al., 1991, p. 15), including college impact models. Impact models attempted to identify sets of variables that may have exerted an influence on the student, causing change.

The 1970s witnessed a growth of research involving impact models. The theoretical models of Spady, Tinto, Pascarella, and Astin discussed in the previous section were related to early college impact studies of a student's decision to drop out and to other student outcomes (Bean, 1982; Pascarella et al., 1991). Bean (1982) and Spady (1970) suggested strong ties between theories of persistence/non-persistence and Durkheim's theory of suicide. Bean (1982) noted that in the models of Spady, Tinto, and Pascarella, each found his theoretical base of social and academic

integration of the student with the institution in Durkheim's theory. Spady (1970) wrote:

> According to Durkheim, breaking one's ties with a social system stems from lack of integration into the common life of that society. The likelihood of suicide increases when two kinds of integration are absent: insufficient moral consciousness (viz. low normative congruence) and insufficient collective affiliation (viz. low friendship support). (pp. 77-78)

Although dropping out of college was clearly a less drastic form of rejecting society, Spady (1970) noted parallels in factors from Durkheim's theory and a lack of social integration in student retention studies.

> A model based on Durkheim's theory of suicide provides a fruitful vehicle for summarizing a large portion of current research, and focusing future attention on the interaction between student attributes (i.e., dispositions, interests, attitudes, and skills) and the influences, expectations, and demands imposed by various sources in the university environment. (p. 64)

From suicide to satisfaction could have been viewed as a semantic play on extremes. The educational research lens began to change. The chain of thought seemed to proceed from suicide and a lack of social integration to non-persistence. Then the focus moved from variables influencing non-persistence to those fostering social integration and persistence, continuing to satisfaction with aspects of education. Astin (1984) viewed student outcomes, like satisfaction, as they related to involvement. Involvement in the educational process seemed related to social integration. A student who was involved in the educational process was integrated into the social structure of that education.

Educational research also drew heavily on an extensive body of research related to job satisfaction to adapt existing models or to develop

new models for determining variables influencing satisfaction. Drawing from job satisfaction research was an obvious extension. For example, Holland developed a personality index relating personality types to job environments (Watkins, 1993). One of the constructs supplementing Holland's theory of personality types, differentiation, hypothesized that highly differentiated people, that is those individuals who closely resembled one of six personality types, reflected greater vocational and educational achievement, stability, and satisfaction (Erwin, 1987; Witt & Handal, 1984). Erwin's study (1987) supported a portion of Holland's differentiation construct, strengthening a link between employment research and educational research. Notably, early in his career, Astin worked with Holland (Astin, 1991). This early association may have influenced Astin's development of the I-E-O model for determining input and environmental variable influences on student outcome variables.

Moving beyond Holland's six personality types, factors that affected student satisfaction with programs or institutions emerged from the literature. Feldman and Newcomb (1969) summarized numerous educational studies including early satisfaction studies conducted by Pace in 1954 and Pace and Troyer in 1949. In summaries of these early studies, Feldman et al. (1969) noted that 81% of the students involved in these studies perceived preparing for a vocation (career) as a major goal of general education. In more recent work, Chadwick and Ward (1987) conducted a study based on an exit survey of senior business students at a large university in the Midwest. They approached the study as a means of determining student satisfaction with the program and for making recommendations for college and university administrators. Chadwick et al. (1987) found that the factors that influence satisfaction may change

across the educational experience. They found that graduates emphasized career preparation as an important aspect the educational experience.

In addition to career preparation, respondents for Chadwick et al. (1987) viewed placement office effectiveness, advisors who provide career guidance as well as help with course selection, and availability of internship programs as critical to their willingness to recommend an institution (the study's measure of satisfaction). Chadwick et al. (1987) also noted that quality of instruction in the form of an available and knowledgeable faculty was the second highest factor in contributing to the respondents' perception that a program was high quality. Likewise, respondent satisfaction was influenced by several of the variables under consideration in this study.

In 1987, Astin, Korn, and Green published findings from the 1985 follow-up of 1981 freshmen for the ongoing research conducted as apart of the nation's longest and largest continuing study, Cooperative Institutional Research Program (CIRP). "In addition to measuring retention rates, the CIRP follow-up survey provides new national data about student satisfaction with various aspects of the undergraduate experience" (Astin, Korn, & Green, 1987, p. 40). The study assessed 21 different aspects of the undergraduate experience. Two distinct cohorts participated in the study, those students with two or four years of exposure to a college environment. Satisfaction with courses in the student's major ranked highest for both groups. Over 70% of each cohort responded that they were either satisfied or very satisfied with interacting with professors outside of class and overall quality of instruction. Satisfaction with lab facilitates and equipment was in the mid- to upper 60% range. Notably, fewer than 50% of each group were satisfied with

career counseling, financial aid services, and job placement services. As a result, Astin et al. (1987) recommend that colleges needed to and could alter current policies and practices to enhance learning opportunities and provide better assistance in non-classroom assistance.

The CIRP 1988 follow-up for 1984 and 1986 college freshmen (Astin, Korn, Dey, & Hurtado, 1990) echoed earlier findings. Students were most satisfied with courses in their majors. Other aspects of the college experience eliciting relatively high rates of student satisfaction included opportunities to discuss course work with professors outside of class and the overall quality of instruction. "As found with previous follow-up surveys, the lowest rates of student satisfaction occur with individualized services such as academic counseling, career counseling and advising, job placement services, and financial aid services" (Astin et al., 1990, p. 3). Although these areas were rated below 70%, the percentage of those students who responded as either very satisfied or satisfied with personal services increased over the percentage of satisfaction with the earlier study reported in 1987. The increased satisfaction was noted in the areas of career counseling, academic advising, tutorial services, and job placement.

Moore and Smith (1992) also conducted a multi-phase project in which 2000 students were selected in a stratified random sample from the 4,488 students involved the first phase of a follow-up of Minnesota private career school students. They reported a 40.2% response rate and found that the lowest area of satisfaction was with school services. Only 40% of the Moore et al. (1992) study reported that they were satisfied with college services.

Researchers have been interested in student satisfaction (Astin et al., 1987, 1990, 1994; Aitken, 1982; Reed et al., 1984; Morstain, 1977; Sanders & Chan, 1993) and in determining variables that influence student satisfaction (Alberti, 1972; Lincoln et al., 1983; Morstain, 1977; Pike, 1989). This previous research identified two general categories of variables that influence satisfaction--students' precollege characteristics and their educational experiences.

Precollege characteristics, called input variables by Astin, included a wide variety of demographic and background variables. These characteristics held the potential for influencing student satisfaction. For example, studies often included age with the other demographic variables in a study. Findings from Moore et al. (1992) revealed that dissatisfied students tended to be younger and right out of high school. Age, however, did not always assume a key role in influencing satisfaction (Aitken, 1982).

Variables related to educational experience, Astin's environmental variables, encompassed a wide variety of variables. Every aspect of the educational experience, both inside and outside of the classroom, held the potential for influencing student satisfaction. Selecting a major and being actively involved in that major emerged as a significant influence on satisfaction (Astin et al., 1987, 1990; Moore et al., 1992). This satisfaction arising from interaction within a major extended to and varied across vocational programs (Moore et al., 1992). Moving beyond the major, another environmental variable impacting satisfaction was quality of instruction. Quality of instruction influenced student satisfaction with his or her educational experience (Astin et al., 1987, 1990; Moore et al., 1992).

The educational environment extends beyond the classroom. Research revealed that satisfaction was impacted by variables outside the classroom. For example, involvement with instructors emerged as an important variable in fostering student satisfaction. Astin wrote that "frequent interaction with faculty members is more strongly related to satisfaction with college than any other type of involvement or indeed any other student or institutional characteristic [variable]" (1985, p. 149). Alberti (1972) found that students viewed interpersonal relationships with faculty as one of the most outstanding features of the college experience. This interaction fostered a number of student outcomes, including satisfaction with the educational experience. Pike (1989) also studied the link between performance and satisfaction using four precollege variables and three involvement variables, including involvement with instructors. Involvement with faculty impacted both performance and satisfaction (Pike, 1989).

Other environmental variables were both a result of the environment and a part of the continuing environment. These intermediate outcomes, such as grade point average, in turn impacted other outcomes, such as student satisfaction. For analysis purposes, Astin (1991) recommended entering grade point average or other intermediate outcomes into the regression model at the last stage because of this intermediate outcome's potential influence on satisfaction. Careful consideration of intermediate outcome's impact on satisfaction, as suggested by Astin, was supported by the research of Aitken (1982) and Pike (1989). Aitken (1982) found GPA , defined as expected grades reported by students, to be the most important variable in determining academic satisfaction. To a lesser extent, Aitken (1982) found that course

satisfaction, ratings of instructors, and satisfaction with major also influenced academic satisfaction. Additionally, Pike (1989) found a significant relationship between performance, measured by GPA (an intermediate outcome) and satisfaction.

Two categories of variables, input and environmental variables, emerged as impacting student satisfaction. Precollege variables and involvement were not sufficient by themselves to explain students' performance or satisfaction. For example, Pike (1989) found that race was significantly related to performance (grades) but not to satisfaction. In contrast, Howard and Maxwell (1980) found that student grades had minimal impact on satisfaction when entered after students' perception of progress (preparation) or motivation.

Summary

This review of the literature explored three areas, historical foundations, theoretical models, and satisfaction studies. These areas provided a foundation for this study. Historical foundations looked at both the historical and legislative background for the study. In the section on theoretical models, potential models for use in this study were explored. Finally, the section on satisfaction served to ground this study in previous research.

Review of the literature provided an historical and legislative foundation for the study. Vocational education has been a part of the educational process since the earliest days. Whether or not vocational education belongs in public education or outside of public education became an argument relegated to the past. Vocational education has been, is, and will be a part of the educational system. Legislation has

brought vocational education into the mainstream of present educational systems. With the mandate to include workforce preparation in the educational system came the imperative to evaluate that preparation. The vocational initiative under consideration in this study, Tech Prep, has received little evaluation. Notably absent was an evaluation of student satisfaction. This absence of evaluation of student satisfaction with Tech Prep was the main problem for this study.

In exploring potential models for use in evaluating student satisfaction with Tech Prep, the similarities among and between sociological models emerged. Astin, Tinto, and Pascarella were known for sociological model development. Their models were determined to be similar. They used different language to express similar concepts. Astin's I-E-O model, grounded in involvement theory, offered a means for answering both the research questions and a theory from which to make recommendations. This model suggested categories of variables and individual variables to consider for this study.

This review of literature on research related to satisfaction provided a wealth of information. Researchers have been and continue to be interested in those variables that influence satisfaction. Some variables emerged as beyond the control of the institution or program. The input variables, alone, did not provide a complete picture of the influences on satisfaction. Environmental variables, those variables that occurred as a direct result of an institution's, program's, or instructor's policies and practices, also impacted student satisfaction. This review supported the selection of variables, based on Astin's I-E-O model input and environmental variables, for consideration in this study.

CHAPTER III
METHODOLOGY

Introduction

The methodology chapter explains the quantitative procedures that were used in conducting this study. This chapter is divided into seven sections: (1) introduction, (2) general research design, (3) instrumentation, (4) sample population, (5) data collection, (6) data analysis, and (7) summary.

Restatement of the Problem

Under Carl Perkins guidelines, Tech Prep programs were to span four years of high school and the first two years of post-secondary education. The legislation included an emphasis on program accountability (Decision Information Resources, 1994; Pullin, 1994). Evaluations of Tech Prep programs in Texas have not included affective student outcomes, such as students' satisfaction.

The localized absence of students' input was consistent with research patterns in evaluation. The general problem facing the field was the lack of reported research on students' satisfaction with vocational education. To increase the knowledge base in this facet of assessment, student satisfaction was selected as the dependent variable because of its value as an alternative measure for evaluating schools or programs (Astin, 1991; Bane et al., 1972; Johnson, 1981a, 1981b). The main problem for this study was the lack of reported research on community college students' satisfaction with Tech Prep programs in Texas.

Restatement of the Purpose

The literature revealed a notable lack of reported research regarding community college student satisfaction with educational environments. To increase the knowledge base in the use of affective outcomes, student satisfaction was selected as the dependent variable. The purpose of this study was to evaluate community college students' satisfaction with Tech Prep programs in Texas by determining input and environmental factors influencing that satisfaction. This study proposed to evaluate Tech Prep programs through the perspectives of students. This evaluation included three main purposes:

1. to determine which, if any, of the input and environmental variables affect student satisfaction with Tech Prep programs in Texas;
2. to identify policies and practices that enhanced student satisfaction; and
3. to make recommendations concerning policies and practices to increase community college student satisfaction with Tech Prep programs in Texas and the nation.

General Research Design

This study used a survey research design (Davis, 1971; Dutka, Frankel, & Roshwalb, 1982; Labaw, 1980). The research design consisted of a one time administration of the 1995 Survey of Community College Tech Prep Students. The survey was administered to postsecondary Tech Prep students enrolled in Texas two-year colleges during the 1995 spring semester.

The survey questionnaire was developed using Astin's (1970a, 1970b, 1991) I-E-O model to define input and environmental variables that may influence student satisfaction with Tech Prep programs. The survey consisted of 67 questions in two sections. The first section, Background, contained 40 questions, pertaining to input, environmental, and outcome variables. Some of the first 40 questions contained multiple items of related information. The second survey section, Satisfaction with Tech Prep, contained 27 questions pertaining to outcome--student satisfaction--variables.

This study considered seven input variable clusters, representing fifteen input variables; five environmental variable clusters, representing twenty-eight environmental variables; and three outcome variables.

Instrumentation

Rationale for Development of an Instrument

This study examined a variety of background variables and specific program areas thought important to students' satisfaction with Tech Prep programs. Several researchers have used other instruments for measuring student satisfaction with institutions or vocational programs. These instruments produced varying degrees of success and researcher satisfaction with the resulting evaluation. For this study, the researcher reviewed the following instruments:

1. The Maryland State Department of Education Vocational-Technical Education Program Evaluation Questionnaire, a 300-item, 12-page questionnaire that resulted from a collaboration between the Maryland State Department of Education's Vocational-Technical Division and the Educational Testing Service (Johnson, 1981a, 1981b).

2. The Inventory of College Activities, 1962 version, which was developed by the National Merit Scholarship Corporation (Astin, 1968).
3. Minnesota Association of Private Postsecondary Schools Student Follow-Up Questionnaire, 1991 version (Moore et al., 1992).
4. National Client Follow-Up Survey, 1993 version, which was administered in Australia (Dawe, 1993).
5. Arapahoe Community College Student Satisfaction Survey, 1993 version (Arapahoe Community College, 1993).
6. 1993 Student Information Form (Astin et al., 1994).
7. 1988 Follow-Up Survey of College Students, (Astin et al., 1990).

In addition to reviewing these instruments, the researcher reviewed numerous studies and dissertations in which commercially produced questionnaires were used or adapted for use in ascertaining student satisfaction with a variety of programs or program characteristics (Beasley, 1990; Morstain, 1977; Norton, 1992; Watkins, 1988). For several studies, the researchers developed instruments, but the instruments were not published with their reports (Langan & Keeler, 1993; Lincoln et al., 1983; Sanders et al., 1993). In scanning the literature, descriptions of the development of several commonly used instruments, which included measures of satisfaction, were read (Astin, 1968, 1993; Beasley, 1990; Reed, Lahey, & Downey, 1984).

Based on an analysis of the aforementioned instruments and relevant research involving student satisfaction, the determination was made that an instrument did not exist for evaluating student satisfaction with Tech Prep. Therefore, an instrument was developed for use in this study.

Instrument Development

The actual design of the instrument was directed by the I-E-O model. The content included three broad categories of variables--input, environmental, and outcome. The variables included and the measures of those variables arose from the purpose for the study. The questionnaire was divided into two major sections: (1) Background and (2) Student Satisfaction with Tech Prep. The questionnaire consisted of 67 questions (see Appendix B).

Questionnaire Content

"I" Input Variables. Some input variables, such as age (item 6) or sex (item 5), had single measures on the questionnaire. Others, such as ethnicity (item 21), allowed multiple responses. Socio-economic status, SES, had involved four variables related to SES (items 11, 20 a, b, and 24). Academic preparation, family responsibilities, and expectancy also represented clusters of variables that were considered separately. (See Table 3.1 for the relationship between variables or variable clusters and questionnaire items.)

"E" Environmental Variables. The twenty-eight environmental variables are grouped into five clusters: (1) external involvement, (2) college services involvement, (3) program involvement, (4) student's perceived preparation, and (5) grade point average (GPA). These environmental variables, as perceived by Astin (1991), were the link between an institution's or program's ability to involve a student and the policies and practices governing an institution's implementation of programs, specifically Tech Prep programs. For analysis, the variables were considered separately rather than in clusters (see Appendix A).

Table 3.1: Questionnaire Items Related to Input, Environmental, and Outcome Variables.

"I" Input Variables	Questionnaire Item(s)
Age	6
Sex	5
Ethnicity	21
Academic Preparation	4, 7, & 26 (a, b)
Socio-economic Status	11, 20 (a, b), & 24
Family Responsibilities	22 & 23
Expectancy	8 & 13
"E" Environmental Variables	
External involvement	16, 17, 18, & 19
College Services Involvement	32, 33, 34, 35, 36, 37, 38, 39, & 40
Program Involvement	1, 2, 3, 9, 10, 12 (a, b), & 27 (a, b, c),
Student's Perceived Preparation	28 (a, b) & 29(a, b)
GPA	15
"O" Outcome Variables	
Vocational/Tech Prep Instruction and Curriculum	41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, & 54
Academic/Tech Prep Instruction and Curriculum	58, 59, 60, 61, 62, 63, 64, &65
Overall Tech Prep Program	14, 30, 31, 55, 56, & 67

"O" Outcome Variables. The survey included a section of student satisfaction measures for the outcome variables. Items 41 through 54 measured student satisfaction with vocational/Tech Prep instruction and

curriculum. Items 57 through 65 measured student satisfaction with academic/Tech Prep instruction and curriculum. Student's overall satisfaction with Tech Prep was measured by items 14, 30, 31, 55, 56, 66, and 67.

Validation of the Instrument

Because the survey was a newly developed instrument, the important question of validity emerged. In an attempt to ascertain if the document measured what the researcher hoped it would measure, the survey was reviewed for clarity and content validity by (1) several Texas Tech higher education faculty (doctoral committee members); (2) a Special Populations Director at a two-year institution; (3) an activist for 'differently abled' people; (4) an administrator of technical education at a two-year institution; and (5) several focus groups of community college Tech Prep students. Each of those contacted provided helpful suggestions for modifying the questionnaire.

The survey was analyzed for readability using the Flesch-Kincade grade level. The readability level was 6.4 grade level.

Sample Population

Twenty-five hundred Tech Prep students enrolled during the spring 1995 semester in Texas public two-year colleges were to be surveyed. A problem soon became evident--'Who and where were the tech prep students?' The Texas Higher Education Coordinating Board defined a tech prep student as any student enrolled in a state-approved tech prep program (cited in D.I.R., 1994). The tech prep students could be enrolled in any of the public two-year institutions. The Texas public two-year

colleges included 50 community junior college districts, two independent junior colleges, and the Texas State Technical College System (TSTC) (TJCTA Messenger, 1994). These institutions included 70 campuses across the state. Further confounding distribution was the knowledge that not every campus had a Tech Prep program. During the fall 1994 semester, 55 of the 70 campuses had Tech Prep programs (Bocanegra, personal communication, 1995).

In 1993, D.I.R. reported 8,591 Tech Prep students enrolled in 23 institutions. December figures for 1994 placed enrollment in Tech Prep programs at about 31,487 students (Bocanegra, personal communication, 1994), but the population could change rapidly with Tech Prep programs. In order to determine the number of Tech Prep students at a each campus, the Coordinating Board was contacted. The statistics department provided enrollment data based on registrar's reports to the Coordinating Board for fall 1994 semester, as well as for preceding semesters. In the fall 1994 semester 25,067 students were enrolled as majors in state-approved Tech Prep programs. These students were enrolled as declared majors in Tech Prep programs at 53 institutions/institutional campuses. (Spring 1995 enrollment totals would not be available before the questionnaires needed to be posted.)

Each two-year college campus with Tech Prep students enrolled during the fall 1994 semester received a portion of the 2,500 surveys. The portion of the surveys sent to each location was determined by dividing the number of students at the campus by the total number of Tech Prep students in the state. Since the student count received from the Coordinating Board indicated 25,067 Tech Prep students enrolled in two-year institutions during the fall 1994 semester and 2500 surveys were to

be distributed, the institutions should have received surveys for approximately 10% of their Tech Prep students. For example, if College A had 1500 postsecondary Tech Prep students and the state had 25,000 students, then College A would receive 3/50 (that is 1500/25000) or 150 of the 2500 surveys. This proposed distribution created a problem: some institutions would have received only one or two questionnaires. This problem was resolved by deciding that no institution would receive fewer than five surveys. The number of surveys distributed to each campus was rounded up or down slightly to create groups of surveys that were divisible by five (see Appendix C).

Data Collection

Data were collected during the latter part of the 1995 spring semester. Administrators of technical education at each participating institution received a proportion of the 2500 surveys for distribution to instructional staff who, in turn, were to have students complete the questionnaires. The secretary for the Texas Association of College Technical Educators (TACTE) was contacted for a membership mailing list. Administrators of vocational education who received the questionnaires were selected from this membership or through direct contact with the institution, if none were members of TACTE.

During the April 5-7, 1995, meeting of the Texas Association of College Technical Educators in Austin, Texas, an announcement was made concerning this study. Administrators were informed that the surveys would be at their institutions when they returned from the conference. Since this study satisfied part of a Carl D. Perkins grant for identifying exemplary policies and practices in Tech Prep programs in

Texas, the announcement and the cover letter enclosed with the institutional packet explained the questionnaire's place in the overall identification of exemplary policies and practices of Tech Prep and of the use of the data for this dissertation.

In the cover letter included in the institutional packet, the administrators were asked to route the surveys to instructors in their institution's Tech Prep programs and to return the completed surveys to Texas Tech University. Packets included the following materials:

1. Appropriate number of questionnaires for a given institution or campus.
2. Envelopes, if necessary, for re-packaging questionnaires for distribution to instructors of intact classes.
3. Letters to faculty with instructions for administering questionnaires to students and returning completed questionnaires to their administrator (see Appendix D).
4. Letter to the student explaining the intent of the study (see Appendix D).
5. Envelopes or boxes for returning questionnaires.
6. A ziplock plastic bag containing return label and postage for returning completed questionnaires.

Instructors were asked to administer the surveys to intact Tech Prep classes. Students were to complete and return the questionnaires in class during or before the third week of April. The instructors were asked to return the completed questionnaires to their administrator for return to Texas Tech.

The surveys were sent to the institutions late in the spring 1995 semester. The lateness of the mailing did not allow sufficient time for

follow-up letters to be effective in increasing response rate. Instead of writing follow-up letters, administrators for institutions or systems receiving large numbers of surveys were contacted by telephone. The telephone follow-up produced varied results. Several institutions declined to participate because of the timing (end of semester and final exams) in the semester. Although Astin suggested surveying students at the end of their programs to obtain program satisfaction, future studies should take into account semester constraints and mail the questionnaires earlier in the semester.

Response Rate

The 2500 questionnaires were distributed to 53 campuses across the state. Administrators at these institutions received from 5 to 225 questionnaires for distribution to students. These institutions represented 24 of the 25 consortia. A total of 512 questionnaires were returned for an overall response rate of 20.5%. Twelve of the surveys were omitted from analysis because the respondents were minors, under age eighteen, and minors needed parental permission to participate in a survey. Once these twelve surveys were removed because parental permission was not requested, the remaining 500 questionnaires yielded a 20.0% response rate.

Responses were received from 21 institutions representing a 39.6% response rate for institutions. Institutions from 14 out of the 24 consortia represented in the study returned completed surveys for a 58.3% consortia response rate.

The questionnaires were optically scanned at the Texas Tech Health Sciences Center. A disk with the scanned data was received from the Health Sciences data processing center on July 6, 1995.

Analysis of Data

Although completed questionnaires were scanned visually by the researcher prior to being optically scanned, the resulting optically scanned data were reviewed for possible errors in machine scanning. Several of the records needed to be corrected before beginning the analysis. Once the records were reviewed and corrected, documentation was prepared for the data set. The reliability of multiple-measure scales was considered. Then the data were analyzed using both descriptive and inferential statistical methods.

Reliability of Multiple-Measure Scales

A quantitative study was conducted to determine the reliability of scales represented by two or more items on the survey. Stevens (1992) noted that a variety of rules have emerged that look at the relationship among number of factors, factor loadings, and sample size. In addition to the popular rules, Stevens discussed recommendations proposed by Guadagnoli and Velicer "that the most important factors are component saturation (the absolute magnitude of the loadings) and absolute sample size" (Stevens, 1992, p. 384). Stevens supported the following recommendations for the applied researcher:

1. Components with four or more loadings above .60 in absolute value are reliable, regardless of sample size.

2. Components with about 10 or more low (.40) loadings are reliable as long as the sample size is greater than about 150.
3. Components with only a few low loadings should not be interpreted unless the sample size is at least 300. (p. 384)

Each of the three dependent variables considered in this study were based on multiple measures. A factor analysis of the principal components assembled to measure each satisfaction construct was conducted (Stevens, 1992). Only those principal components with a factor load of 0.3 or larger were combined to create a dependent variable.

Satisfaction with Vocational/Tech Prep Scales

Factor analysis for Vocational Satisfaction items (see Table 3.2) revealed that factor loads ranged from 0.657 to 0.861. Each of the thirteen factors entered to create the dependent variable related to student satisfaction with Vocational/Tech Prep Instruction and Curriculum exceeded the 0.3 threshold. Since the factor loadings all exceed 0.3 and 358 cases were used in determining the factor loads, combining these factors for the dependent variable appeared to be appropriate (SPSS, Inc., 1988; Stevens, 1992).

The reliability of combining these factors to create the vocational satisfaction variable was supported by calculating Cronbach's alpha with alpha = 0.948. The closer the alpha value is to one the greater the reliability.

Table 3.2: Factor Loads for Vocational Satisfaction Measures (N=358)

Questionnaire Item	Factor Load
Q41	0.691
Q42	0.791
Q43	0.766
Q44	0.786
Q45	0.846
Q46	0.781
Q47	0.833
Q48	0.840
Q49	0.858
Q50	0.861
Q51	0.815
Q52	0.677
Q53	0.657
Q54	0.685

Satisfaction with Academic/Tech Prep Scales

Factor analysis for Academic Satisfaction (see Table 3.3) revealed that factor loads ranged from 0.759 to 0.902. Each of the nine factors had factor loads sufficiently high, exceeding the 0.3 threshold, to be included as a factor of the dependent variable for student satisfaction with Academic/Tech Prep Instruction and Curriculum. Since all of the factor loadings exceeded 0.3 and 425 cases were used in determining the factor loads, combining these factors for the dependent variable appeared to be appropriate.

The reliability of combining these nine factors to create the academic satisfaction variable was supported by calculating Cronbach's alpha with alpha = 0.959.

Table 3.3: Factor Loads for Academic Satisfaction Measures (N=425)

Questionnaire Item	Factor Load
Q57	0.759
Q58	0.877
Q59	0.863
Q60	0.864
Q61	0.898
Q62	0.902
Q63	0.883
Q64	0.876
Q65	0.886

Overall Satisfaction with Tech Prep Scales

Factor analysis for Overall Satisfaction (see Table 3.4) revealed that factor loads ranged from 0.321 to 0.876 with one factor not achieving the 0.3 factor load minimum set prior to analysis. Six of the seven factors entered to create the dependent variable for Overall Satisfaction exceeded the 0.3 threshold. Questionnaire item from question 14 (If you could start over, would you take this vocational/Tech Prep program again?) did not exceed the 0.3 threshold. Combining the remaining six principal components for the dependent variable appeared appropriate.

Once item 14 was removed, 399 cases were considered in calculating reliability of the overall satisfaction dependent variable.

Combining the six principal components to create the overall satisfaction variable was supported by Cronbach's alpha with alpha = 0.850.

Table 3.4: Factor Loads for Overall Satisfaction Measures (N=399)

Questionnaire Item	Factor Load
Q30	0.643
Q31	0.321
Q55	0.841
Q56	0.862
Q66	0.876
Q67	0.848

In considering the independent variables, the questionnaire included fifteen input and twenty-eight environmental variables as predictors of student satisfaction with each of the three outcome variables. Since none of these independent variables was represented by more than one questionnaire item, neither a factor analysis nor an alpha was calculated for these variables.

Descriptive Statistics

Descriptive statistics were calculated for the data. Calculations were made for all dependent variables, factors of dependent variables, and independent variables. Descriptive statistics included frequencies and percentages for discrete variables, such as gender. These statistics included means and standard deviations for continuous variables, such as time spent in preparation for class.

Correlations were computed to determine the strength of relationships between variables. Correlations supported dependence of multiple measure for the dependent satisfaction variables. Furthermore, calculation and review of these simple correlations were necessary to establish independence of the variables before running multiple regressions. The closer the correlation coefficient is to one, the stronger the relationship. A high correlation indicates that the variables are not independent and, therefore, the variables need to be collapsed or transformed before running regressions that include those values.

Inferential Statistics

For inferential purposes, the data collected were analyzed using multiple regression. Three regression analyses were conducted, one for each outcome (dependent variable).

A multiple regression model may be represented by the equation:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k + \varepsilon$$

where Y = dependent variable;

β_0 = Y intercept, or constant term;

β_i = partial regression coefficients;

X_i = independent variables;

and ε = residual or random error (McClave & Dietrich, 1988; Pedhazur, 1982). Each β is interpreted as indicating the expected change in Y associated with a change in a single independent variable while holding 'constant' or controlling for all other independent variables (Pedhazur, 1982). It is assumed that the residual or random error, ε, for any given set of independent variables has a normal probability

distribution with a mean of zero and a equality of variance, σ^2. The random errors are independent (McClave et al., 1988).

In keeping with Astin's (1991) I-E-O model, blocked stepwise multiple regression was used. As Astin (1970b) wrote, "a stepwise analysis of college impact would control successively the effects of various independent variables on the output variable" (p. 44). Stepwise multiple regression allowed each independent variable to be added to the regression model one at a time. Each step calculated a new regression model for predicting the dependent variable. If the independent variable did not impact the model, it was omitted. All of the independent variables were added until none of the remaining variables influenced the prediction (Astin, 1991; Pedhazur, 1982).

The data were entered into the three regression analyses in blocks. First, the input block was entered in each regression. This block was used to determine the impact of incoming student characteristics on each of the student satisfaction outcomes. Then an environmental block that included external involvement, college services involvement, and program involvement variables was entered. The third block included the environmental variables that were considered to be intermediate outcomes. For these analyses, student's perceived preparation and GPA were entered as the third and final block.

The first phase of the stepwise multiple regression determined the influence of input variables on outcome variables. This input-to-outcome regression answered the first research question. The second phase of the multiple regression determined the influence of environmental variables on outcome variables. By successively controlling for the influence of

input variables, the effects exerted by environmental variables and intermediate outcomes on the outcome variables were determined.

The multiple regressions created three equations to predict student satisfaction with the three outcome variables; student satisfaction with academic/Tech Prep instruction and curriculum; student satisfaction with academic/Tech Prep instruction and curriculum; and student overall satisfaction with Tech Prep programs in Texas.

The usefulness of the models was determined by values of the adjusted R^2 and the F-statistic. The value of the adjusted R^2 served as an indicator of how well the prediction equation fits the data. The F-statistic was used to determine if the data provided sufficient evidence to indicate that the model contributed information to the prediction of the dependent variable (McClave et al., 1988).

After each phase, the data were observed for unexpected values. The assumptions for multiple regression, independence of variables and normality, equality of variance, linearity, and independence of residuals were verified.

Summary

Since Tech Prep was a new program, an appropriate instrument for evaluating student satisfaction with Tech Prep was not available. Review of related instruments, instrument development processes, and potential factors impacting satisfaction, undergirded the development of the instrument used in this study. The instrument was reviewed by the dissertation committee members as well as individuals working with community college students and several focus groups of Tech Prep students.

A mechanism was developed for management of the data. The questionnaires were distributed and retrieved. Then, the questionnaires were optically scanned. At each stage of the data management process the data were observed by the researcher for potential problems from the handling, such as improper scanning, or from analysis, such as multicollinearity.

The data were analyzed using both descriptive and inferential methods. Satisfaction variables were based on multiple measures. The individual measures were analyzed using factor analysis to determine which factors loaded into the variable at a 0.3 threshold. The reliability of these variables was ascertained using Cronbach's alpha. The independent variables were analyzed using multiple regression techniques to determine which, if any, were predictors of satisfaction. Throughout the analyses, the results were observed to preserve the premises for use of multiple regression.

The following chapters present the findings and the recommendations arising from these analyses. When examining input and environmental variables, it was expected that variables from each group would influence student satisfaction with Tech Prep programs in Texas. Based on Astin's involvement theory and using the results from this study, it was anticipated that recommendations could be made that would enhance student satisfaction with Tech Prep programs.

CHAPTER IV
FINDINGS

Introduction

The findings chapter contains the research results and data analyses based on the data collected from students enrolled in Tech Prep programs at two-year institutions across Texas. This chapter is divided into five sections: (1) introduction, (2) sample population, (3) regression analyses, and (4) summary.

All research questions referred to input, environmental, and outcome variables defined using Astin's (1970a, 1970b, 1991) I-E-O college impact model.

Research Question 1. Which input variables, if any, affect student satisfaction with Tech Prep programs in Texas?

Research Question 2. Which environmental variables, if any, affect community college students' satisfaction with vocational/Tech Prep instruction and curriculum?

Research Question 3. Which environmental variables, if any, affect community college students' satisfaction with academic/Tech Prep instruction and curriculum in Texas?

Research Question 4. Which environmental variables, if any, affect community college students' overall satisfaction with Tech Prep programs in Texas?

To answer these research questions, 2500 surveys were sent to 53 campuses across the state, representing contact with 24 of the 25 Tech Prep consortia. Responses were received from 21 of the 53 institutions

(39.6% response). Institutions from 14 of the 24 consortia contacted in this study returned completed surveys (58.3% response). Completed questionnaires were returned by 500 students over age 18 (20.0% response rate). Although a 20% response rate is common in survey research, this low response rate became a limitation of this study.

The resulting data were analyzed using both descriptive and inferential statistical methods. Descriptive statistics included frequencies, means, percents, and standard deviations. For inferential statistics, blocked stepwise multiple regressions were conducted for each dependent variable. The initial block for each regression served to determine the influence of input variables on outcome variables. Then, additional blocks were entered to determine the influence of environmental variables on outcome variables.

The research questions were designed with Astin's (1984) involvement theory and I-E-O model (1991) in mind. Involvement theory connected institutional policies and practices to the influence of input and environmental variables on outcome variables. Involvement theory linked intended student outcomes to the program's ability to elicit sufficient investment of effort and energy to achieve the desired result, or student satisfaction with Tech Prep in this study. The I-E-O model included the potential for factors beyond the control of the institution or program to impact the outcome. Answering the research questions accomplished the first purpose to determine which, if any, of the input and environmental variables are predictors of student satisfaction with Tech Prep programs in Texas. Analysis of the input, environmental, and outcome variables, in light of involvement theory, allowed the other purposes of this study to be accomplished--to identify policies and

practices that enhance student satisfaction and to make recommendations concerning policies and practices to increase community college student satisfaction with Tech Prep programs in Texas and the nation.

Sample Population

"I" Input Variables

The respondents ranged in age from 18 to 63 years, with an average age of 28.6 years. Many respondents (52.6%) reported graduating from high school in 1991 or before. GED's were earned by 13.4% of the respondents. Only 9.0% of the respondents graduated in 1993 and 9.6% in 1994. Clearly, the perspectives arising from this survey reflected the responses of a mature cohort.

Over half of the respondents (56.4%) were female. Most of the respondents were single/divorced/widowed (64.0%). An overwhelming majority (93.6%) lived off campus. Over half of the respondents were not responsible for dependent children (57.8%). Of those respondents with children, most had either one (15.2%) or two (17.0%) dependent children.

In looking at variables that are often used to determine socio-economic status, the questionnaire asked about parental educational levels and sources of governmental financial support (i.e., PELL grants or AFDC) that are dependent on personal income. Over half of the respondents were first generation attendees at post-secondary institutions, with 54.0% of their fathers and 55.0% of their mothers completing high school or less. Several respondents reported that their parents had completed grade school or less--15.1% of fathers and 10.5% of mothers. Few respondents received financial assistance. Only 7.2% of the respondents were eligible for or received Aid to Families with Dependent

Children (AFDC). Less than half of the respondents were eligible for or received PELL grants (41.2%).

The ethnic composition of the respondents created a problem in the regression analysis. The respondents were predominately white/Caucasian (74.8%). Mexican American/Chicano (16.6%) emerged as a distant second largest ethnic group. The disparity in ethnic representation was handled by recoding the variables into two broad categories--minority and non-minority.

Most of the respondents considered English to be their native language (90.4%). Although this response was high, it was not astonishing, given the ethnic composition of the cohort. Furthermore, these respondents indicated that they did not have any problems with English (91.2%) that would prevent them from taking the courses they would like to take. Almost as many of this cohort felt that they did not have problems with mathematics (88.4%) that would prevent them from taking courses.

Respondents indicated that the major motives for being enrolled in the programs included receiving an associate's degree (59.0%), obtaining a certificate (12.0%), or satisfying job-related/job-required needs (7.0%). Overwhelmingly, respondents (97.0%) expected to complete their chosen programs. With over half of the respondents indicating the express purpose of receiving an associate's degree and with almost 100% expecting to complete their current program, this study revealed a strong commitment to the program.

"E" Environmental Variables

Many of the respondents are involved outside the mainstream of the college experience. Most of these students lived and worked away from the institutions in which they were enrolled. In ascertaining residence for members of this cohort, the responses revealed that 61.4% lived in their own home or apartment and 32.2% lived with parents or other relatives. Only 2.8% of the respondents lived in dorms or other student housing.

Sixty percent of the respondents were employed, with 15.4% working 40 hours or more each week. Although not employed full-time, 23.0% of the respondents worked more than 20 hours each week. The majority of the respondents (52.6%) worked off campus. Of those employed, 57.4% worked in positions that were not related to their chosen Tech Prep career area.

In describing the respondents to the Tech Prep survey, it became apparent that these students have not participated in an extended Tech Prep program. A major portion of the respondents entered community college Tech Prep programs after working (48.0%) or participating in other post-secondary activities (18.8%). Only 28.2% entered the 2-year program from high school, without other work, college, or military experience. Of those entering from high school, only 9.8% reported entering from a high school Tech Prep program. Of the 22.2% who responded that they had received credit for or exemption from courses, only 7.0% received credit based on involvement in a high school Tech Prep program. The students who responded to this survey were not what many would define as a 'tech prep' student because these students have not been involved in a 2+2 nor a 4+2 program.

The most frequently mentioned Tech Prep program affiliations of the respondents were health professions (32.0%); engineering related technologies (25.4%); and office systems technology (10.2%). These students were involved in rapidly changing, high- technology fields identified for rapid job market growth.

The respondents were involved with their current programs. The involvement emerged through responses to several items on the questionnaires. Most of the respondents (65.2%) declared themselves to be full-time students (enrolled in 12 or more hours). These students were involved in lab/clinical time and class/lecture time. Forty percent (40%) spent 1 to 6 hours and 23.8% spent 7 to 12 hours in attendance in labs each week. In looking at hours of time spent in class, 32.2% attended class from 1 to 6 hours and 42.0% spent 7 to 12 hours each week.

These students had completed a diverse number of courses, indicating that the respondents were at different stages in their programs (see Table 4.1).

Table 4.1: Post-secondary Courses Completed (N=500)

Number of courses	Percent Completed
none	19.0
1-4	24.2
5-8	11.4
9-15	14.0
16-20	7.2
over 20	20.6

These students were not highly involved in preparing for their classes nor in interacting with their instructors. A majority of the respondents (55.4%) spent fewer than five hours and 27.0% spent between five and nine hours in preparation for class each week. The respondents spent fewer than five hours a week interacting with vocational (76.2%) and academic (90.2%) instructors outside class time.

The respondents were as different from traditional students in their involvement with the college experience as were their demographic characteristics. Although enrolled as full-time students, these students had commitments external to the 'college experience' that impacted their involvement in the programs. These students spent little time in preparation of class, and they had minimal interaction with instructors, both vocational and academic, outside of the structure of class or laboratory time.

The majority of these students rarely availed themselves of the services provided through student services. The questionnaire asked respondents to indicate their use of student services by selecting one of three responses: frequently, occasionally, or never. This portion of the questionnaire contained items related to nine areas of student services: academic advising/career planning, vocational guidance/career planning, counseling for Tech Prep program, counseling related to internship/apprenticeship, financial aid services, veterans services, college sponsored tutorial services, student employment services, and job placement services. Over 70% of the respondents never used five of the services. The most frequently used service was financial aid with 26.4% using this service frequently and 29.0% using this service occasionally. Academic advising was used occasionally by 53.6% of the respondents.

The vocational and career guidance service was used occasionally by 41.6% and never by 48.2% of the respondents.

These respondents perceived themselves as being prepared to enter the workforce or to continue for a 4-year degree. The findings are presented in Table 4.2. The majority of respondents either agreed or strongly agreed with queries concerning their perceived preparation to enter the workforce or to continue for a four-year degree.

Table 4.2: Perceived Preparation (N=500)

Questionnaire Item	% Strongly Agree	% Agree
After vocational coursework completed will be:		
prepared to enter workforce	48.6	42.8
prepared to continue for a 4-year degree	34.8	36.2
After academic preparation completed will be:		
prepared to enter workforce	49.6	40.8
prepared to continue for a 4-year degree	36.6	33.8

Related to the student's perceived preparation is an intermediate outcome of their involvement with the program, the students' grade point averages (GPAs). Almost three-quarters of the respondents (73.2%) reported GPAs of 2.50 or greater on a five point scale, and 24.0% reported 3.50 or greater GPAs. These GPAs reflected the students' mastery of the

academic and vocational subject matter. As an intermediate outcome, GPA may be related to student satisfaction in that students with a higher grade point average may be better satisfied with their career choices in these Tech Prep programs or students who were better satisfied achieved higher GPAs.

Profile of a Tech Prep Student

A profile of a current Tech Prep student emerged from these questionnaire items. This student was a white female in her mid-twenties. She was single, lived in her own home, and had one or two dependent children. This Tech Prep student received little financial support from governmental sources. She was employed and worked over 20 hours a week. Her work was located off campus and not related to her current Tech Prep program.

This composite Tech Prep student commuted to the institution. She was a full-time student, balancing work, children, and studies. She spent time in laboratory and class situations. Little time was spent outside class time in preparing for class or interacting with instructors, both vocational and academic. She felt, however, that she was receiving preparation to enter the work force or to continue for a 4-year degree.

"O" Outcome Variables

Three outcome variables were considered in this study. These outcomes represented student satisfaction with vocational, academic, and overall measures for Tech Prep programs. As discussed in Chapter III, these three variables were created by scaling and combining multiple items from the questionnaire. In reviewing the descriptive statistics for

each of these measures combined to create the three dependent variables, the high level of student satisfaction exhibited by this cohort with these three aspects of Tech Prep programs was discerned.

Vocational Satisfaction

The respondents were asked to respond to 14 items concerning satisfaction with vocational/Tech Prep instruction and curriculum. Four responses were available : (1) Very Satisfied, (2) Satisfied, (3) Dissatisfied, or (4) Very Dissatisfied. Most of the respondents were either very satisfied or satisfied with their vocational programs. Of the fourteen items, over 90% of the students were either satisfied or very satisfied with eight of the items and over 80% were either satisfied or very satisfied with five of the items.

The only facet that received less than 80% satisfaction was the item related to job sites. Although 68.4% of the respondents indicated that they were either satisfied or very satisfied with job sites for internships or clinicals, this response was noticeably lower than those for other areas. Remembering, however, that 56.6% of the respondents had completed fewer than nine classes in the Tech Prep program brings this lower satisfaction rating into perspective. With fewer than nine classes completed, many of the respondents may not have completed enough of their program to be working in an internship or clinical situation. Also, almost a quarter of the respondents (22.8%) indicated that this item, jobsites for internships or clinicals, was not relevant at this time. Only 7.8% of the respondents were dissatisfied and 1.0% were very dissatisfied with job sites.

In Table 4.3, percentages for responses, satisfied and very satisfied, were combined to produce cumulative percentages for each of the items related to students' satisfaction with vocational/Tech Prep instruction and curriculum.

Table 4.3: Responses to Vocational/Tech Prep Questionnaire Items (N=500)

Questionnaire Item	Cumulative Satisfaction (%)
Vocational Instructors' Knowledge of Field	96.0
Vocational Course Objectives	94.6
Vocational Instructors' Varied Teaching	93.0
Vocational Instructors' Ability to Relate to Students	92.6
Vocational Course Content	92.6
Quality of Vocational Instruction	92.2
Balance of Theoretical and Practical	91.8
Academic Content in Vocational Coursework	90.2
Balance of Class and Laboratory Time	88.6
Vocational Instructors' Availability Out of Class	88.2
Vocational Course Sequencing	87.8
Laboratory/Workshop Space	84.2
Available Equipment	81.4
Job Sites for Clinicals or Internships	68.4

As seen in Table 4.3, the students involved in this study were highly satisfied with these items related to vocational/Tech Prep instruction and curriculum.

Academic Satisfaction

As with vocational satisfaction measures, respondents were asked to respond to nine questionnaire items related to satisfaction with academic facets of the Tech Prep program. The response options were identical to those available for vocational satisfaction: (1) Very Satisfied, (2) Satisfied, (3) Dissatisfied, or (4) Very Dissatisfied. Cumulative responses indicated that at least 90% of respondents were either satisfied or very satisfied with four of the measures: academic instructors' knowledge of their subject areas; academic instructors' varied teaching techniques; quality of academic instruction; and academic course objectives.

The other five academic items were deemed as satisfactory or very satisfactory by at least 87% of the respondents. These areas were instructors' ability to relate to students; instructors' availability out of class; balance of theoretical and practical; vocational/Technical applications in academic coursework; and academic content relevant to career. Clearly, the current Tech Prep cohort was satisfied with the academic component of the existing Tech Prep program.

For the questionnaire items related to academics, from 7.4% to 12.6% of the respondents either left items unmarked or marked as not relevant. These percentages reflected the differences between certificate and associate degree programs. Many certificate programs do not require

academic courses. Therefore, students pursuing certificates were not required to enroll in academic courses.

In Table 4.4, percentages for responses, satisfied and very satisfied, were combined to produce cumulative percentages for each of the items related to students' satisfaction with academic/Tech Prep instruction and curriculum.

Table 4.4: Responses to Academic Questionnaire Items (N=500)

Questionnaire Items	Cumulative Satisfaction (%)
Academic Instructors' Knowledge of Subject	91.8
Quality of Academic Instruction	91.0
Academic Course Objectives	90.6
Academic Instructors' Varied Teaching	90.2
Academic Instructors' Ability to Relate to Students	88.4
Voc/Tech Applications in Academic Coursework	88.2
Academic Course Content Relevant to Career	88.2
Balance of Theoretical and Practical	87.8
Academic Instructors' Availability Out of Class	87.0

Overall Satisfaction

Seven items were included in the questionnaire to discern overall student satisfaction with the Tech Prep program in Texas. The responses were a resounding YES. The first item, number 14, asked, "If you could

start over, would you take this vocational/Tech Prep program again?" Respondents would take the same program over again as 91.2% indicated. Ninety-two percent (92.0%) would recommend the program to a friend. In describing their satisfaction with the overall environment, 95.0% were either satisfied or very satisfied. The respondents were satisfied, both vocationally (88.2%) and academically (88.2%), with their preparation to enter the workforce. In considering their preparation to continue for a 4-year degree, 85.6% of respondents were satisfied vocationally with their preparation to continue and 83.6% academically. Remembering that most of these students were in early stages of their programs, with nine or fewer classes, the number of students indicating satisfaction with their vocational and academic preparation should increase (Moore et al., 1992).

Regression Analyses

Multiple regression analysis was the statistical method used to answer the research questions and to fulfill the purposes of this study. The advantage of multiple regression emerged because this analysis technique shows both the combined effects of independent variables and the separate effects of each independent variable while controlling the effects of other variables already entered into the equation. Regression analyses allowed variables to be entered in blocks based on Astin's I-E-O model through a blocked stepwise regression. In each of the analyses the number of responses used was reduced from 500 to 305. This reduction occurred because some of the respondents did not respond to every item involved in these analyses.

As each research question was addressed, zero-r (Pearson r),the initial and final step beta weights, and the F-ratio were displayed in table

form. The resultant prediction equations indicated the independent variables that influenced student satisfaction in this study.

Research Question 1

This study considered three dependent variables that were facets of student satisfaction with Tech Prep programs in Texas. To answer the first research question, the influence that the fifteen input variables exerted on the three outcome variables was determined.

Research Question 1. Which input variables, if any, affect student satisfaction with Tech Prep programs in Texas?

Since the study encompassed three dependent variables as aspects of student satisfaction with Tech Prep programs in Texas, this first research question was reflected in each of the three regression analyses and resulting equations. In the blocked stepwise multiple regression, the fifteen input variables were entered into the first block of the three multiple regression analyses. The input variables that entered the prediction equations were not the same nor manifested the same level of influence in each equation.

Students' Satisfaction with Vocational/Tech Prep Instruction and Curriculum

In answering the first research question for students' satisfaction with vocational/Tech Prep instruction and curriculum, four input variables entered the model. Inclusion was based on a 0.05 level of significance for F which is the SPSS^{x} default value for the probability of F to enter or PIN = 0.05 (SPSS, 1988) (see Table 4.5). Four input variables entered the regression equation. Age entered with a negative beta weight.

The other three input variables emerged as predictors of vocational satisfaction entering with positive beta weights: white (non-minority) ethnicity, completion of a GED as a part of academic preparation, and the number of dependent children.

Table 4.5: Input Variables Influencing Community College Students' Satisfaction with Vocational/Tech Prep Instruction and Curriculum

				Final Step	
Step	Variable	zero-r	Step β	β	F-ratio*
1	White (non-minority)	0.1913	0.1913	0.2038	11.544
2	Age	-0.1318	-0.1335	-0.2441	8.714
3	Number of dependent children	0.0533	0.1563	0.1187	8.044
4	Completed a GED	0.0754	0.1199	0.1104	6.687

*F-ratio significant at 0.05 level. N=305

After the four input variables entered into the regression equation, the adjusted R^2 was 0.1006. Therefore, approximately 10.1% of student satisfaction with vocational/Tech Prep instruction and curriculum could be accounted for by these four input variables. These four input variables play a part in student satisfaction with Tech Prep programs.

Students' Satisfaction with Academic/Tech Prep Instruction and Curriculum

In answering the first research question for students' satisfaction with academic/Tech Prep instruction and curriculum, three input variables entered the model at the 0.05 level of significance (see Table

4.6). Once again, white (non-minority) as an ethnicity entered with a positive beta weight. From the academic preparation cluster, graduating from high school in 1994 and graduating from high school in or before 1991 both entered with negative beta weights.

Table 4.6: Input Variables Influencing Community College Students' Satisfaction with Academic/Tech Prep Instruction and Curriculum

				Final Step	
Step	Variable	zero-r	Step β	β	F-ratio*
1	White (non-minority)	0.1625	0.1625	0.1702	8.243
2	Graduated in 1991 or before	-0.1061	-0.1185	-0.1850	6.373
3	Graduated in 1994	-0.0636	-0.1226	-0.1436	5.5518

*F-ratio significant at 0.05 level. N=305

After the three input variables entered into the regression equation, the adjusted R^2 was 0.0694. Therefore, approximately 6.9% of student satisfaction with academic/Tech Prep instruction and curriculum could be accounted for by these three input variables. These three input variables played a limited part in students' satisfaction with academic/Tech Prep instruction and curriculum.

Students' Overall Satisfaction with Tech Prep Programs in Texas

In answering the first research question for the third dependent variable, students' overall satisfaction with Tech Prep programs in Texas, four input variables entered the model at the 0.05 significance level (see

Table 4.7). Three input variables entered with positive beta weights, white (non-minority) ethnicity, completion of a GED, and number of dependent children. Once again, age entered with a negative beta weight.

Table 4.7: Input Variables Influencing Community College Students' Overall Satisfaction with Tech Prep Programs in Texas

				Final Step	
Step	Variable	zero-r	Step β	β	F-ratio*
1	White (non-minority)	0.1847	0.1847	0.1934	10.738
2	Completed a GED	0.1237	0.1313	0.1582	8.197
3	Age	-0.0674	-0.1171	-0.1736	6.870
4	number of dependent children	0.0875	0.1422	0.1157	6.529

*F-ratio significant at 0.05 level. N=305

After the four input variables were entered into the regression equation, the adjusted R^2 was 0.0676. Therefore, approximately 6.8% of student satisfaction with overall Tech Prep programs could be accounted for by these four variables. These four input variables played a limited part in students' overall satisfaction.

Discussion of Impact Variables for
Research Question 1

To answer the first research question, input variables were found that influenced student satisfaction with the three satisfaction variables considered in this study representing aspects of Tech Prep programs. For each of the dependent variables three or four of the input variables influenced students' satisfaction with that aspect of Tech Prep programs.

Age entered each of the three regression equations as a negative. White (non-minority) ethnicity entered each of the three as a positive. The number of dependent children and completion of a GED affected both vocational and overall satisfaction variables, entering with positive beta weights. Graduation in 1991 or before and graduation in 1994 entered the regression for academic satisfaction with negative beta weights.

Ascertaining the input variables that impacted each of the three dependent variables allowed the researcher to statistically control the influence these variables exerted. Once the bias introduced by these input variables was controlled, the impact of the environmental variables was ascertained. Removing the bias introduced by these input variables also enabled the second purpose for this study to be accomplished, to identify policies and practices that enhanced student satisfaction with Tech Prep programs in Texas.

The answer to the first research question also served to form the foundation for answering each of the other three research questions. The remainder of the research questions were answered after analyzing and controlling the effects of input variables so that the influence each environmental variable had on outcome variables could be determined. The second and third research questions focused on student satisfaction with vocational and academic instruction and curriculum. The fourth research question focused on students' overall satisfaction with Tech Prep programs.

Research Question 2

Research Question 2. Which environmental variables, if any, affect community college students' satisfaction with vocational/Tech Prep instruction and curriculum?

In answering this research question, the effects of the input variables were held constant. Then, the two blocks of environmental variables were entered into the regression analysis. The first of these two blocks included external involvement, college services involvement, and program involvement variable clusters. The final variable block included the intermediate outcomes, student perceived preparation variables and GPA. Intermediate outcomes become a part of the continuing environment and can influence other outcomes. Astin (1991) suggested that intermediate outcome variables be treated as environmental variables, but that these intermediate variables be considered after the input and other environmental variables have been entered into the regression.

Six environmental variables entered the regression equation at a significance level of 0.05. Four of the environmental variables were academic advising, living off campus, and majoring in either engineering related technologies and business management / administrative services. Respondents selected from three responses indication their frequency of use--frequently, occasionally, or never. Selections for place of residence included five options, two off campus, two on campus, and one other. The regression analysis detected multicollinearity for this variable. It was recoded to allow yes or no responses for living on campus, off campus, or other. The majors were chosen from a field of eleven choices.

The other two environmental variables entering the regression were intermediate outcomes. The intermediate outcomes that affected students' vocational satisfaction related to the students' perceived preparation. Students' perceived that after academic coursework was completed they would be prepared to continue for a four-year degree or to enter the workforce (see Table 4.8). The intermediate outcomes included items related to students perceived preparation both vocationally and academically to enter the workforce or to continue for a four-year degree.

Table 4.8: Input and Environmental Variables Influencing Community College Students' Satisfaction with Vocational/Tech Prep Instruction and Curriculum

				Final Step	
Step	Variable	zero-r	Step β	β	F-ratio*
1	White (non-minority)	0.1913	0.1913	0.2038	11.544
2	Age	-0.1318	-0.1335	-0.2441	8.714
3	Number of dependent children	0.0533	0.1563	0.1187	8.044
4	Completed a GED	0.0754	0.1199	0.1104	6.687
5	Engineer related technologies	-0.2347	-0.1901	-0.1326	7.678
6	Academic advising	0.1719	0.1445	0.1284	7.778
7	Live off campus	-0.1222	-0.1406	-0.1201	7.844
8	Business management /administration	-0.0816	-0.1206	-0.1228	7.664
9	After academic courses prepared to continue for 4-yr degree	0.2614	0.2159	0.2028	8.947
10	After academic courses prepared for workforce	0.2726	0.1337	0.1337	8.816

*F-ratio significant at 0.05 level. N=305

After the four input variables and the six environmental variables were entered into the regression equation, the adjusted R^2 was 0.2352. Therefore, approximately 23.5% of the variation in student satisfaction with vocational/Tech Prep instruction and curriculum could be accounted for by these ten variables. An adjusted R^2 of 0.2352, although low in value, was comparable to values found in satisfaction research.

These ten variables entered the prediction equation:

Y = 39.5332 + 0.2038(white - non-minority) + -0.2441(age) + 0.1187(number of dependent children) + 0.1104(completed GED) + -0.1326(engineer related technologies) + 0.1284(academic advising) + -0.1201(live off campus) + -0.1228(business management/administration) + 0.2028(academically prepared to continue for 4-yr degree) + 0.1337(academically prepared to enter workforce).

Additional relationships were observed when the changes in betas were reviewed after each step. This review revealed redundancy and suppressor effects. In redundancy each independent variables may carry part of the information about the dependent variable that is supplied by another independent variable. Redundancy may be noted when the step betas or the final beta for an independent variable are less than the simple correlation (zero-r) (Cohen & Cohen, 1975).

Suppressor effects are indicated when the beta weights are outside the interval established by the simple correlation (zero-r) and zero. Suppressor effects may emerge in multiple regression when one of two situations arises. When two independent variables have the same correlational relationship (both positive or both negative) with the dependent variable and a negative relationship with each other, a cooperative suppressor effect occurs. Cohen and Cohen (1975) considered a cooperative suppressor effect to be the most desirable because the

negative relationship between the independent variables involves or partials out a portion of the variance that is irrelevant to the dependent variable. "[T]hus, when each variable is partialled from the other, all indices of relationship with Y are enhanced" (Cohen & Cohen, 1975, p. 90). Cooperative suppression is indicated when the β_i exceeds the simple correlation (zero-r or r_{Yi}) and is of the same sign as the zero-r.

The second situation giving rise to suppressor effects, net suppression, may occur when two independent variables have opposite relationships with the dependent variable (one positive and one negative) and a positive relationship with each other. One of the independent variables may be hiding or masking the true relationship between that independent variable and the dependent variable. As with cooperative suppression, the final beta falls outside the range established by zero and the simple correlation for that independent variable. If β_i, is opposite in sign from r_{Yi}, it serves as a net suppressor.

Since Table 4.8 indicated several situations where independent variables have opposite relationships with the dependent variable, review of the steps for redundancy and suppressor effects was warranted. The step beta weights and zero-r, are presented in Table 4.9. In most situations, standardized coefficients tend to decrease in magnitude as other variables are entered into the regression because the independent variables tend to be correlated to some extent and redundancy occurs. When standardized coefficients are greater than correlation coefficients, suppressor effects are indicated (Cohen & Cohen, 1975). In Table 4.9, redundancies and suppressor effects emerged between steps as well as in the final step. Redundancies and cooperative suppressor effects were indicated.

Table 4.9: Suppresser Effects of Input and Environmental Variables Entered into the Regression For Student Satisfaction with Vocational/Tech Prep Instruction and Curriculum (N = 305)

				Standardized Coefficient after Step									
Step	Variable	R	zero-r	1	2	3	4	5	6	7	8	9	10
1	NONMIN	.1913	.1913	.1913	.1924	.2042	.2204	.2008	.1990	.2112	.2075	.2065	.2038
2	Age	.2332	-.1318		-.1335	-.2020	-.2564	-.2412	-.2357	-.2366	-.2490	-.2461	-.2441
3	Dep. child	.2720	.0533			.1563	.1364	.1250	.1077	.1000	.1137	.1133	.1187
4	GED	.3440	.0754				.1199	.1088	.0990	.1099	.1134	.1134	.1104
5	Engr. Tech	.3909	-.2347					-.1901	-.1854	-.1892	-.2044	-.1676	-.1326
6	Acad. Adv.	.4162	.1719						.1445	.1422	.1474	.1510	.1284
7	Off Campus	.4388	-.1222							-.1406	-.1413	-.1306	-.1201
8	Business	.4541	-.0816								-.1206	-.1297	-.1228
9	Acad. 4-yr	.5008	.2614									.2159	.2028
10	Acad. work	.5151	.2726										.1337

For example, white (non-minority) was the first variable to enter the regression. White had a final beta of 0.2038 and r = .1913. Since the beta is outside the interval established by r = 0.1913 and zero and is the same sign (both positive), cooperative suppression effects were indicated. In tracing the changes in beta values for white, interactions with each of the other variables was noted. Adding age raised the beta for white slightly, indicative of a minimal cooperative suppressor effect. When number of dependent children was added the beta for age increased greatly and white increased slightly. When completed a GED was added, the beta for white increased from 0.2042 to 0.2204 and the beta for age increased from -0.2020 to -0.2564, indicative of a large cooperative suppressor effect. When GED was added, the beta for number of dependent children decreased from 0.1563 to 0.1364 which was indicative of redundancy between completing a GED and each of the other three input variables.

When engineer related technology and academic advising were added, the beta weight for each of the earlier input or input and environmental variables dropped, indicating redundancy of information about student satisfaction with vocational education. Continued examination of step betas indicated possible interactions between and among variables.

As each independent variable was added to the regression step beta weights fluctuated. These fluctuation were indicative of redundancies and suppressor effects occurring at each step in developing the regression equation. At the final step, five of the beta weights were within the intervals established by the simple correlations and zero. For these five independent variables, redundancies occurred among and between the

independent variables. The other five variables in the regression equation had beta weights outside the interval created by the simple correlation and zero. For these five variables, suppressor effects were evident. Since none of the β_i differ in sign from the simple correlations, net suppression was not indicated.

The resultant equation included the ten independent variables that satisfied a 0.05 significance level for the F statistic. Similar equations were produced for the other two dependent variables.

Research Question 3

Research Question 3. Which environmental variables, if any, affect community college students' satisfaction with academic/Tech Prep instruction and curriculum in Texas?

After controlling for independent variables, the influence of environmental variables on community college students' satisfaction with academic/Tech Prep instruction and curriculum was determined. As with the previous regression analysis, the environmental variables were entered in two blocks. The final block included the intermediate outcomes, student's perceived preparation and GPA. As a result of this analysis, seven environmental variables emerged as influencing student satisfaction with academic/Tech Prep instruction and curriculum at the 0.05 significance level (see Table 4.10).

Three of the seven environmental variables entered with positive betas. Academic advising entered as a positive influence on academic satisfaction. Two of the environmental variables were intermediate outcomes--academic preparation to continue for a four-year degree and

academic preparation to enter the workforce. These intermediate outcomes also entered the regression equation with positive beta weights.

Two of the major selections, engineering related technologies and business management/administration, as well as number of hours spent in lab each week entered the regression equation with negative beta weights. Attending college sponsored tutorials also entered as a negative beta.

Table 4.10: Input and Environmental Variables Influencing Community College Students' Satisfaction with Academic/Tech Prep Instruction and Curriculum

				Final Step	
Step	Variable	zero-r	Step β	β	F-ratio*
1	White (non-minority)	0.1625	0.1625	0.1702	8.243
2	Graduated in 1991 or before	-0.1061	-0.1185	-0.1850	6.373
3	Graduated in 1994	-0.0636	-0.1226	-0.1436	5.552
4	Academic advising	0.1895	0.1694	0.1806	6.356
5	College sponsored tutorials	-0.0991	-0.1713	-0.1689	6.920
6	Engineer related technologies	-0.1864	-0.1463	-0.1186	7.087
7	Business management /administration	-0.0787	-0.1071	-0.1341	6.704
8	Hours in lab per week	-0.0489	-0.1185	-0.1637	6.540
9	After academic courses prepared to continue for 4-yr degree	0.2474	0.2228	0.2075	7.877
10	After academic courses prepared for workforce	0.2553	0.1720	0.1720	8.188

*F-ratio significant at the 0.05 level. N = 305

After the three input and seven environmental variables were entered into the regression, the adjusted R^2 was 0.2345. Therefore,

approximately 23.5% of the variation in student satisfaction with academic/Tech Prep instruction and curriculum could be accounted for by these ten variables.

These ten variables entered the prediction equation:

Y = 29.1258 + 0.1702 (white - non-minority) + -0.1850 (graduated in 1991 or before) + -0.1436 (graduated in 1994) + 0.1806 (academic advising) + -0.1689 (college sponsored tutorials) + -0.1186 (engineer related technologies) + -0.1341 (business administration /management) + -0.1637 (hours in lab per week) + 0.2075 (after academic courses continue for 4-yr degree) + 0.1720 (after academic courses prepared for workforce).

Additional relationships were observed when the changes in Beta weights were reviewed after each step. This review revealed both redundancies and suppressor effects among the variables. Where the betas increased when the next variable was added, a cooperative suppressor effect was noted. When the betas decreased in magnitude a redundancy was noted. This effect is the more common because of the correlations that exist between independent variables and those variables accounted for overlapping portions of the variance in the dependent variable.

For example, the beta weight associated with white (non-minority) ethnicity entered as 0.1625 and then ranged from 0.1485 to 0.1705 with a final step beta of 0.1702. This and other fluctuations that occurred in beta weights indicated redundancies and suppressor effects present in this dynamic (see Table 4.11).

Table 4.11: Suppressor Effects of Input and Environmental Variables Entered into the Regression For Student Satisfaction with Academic/Tech Prep Instruction and Curriculum (N= 305)

				Standardized Coefficient after Step									
Step	Variable	R	zero-r	1	2	3	4	5	6	7	8	9	10
1	NONMIN	.1625	.1625	.1625	.1711	.1677	.1666	.1624	.1485	.1553	.1699	.1705	.1702
2	Grad 1991+	.2009	-.1061		-.1185	-.1986	-.1820	-.2029	-.2043	-.2173	-.1888	-.1886	-.1850
3	Grad 1994	.2910	-.0636			-.1226	-.1171	-.1287	-.1300	-.1305	-.1351	-.1382	-.1436
4	Acad. Adv.	.3363	.1895				.1694	.2109	.2025	.2073	.2060	.2089	.1806
5	Tutorials	.3739	-.0991					-.1713	-.1619	-.1697	-.1680	-.1662	-.1689
6	Engr. Tech.	.4004	-.1864						-.1463	-.1639	-.1914	-.1567	-.1186
7	Business	.4303	-.0787							-.1071	-.1260	-.1380	-.1341
8	Hrs. in Lab	.4434	-.0489								-.1185	-.1323	-.1637
9	Acad. 4-yr	.4939	.2474									.2228	.2075
10	Acad. work	.5169	.2553										.1720

Research Question 4

Research Question 4. Which environmental variables, if any, affect community college students' overall satisfaction with Tech Prep programs in Texas?

The fourth research question focused on community college students' overall satisfaction with Tech Prep programs in Texas. As discussed in Chapter III, the measures combined to create the overall satisfaction variable were level of overall satisfaction (Q30), recommendation of Tech Prep program to a friend (Q31), satisfaction with vocational preparation to continue for a four-year degree (Q55) or to enter the workforce (Q56), and satisfaction with academic preparation to continue for a four-year degree (Q66) or to enter the workforce (Q67).

As with the previous regressions, variables were entered into the regression in blocks. After controlling for independent variables the impact of environmental variables related to students' overall satisfaction with Tech Prep was determined. The environmental variables were entered in two blocks. The first block included the external involvement, college services involvement, and program involvement variable clusters. The final block included the intermediate outcomes, students' perceived preparation and GPA.

After entering the final two blocks, seven environmental variables were considered to be significant predictors of students' overall satisfaction with Tech Prep programs at the 0.05 significance level. Three of these environmental variables entered with positive beta weights. Two of these variables were intermediate outcomes related to the students' perceived preparation, after academic coursework prepared to continue for a 4-year degree and after academic courses prepared to enter the

workforce. Both of the intermediate outcomes entered with positive beta weights (see Table 4.12). The other environmental variable that entered with a positive beta was academic advising.

The other four environmental variables, living off campus, participating in college sponsored tutorials, and majoring in engineering related technologies or business management/administration entered the regression equation with negative beta weights.

Table 4.12: Input and Environmental Variables Influencing Community College Students' Overall Satisfaction with Tech Prep Programs in Texas

				Final Step	
Step	Variable	zero-r	Step β	β	F-ratio
1	White (non-minority)	0.1847	0.1847	0.1934	10.738
2	Completed a GED	0.1237	0.1313	0.1582	8.197
3	Age	-0.0674	-0.1171	-0.1736	6.870
4	Number of dependent children	0.0875	0.1422	0.1157	6.529
5	Engineer related technologies	-0.2617	-0.2182	-0.1377	7.923
6	Live off campus	-0.1610	-0.1899	-0.1596	8.879
7	Business management /administration	-0.0939	-0.1457	-0.1476	8.879
8	Academic advising	0.1485	0.1213	0.1279	8.605
9	College sponsored tutorials	-0.0901	-0.1312	-0.1229	8.471
10	After academic courses prepared to continue for 4-yr degree	0.3602	0.3173	0. 2989	12.582
11	After academic courses prepared for workforce	0.3013	0.1576	0.1576	12.651

* F-ratio significant at 0.05 level. N = 305

After the four input variables and seven environmental variables were entered into the regression the adjusted R^2 was 0.3143. Therefore, approximately 31.4% of the variation in overall student satisfaction with Tech Prep programs could be accounted for by these eleven variables.

These eleven variables entered the prediction equation:

Y = 15.8406 + 0.1934 (white - non-minority) + 0.1582 (completed GED) + -0.1736 (age) + 0.1157 (number of dependent children) + -0.1377 (engineer related technologies) + -0.1596 (live off campus) + -0.1476 (business management/administration) + 0.1279 (academic advising) + -0.1229 (college sponsored tutorials) + 0.2989 (after academic coursework continue for a 4-yr degree) + 0.1576 (after academic courses prepared to enter the workforce)

Additional relationships were observed when the changes in beta weights were reviewed after each step. This review revealed both redundancies and suppressor effects among the variables. As each variable was entered into the regression, its presence affected the beta weight for each or the variables already entered into the equation. These fluctuations indicated the relationship existing between this variable and each of the other independent variables. This relationship either augmented or reduced the impact of the other variables on the dependent variable (see Table 4.13).

Table 4.13: Suppressor Effects of Input and Environmental Variables Entered into the Regression For Overall Student Satisfaction with Tech Prep (N= 305)

				Standardized Coefficient after Step										
Step	Variable	R	zero-r	1	2	3	4	5	6	7	8	9	10	11
1	NONMIN	.1847	.1847	.1847	.1900	.1924	.2023	.1837	.2005	.1973	.1958	.1944	.1946	.1934
2	GED	.2266	.1237		.1313	.1654	.1478	.1331	.1481	1535	.1455	.1604	.1607	.1582
3	Age	.2528	-.0674			-.1171	-.1744	-.1714	-.1731	-.1901	-.1864	-.1758	-.1737	-.1736
4	Dep. Child.	.2826	.0875				.1422	.1316	.1204	.1367	.1227	.1130	.1112	.1157
5	Engr. Tech	.3704	-.2617					-.2182	-.2234	-.2425	-.2392	-.2318	-.1781	-.1377
6	Off Campus	.4154	-.1610						-.1899	-.1898	-.1876	-.1904	-.1733	-.1596
7	Business	.4393	-.0939							-.1457	-.1505	-.1520	-.1611	-.1476
8	Acad. Adv.	.4554	.1485								.1213	.1536	.1563	.1279
9	Tutorials	.4723	-.0901									-.1312	-.1251	-.1229
10	Acad. 4-yr	.5658	.3602										.3173	.2989
11	Acad. work	.5842	.3013											.1576

Summary

The findings presented in Chapter IV resulted from the descriptive and inferential statistics methods employed in this study. A high degree of satisfaction emerged from the descriptive statistics. As a result of descriptive analysis of the data gathered for this study, a picture of a typical member of this cohort emerged. This student was a non-minority female in her mid-twenties. She was single, lived off campus, and had one or two dependent children. She was employed off campus in a field that was not related to her Tech Prep career area. She worked over 20 hours a week and did not spend much time in preparing for her classes. She also did not interact with either vocational or academic instructors outside class or lab time.

The descriptive statistics did not reveal the anticipated involvement with the program. This cohort did not enter Tech Prep programs as a continuation of high school Tech Prep programs. Few received credit based on previous involvement with Tech Prep. Furthermore, many students had only completed nine or fewer courses in their Tech Prep programs.

Through the regression analyses, the impact of input and environmental variables on each of the three dependent was determined. The three dependent variables were student satisfaction with vocational/Tech Prep instruction and curriculum, student satisfaction with academic/Tech Prep instruction and curriculum, and overall student satisfaction with Tech Prep programs in Texas. In reviewing the inferential statistics, as each research question was answered, the input and environmental variables that impacted each of the satisfaction variables emerged.

The first research question asked "Which input variables, if any, affect community college student satisfaction with Tech Prep programs in Texas?" For each of the dependent variables, several input variables were found to affect that dependent variable at the 0.05 level of significance. For student satisfaction with vocational/Tech Prep instruction and curriculum, four input variables affected student satisfaction. These variables were white (non-minority) ethnicity ($\beta = 0.2038$), age ($\beta = -0.2441$), number of dependent children ($\beta = 0.1188$), and GED completion ($\beta = 0.1104$). Three of the four input variables had a positive effect on this dependent variable. For student satisfaction with academic/Tech Prep instruction and curriculum, three input variables were found that affected the dependent variable. These input variables were white (non-minority) ethnicity ($\beta = 0.1702$), graduate from 1991 or before ($\beta = -0.1850$), and graduate from 1994 ($\beta = -0.1436$). Two of these three input variables had a negative effect on the dependent variable. For students' overall satisfaction with Tech Prep programs in Texas, four input variables were found that affected student satisfaction. These input variables were white (non-minority) ethnicity ($\beta = 0.1934$), GED completion ($\beta = 0.1582$), age ($\beta = -0.1736$), and number of dependent children ($\beta = 0.1157$).

Through the second research question, "Which environmental variables, if any, affect community college students' satisfaction with vocational/Tech Prep instruction and curriculum?", those environmental variables that affected this dependent variable were sought. Through a blocked stepwise multiple regression process, the input variables were held constant and the effect of each of the environmental variables was determined. Of the 28 environmental variables considered, seven

emerged as affecting this dependent variable. These seven variables included majoring in engineering related technologies (β = -0.1326), academic advising (β = 0.1284), living off campus (β = -0.1201), majoring in business management/administrative services (β = -0.1228), and student's perceived preparation after academic coursework to continue for a 4-year degree (β = 0.2028) or to enter the workforce (β = 0.1337).

The third research question, "Which environmental variables, if any, affect community college students' satisfaction with academic/Tech Prep instruction and curriculum?" was answered using the same blocked stepwise multiple regression techniques. After entering and holding constant the input variables, seven environmental variables emerged as affecting the dependent variable. These environmental variables were academic advising (β = 0.1806), college sponsored tutorials (β = -0.1689), majoring in engineering related technologies (β = -0.1186), majoring in business management/administrative services (β = -0.1441), hours spent in lab (β = -0.1637), and student's perceived preparation after academic coursework to continue for a 4-year degree (β = 0.2075) or to enter the workforce (β = 0.1720).

The fourth research question, "Which environmental variables, if any, affect community college students' overall satisfaction with Tech Prep programs in Texas?" was answered using blocked stepwise multiple regression. The regression analysis revealed seven environmental variables that affect this student satisfaction variable. The environmental variables were majoring in engineering related technologies (β = -0.1377), living off campus (β = -0.1596), majoring in business management/administrative services (β = -0.1476), academic

advising (β = 0.1279), college sponsored tutorials (β = -0.1229), and student's perceived preparation after academic coursework to continue for a 4-year degree (β = 0.2989) or to enter the workforce (β = 0.1576).

Once the input and environmental variables that affected each of the three dependent satisfaction variables were identified, analysis of the relationships of these variables with the dependent variable of interest and with each other set the stage for accomplishing the other two purposes: (2) to identify policies and practices that enhanced student satisfaction and (3) to make recommendations concerning policies and practices to increase community college students satisfaction with Tech Prep programs in Texas and the nation. These two purposes are addressed in Chapter V.

CHAPTER V

SUMMARY, RECOMMENDATIONS, AND CONCLUSIONS

Chapter V contains a summary of this study. This chapter is divided into six sections: (1) summary, (2) the major findings, (3) implications for policy and practice, (4) implications for theory, (5) recommendations for future research, and (7) conclusions.

Summary

This study was undertaken with three main purposes in mind,

1. to determine which, if any, of the input and environmental variables were predictors of student satisfaction with Tech Prep programs in Texas;
2. to identify policies and practices that enhanced student satisfaction; and
3. to make recommendations concerning policies and practices to increase community college student satisfaction with Tech Prep programs in Texas and the nation.

Using the I-E-O model developed by Astin (1991) and after a review of related literature, variables were selected for consideration. To accomplish the purposes of this study, a questionnaire was developed and 2500 surveys were disseminated to 53 institutions across the state. The surveys were administered to community college Tech Prep student during the later part of the spring 1995 semester. A total of 500 usable surveys were returned out of the 2500 sent to the community colleges, yielding a 20% return rate.

The surveys were optically scanned and the data were analyzed using both descriptive and inferential statistical methods. The descriptive statistics, as discussed in Chapter V, provided a picture of a 'typical' Tech Prep student. The descriptive statistics also indicated that the cohort involved in this study was satisfied or very satisfied with a majority of the satisfaction items in the survey.

Satisfaction items were scaled and then combined to create three dependent variables for the regression analyses. The items combined for each of the satisfaction variables were analyzed using factor analysis. The factor analysis provided factor loadings for combining the individual items in creating the satisfaction scales. Cronbach's alpha was calculated for each of the resultant satisfaction scales (see Table 5.1).

Table 5.1: Cronbach's Alpha for Satisfaction Scales

Dependent Variable	Alpha
Students' satisfaction with vocational/ Tech Prep instruction and curriculum	0.948
Students' satisfaction with academic/ Tech Prep instruction and curriculum	0.959
Students' overall satisfaction with Tech Prep programs in Texas	0.850

Each of the resultant dependent variables was highly reliable.

Major Findings

The regression analyses provided answers to each of the research questions and accomplished the first purpose of this study. Based on the

regression analyses, three prediction equations were created. Analysis of changes in the step betas suggested possible interaction among and between the independent variables.

Student Satisfaction with Vocational/Tech Prep Instruction and Curriculum

Of the 15 input and 28 environmental variables, four input and six environmental variables affected student satisfaction with vocational/Tech Prep instruction and curriculum. The resultant prediction equation for the student satisfaction with vocational/Tech Prep instruction and curriculum variable included ten variables and an adjusted R^2 of 0.2653. The ten variables that entered the prediction equation were:

Y = 39.5332 + 0.2038 (white - non-minority) + -0.2441 (age) + 0.1187 (number of dependent children) + 0.1104 (completed GED) + -0.1326 (engineer related technologies) + 0.1284 (academic advising) + -0.1201 (live off campus) + -0.1228 (business management/administration) + 0.2028 (academically prepared to continue for 4-yr degree) + 0.1337 (academically prepared to enter workforce).

Discussion of Variables Influencing Students' Satisfaction with Vocational/Tech Prep Instruction and Curriculum

Four input variables influenced students' vocational satisfaction. These four included white (non-minority) ethnicity, age, number of dependent children, and GED completion. The four input variables that influenced students' satisfaction with vocational/Tech Prep instruction and curriculum, while of interest, are beyond the control of the program. The remaining two purposes of this study were to identify policies and practices that enhance student satisfaction with Tech Prep and to make

recommendations concerning those policies and practices. The influence exerted by environmental variables helped accomplish these purposes.

Age entered with a negative beta and exhibited a negative correlation with vocational satisfaction. In research, age has produced contradictory results in relation to satisfaction. Moore and Smith (1992) revealed dissatisfied students tend to be younger and recent high school graduates. Aitken (1982) found that age did not always assume a key role in influencing satisfaction.

The input variables were included because of their established potential to influence satisfaction. Through blocked stepwise multiple regression any bias introduced by these factors could be controlled. Once the bias was controlled, the influence exerted by environmental variables could be discerned. Of interest for policy and practice are the environmental variables that influenced student satisfaction.

Contrary to research (Aitken, 1982; Astin, Korn, & Green, 1987; Astin, Korn, Dey, & Hurtado, 1990; Moore & Smith, 1992), the major areas, engineering related technologies and business management/ administrative services, had negative correlations with vocational satisfaction. Usually selecting a major and taking courses related to that major produce high levels of satisfaction. High satisfaction was often related to those courses or majors linking the college experience with future careers (Chadwick & Ward, 1987; Feldman & Newcomb, 1969; Moore et al., 1992).

The disparity with earlier research was manifested by the negative correlation between the variables, hours spent in labs or clinicals and vocational satisfaction. Since these majors were from technical fields, the labs or clinicals were important facets of the vocational programs.

These negative correlations may be explained by the limited involvement with the major. A majority of the respondents (54.6%) had completed fewer than nine hours in their program. Many of the students (76.2%) spent fewer than five hours a week interacting with instructors outside class time. High involvement with faculty has impacted satisfaction positively (Alberti, 1972; Pike, 1989). This would be supported by Astin's involvement theory--the more involved a student is with his or her program or major the higher the expected satisfaction should be. Satisfaction's strong relationship with major and career preparation evident in earlier research, however, cannot be ignored. Ensuing semesters should increase the number of courses completed in the major and the additional involvement in the program should increase student satisfaction with these two majors (Moore et al., 1992).

Involvement with instructors may be related to the instructors employed by the institution to instruct courses in engineering related technologies and business management/administrative services. While the institutions may employ experts currently working in business or industry to instruct these courses, these instructors may be adjunct faculty. Adjunct faculty often do not have or do not take the time to interact with students outside the scheduled class time.

Academic advising showing a positive correlation provided another contradiction with previous research. In previous research, academic advising has been one of the lowest satisfaction areas (Astin, Korn, & Green, 1987; Astin et al., 1990; Moore et al., 1992). This positive correlation between academic advising may indicate that the community colleges are making a special effort to advise Tech Prep students and thus are meeting the needs of the students for academic advising.

Furthermore, academic advising may serve as a proxy for involvement with instructors, if the community colleges are using faculty for academic advising or to assist in academic advising.

Intermediate outcomes have been found to impact student satisfaction (Aitken, 1982; Astin, 1991; Howard and Maxwell, 1980; Moore et al., 1992; Pike, 1989). A student's perception of his or her perceived preparation enhanced his or her satisfaction in the research reviewed and in this study. The students' perception of academic preparation to continue for a four-year degree, speaks well of academic policies and practices. This satisfaction with academic preparation to continue for a four-year degree or to enter the work force gives rise to the question, "Why didn't vocational preparation to continue education for a four-year degree or to enter the work force enter the equation as significantly related to student satisfaction with vocational/Tech Prep instruction and curriculum?" Maybe the absence of these particular intermediate outcome variables is indicative of the early stage of vocational/Tech Prep program involvement and/or is a manifestation of the negative correlation with labs/clinicals.

On a more positive side, this mature cohort may have discovered a facility for learning that was not perceived earlier. Over half of the respondents were first generation attendees at post-secondary institutions, with 54.0% of their fathers and 55.0% of their mothers completing, at most, high school. These respondents, however, were demonstrating successful mastery of the subject matter presented. In this study, 73.2% reported GPAs of 2.50 or greater on a four point scale, with 24.0% reporting GPAs of 3.50 or greater. The respondents were succeeding in mastering the material presented. They perceived their

academic preparation as preparing them to continue their educations for four-year degrees or as preparing them academically to enter the workforce. Perceived preparation has been related to satisfaction in previous research (Aitken, 1982; Astin, 1991; Howard et al., 1980; Moore et al., 1992; Pike, 1989).

Student Satisfaction with Academic/Tech Prep Instruction and Curriculum

Of the 15 input and 28 environmental variables considered in this study, three input and seven environmental variables entered the regression equation. The second equation included ten independent variables to predict student satisfaction with academic/Tech Prep instruction and curriculum. As indicated in the previous discussion, the input variables were included in the study so that their potential bias could be controlled. Once the input variables were controlled, the environmental variables influencing the students' satisfaction with academic/Tech Prep instruction and curriculum for this cohort emerged.

The prediction equation for the student satisfaction with academic/Tech Prep instruction and curriculum variable included ten variables and an adjusted R^2 of 0.2460. The ten variables that entered the prediction equation were:

Y = 29.1258 + 0.1702 (white - non-minority) + -0.1850 (graduated in 1991 or before) + -0.1436 (graduated in 1994) + 0.1806 (academic advising) + -0.1689 (college sponsored tutorials) + -0.1186 (engineer related technologies) + -0.1341 (business administration/ management) + -0.1637 (hours in lab per week) + 0.2075 (after academic courses continue for 4-yr degree) + 0.1720 (after academic courses prepared for workforce).

Six of the variables entered with negative beta weights and four entered with positive beta weights.

Discussion of Variables Influencing Students' Satisfaction with Academic/Tech Prep Instruction and Curriculum

Four of the environmental variables had negative correlations and entered with negative beta weights. College sponsored tutorials, hours spent in lab or clinicals, and majoring in either engineering related technologies or business management/administrative services had negative correlations with this satisfaction variable.

College sponsored tutorials may have had a negative correlation with academic satisfaction for a variety of reasons. Attendance in tutorials may indicate that the student was not as prepared academically as he or she needed to be to pursue his or her course of study. Since graduation in 1991 or before (an input variable) entered with a negative correlation, members of this cohort may have forgotten many of the concepts from academic courses since graduating from high school. The tutorials may have been mandatory. The older members of this cohort may have been or may have felt pressured by limited time in which to complete their programs or degrees. These older members may have viewed tutorials as a waste of their educational time. Another input variable, graduating in 1994, also entered with a negative correlation to academic satisfaction. The 1994 graduate may not perceive his or her academic preparation as adequate. This younger cohort may perceive college sponsored tutorials as indicative of academic inadequacy.

The negative influence of college sponsored tutorials may have occurred because the tutorials were mandatory and the student did not perceive a need to participate in tutorials. Two items on the questionnaire pursued perceived academic preparation by asking if the respondent had

problems with math (84.4%, no) or English (91.2%, no). They perceived that they did not have problems with math or English, yet they were attending college sponsored tutorials. These students may have felt that they were not learning concepts that they needed in the college sponsored tutorials. These students may have felt that the tutorials were repetitive of concepts that they learned in high school. The college sponsored tutorials were negatively related to students' satisfaction with academic/Tech Prep instruction and curriculum.

Two of the ten majors and hours spent in attending labs or clinicals entered with negative beta weights. Reasons for negative correlations with academic satisfaction for the two majors and for hours spent in lab or clinicals may be related to involvement with the courses and with the instructors as indicated earlier. This cohort indicated that 90.2% spent four hours or fewer interacting with instructors outside class each week. They spent fewer than four hours (55.4%) in preparation for academic classes and 32.2% spent fewer than seven hours in class. These students may not have been involved at a high enough level to experience positive satisfaction with the academic aspects of Tech Prep.

In looking at the correlations for the business management/ administrative services major with the factors that were combined to create the academic satisfaction variable, all of the correlations were negative except for instructor's availability outside class and course objectives. This cohort, however, indicated an absence of time for interacting with instructors outside of class. Similarly, in looking at the correlations for the engineering related technologies major with the factors that were combined to create the academic satisfaction variables,

these correlations were all negative and very significant (at the 0.01 level).

Negative correlations for these two majors, engineering related technologies and business management/administrative services, as well as for lab or clinical time may be related to involvement. The involvement factors, however, were present for other majors as well as for these. The possibility exists that the negative impact to satisfaction emerged from other circumstances. It is possible that the students enrolled in these particular majors are more likely to interact with adjunct faculty. Adjunct faculty often teach classes and then leave, allowing little time for interaction with students outside the actual class time.

Again, this is a mature cohort, with a majority of the respondents entering from the workforce (50.5%) or from the military (6.5%). These respondents may be aware of advances in technologies that may not have been reflected in the community college. Both of these majors are highly sensitive to rapid changes in technology. Maintaining state of the art equipment in engineering related technologies and/or business management/administrative services labs may prove to be difficult for the institutions because of rapidly changing technologies. The cohort may have been aware of the needs in the marketplace and the institution may not have had state of the art equipment to support the technologies.

Three environmental variables, however, entered with positive correlations and positive beta weights, academic advising, student's perceived academic preparation to continue for a four-year degree, and student's perceived academic preparation to enter the workforce. The rationale used earlier seemed to be at play here also. For academic advising, the current policies and practices have met the needs of the

students in this area of student services, thus explaining the positive relationship. Academic advising may have been a proxy for involvement with academic instructors, if the academic instructors participated in the academic advising. With perceived preparation, research shows a strong link between student's perceived preparation and satisfaction, as was found in this study.

Students' Overall Satisfaction with Tech Prep Programs in Texas

The prediction equation for the students' overall satisfaction with Tech Prep programs in Texas variable included eleven independent variables and produced an adjusted R^2 of 0.3143. The eleven variables included four input variables and seven environmental variables. The eleven variables that entered the prediction equation were:

Y = 15.8406 + 0.1934 (white - non-minority) + 0.1582 (completed GED) + -0.1736 (age) + 0.1157 (number of dependent children) + -0.1377 (engineer related technologies) + -0.1596 (live off campus) + -0.1476 (business management/administration) + 0.1279 (academic advising) + -0.1229 (college sponsored tutorials) + 0.2989 (after academic coursework continue for a 4-yr degree) + 0.1576 (after academic courses prepared to enter the workforce)

Discussion of Variables Influencing Students' Overall Satisfaction with Tech Prep Programs in Texas

In the blocks, stepwise multiple regression analysis for students' overall satisfaction with Tech Prep programs, three of the 15 input variables, white, GED completion, and number of dependent children showed positive correlations with students' overall satisfaction and entered the regression equation with positive beta weights. Age, once again, had a negative correlation and entered the regression equation

with a negative beta weight. These input variables that entered the regression were held constant to remove any bias they might have introduced. Then environmental variables were analyzed, with seven environmental variables entering the resulting equation.

Living off campus, college sponsored tutorials, and majoring in either engineering related technologies or business management/ administrative services had negative correlations with students' overall satisfaction and entered the regression equation with negative beta weights. In earlier discussions, the lack of involvement of this cohort with the program has been noted in the low number of courses completed, limited class preparation, and limited time interacting with vocational and academic instructors. This cohort has had limited involvement with the program. The limited involvement with instructors may have occurred because the institution utilized adjunct faculty to teach these courses.

Negative correlations for these majors, engineering related technologies and business management/administrative services may arise from reasons other than involvement, as discussed previously. These areas may not have state of the art equipment. The cohort may have perceived, based on prior work experience, that the curriculum was not up to date (current) with the changing marketplace.

Living off campus also decreased the students' involvement with the college and the educational experience. Finding that living off campus entered with a negative correlation was supported by previous research (Astin, 1991) and was, therefore, not unexpected. The negative correlation between the variables, college sponsored tutorials and students' overall satisfaction, may be indicative of a disparity between

actual and perceived academic preparation. As discussed earlier, attendance in tutorials may have been mandatory and perceived as either unnecessary or a waste of the students' time which would decrease student satisfaction.

Three environmental variables entered with positive correlations and with positive beta weights. These three were academic advising, students' perceived academic preparation to continue for a four-year degree, and students' perception academic preparation to enter the workforce. These positive influences emerged in all three of the regression analyses. Possible reasons that these variables showed positive correlations with satisfaction variables were mentioned in prior discussions.

Implications for Policy and Practice

Involvement with college sponsored tutorials entered two of the regression equations as a negative influence and had negative correlations with those two dependent variables, students' satisfaction with academic/Tech Prep instruction and curriculum and students' overall satisfaction with Tech Prep programs. Community colleges may need to re-evaluate the criteria for entering college sponsored tutorials. If students are required to attend because of external guidelines, such as TASP, little can be done about mandatory attendance. If students are required to attend because of some local policy, then that policy may need to be reviewed. If the students are attending college sponsored tutorials because of a need for additional help with courses, the college may need to re-evaluate the mechanism for conducting those tutorials. A change in

format, presentation, or time may enhance students' satisfaction with the program.

The majors that entered the prediction equations, engineering related technologies and business management/administrative services, both had negative correlations with all three of the dependent variables. Student responses to several items on the questionnaire indicated a limited involvement with several aspects of the program. The limited number of courses completed in the program should change in future semesters; therefore, satisfaction with the major should increase with the number of completed courses. Institutions may want to review policies and practices that guide involvement with faculty. If the institution has adjunct faculty instruct most of the courses in these majors, that institution may want to establish office hour requirements for adjunct faculty to provide a set time during which students may contact or interact with the course instructor. The institution may want to have full-time faculty instruct more of the courses. If the courses were taught by full-time instructors, the instructors may need to take the initiative to increase interactions outside the class time. They could be more visible in the student union, offer review sessions, or encourage students to take advantage of office hours.

In reviewing involvement in lab or clinicals, time requirement may need to be adjusted to foster more student involvement. Engineering related technologies and business management/administrative services are highly sensitive to rapidly changing technologies. Institutions may need to evaluate the status of existing laboratory equipment and software to determine if the labs contain equipment that reflects rapidly changing

technology. A conscious effort to keep pace with changes in technology should support increased student satisfaction.

Although the suggestion made above arose from negative correlations between environmental variables and satisfaction variables, the descriptive statistics clearly pointed to a high level of satisfaction with the aspects of Tech Prep considered in this study. Furthermore, the respondents perceived that they were academically prepared to enter the workforce or to continue for a four-year degree. This study supports prior research that perceived preparation was positively correlated with satisfaction. Therefore, the high levels of satisfaction with the academic preparation and with multiple scales used to create the satisfaction variables reported by this cohort made a profound statement for support of the many of the policies and practices that undergird Tech Prep in Texas Community colleges.

Implications for Theory

Involvement theory was selected because of its underlying assumptions. According to this theory (Astin, 1991), the amount of student learning and personal development (satisfaction) associated with any educational program is directly proportional to the quality and quantity of his or her involvement in that program. A further assumption is made in this theory that involvement leads to satisfaction. This cohort appeared to be very satisfied with Tech Prep programs.

The individual scales combined to create the satisfaction variables indicated a high level of satisfaction for the measures combined to create the three dependent variables. These scales spanned aspects of

instruction and curriculum. They were not designed, however, to indicate the level of program involvement.

Program involvement was ascertained through questionnaire items representative of the independent variables. These independent variables provided a view of the respondents' levels of involvement at the time this study was conducted. Review of answers to involvement questions indicated limited involvement outside the class or lab, little preparation, and limited contact with instructors. Because the respondents indicated a high level of satisfaction (evident in the descriptive statistics) to the scales combined to create the dependent variables, the limited involvement with several involvement variables seems contradictory to the assumptions for involvement theory.

However, involvement with the academic advisors entered each of the regression equations with a positive beta weight and showed positive correlations with each dependent variable. Academic advising may have served as a proxy for involvement with instructors. Also, these students were involved with the program and the instructors through actual class time. This cohort responded that 42.0% attended class 7-12 hours each week and 32.2% attended 1-6 hours. These students were involved in the program and with their instructors through their attendance in class and, possibly, through academic advising.

Involvement theory does not exclude the in-class involvement. Although several of the involvement areas outside of class did not impact satisfaction or manifested a negative correlation with the satisfaction variables, that does not indicate that involvement theory is not appropriate for this study. Rather, the areas of limited involvement or negative influence indicate areas of policy and practice that an institution

may wish to investigate further to enhance student satisfaction with Tech Prep programs.

For the two majors that entered the prediction equations, the correlations with satisfaction were negative. The limited involvement with the program as evidenced by few completed hours, may change as the students progress through their programs. As reported by Chadwick and Ward (1987), factors that influence satisfaction may change across the education experience. Involvement theory provides the means for making recommendations to enhance student satisfaction with existing programs and to review satisfaction as involvement with the program progresses and changes.

Recommendations for Future Research

This study lends itself to two types of recommendations. The first recommendations offered above includes suggestions for changes to policies and practices that may enhance student satisfaction if implemented. The second set of recommendations points to potential areas for further research.

A review of the literature reveals limited research in the area of evaluation of Tech Prep programs. This absence of evaluative research was not unexpected due to the newness of this initiative. When the newness of this initiative in Texas is coupled with the maturity of the cohort involved in this study (mean age = 26.8 years), consideration that the membership of the Tech Prep student cohort should change over the next few years. As the cohort changes, their needs and satisfactions with this program should change also. Therefore, the recommendation is made

that this study be replicated with future student groups to determine if Tech Prep programs are still satisfying a changing cohort.

With less than 10.0% of the respondents entering a Texas community college Tech Prep program directly from high school Tech Prep program, future studies are recommended to determine whether or not Tech Prep programs in secondary schools have accomplished a major goal of the program--preparing students to continue for an advanced certificate or an associate degree. Over the next few years the nature of the Tech Prep cohort should change as high school students move into and through these programs. A future decline in cohort age would indicate that one goal of the Tech Prep philosophy is being accomplished--students are continuing from high school into post-secondary education.

As for the cohort represented in this study, the recommendation is made that a follow-up study be considered. This follow-up survey could ascertain their levels of satisfaction at that time and could further ascertain if the Tech Prep program did prepare members of this cohort to continue for a four-year degree and/or to enter the workforce.

In pursuing another direction, it is recommended that a study be conducted to determine the satisfaction of employers with employee's expertise. Tech Prep was created to prepare students to be the workforce of the future. A study of employer satisfaction with Tech Prep students would help determine if this intent had been met.

With any study, it is possible that variables that impact the desired outcome, student satisfaction for this study, were not considered in the study. Among the variables not considered in this study were peer interaction (involvement) variables. Future studies may want to consider

the influence of student's involvement with his or her peer group on satisfaction with Tech Prep.

Conclusions

The 'neglected majority' that Parnell wrote about in 1985 is now in its mid- to late-twenties. The average members of the cohort involved in this study were the students referred to in Parnell's earlier work. Initiating a study in which a mature cohort predominated allowed for insight that arises from both age and experience. Surveying a mature cohort underscores the power of the Tech Prep program and allows the rare opportunity for establishing a baseline from which to examine student satisfaction with the Tech Prep program as the cohort changes across the years.

Descriptive statistics revealed that for each of the scales combined to create the three dependent student satisfaction variables, students were very satisfied with these aspects of the Tech Prep programs. These scales were highly and very significantly correlated. The students involved in this study were very satisfied with their Tech Prep programs.

Based on the responses of this mature cohort, three prediction equations were formulated. The predictor equations suggested magnitude and direction of influence exerted by input and environmental variables on the dependent variables. The variables that entered the prediction equations and the direction of that entry were of greater value than the predictive power of any of the equations. The interaction of the variables at each step as the equations were developed allowed examination of redundancies and cooperative interactions.

Academic advising, students' perceived academic preparation to continue for a four-year degree, and students' perceived academic preparation to enter the workforce entered each of the three regression equations with positive beta weights, which supported each of the satisfaction variables. Academic advising coupled with the time spent in class indicated involvement with the instructors and with the program. Students perceived themselves as being academically prepared to continue for a four-year degree or to enter the work force. Envisioning themselves as prepared enhanced their present satisfaction levels. Although these students were not the traditional Tech Prep students, the Tech Prep initiative in Texas appears to be accomplishing one of the major goals for Tech Prep--preparing students to continue their educations or to enter the workforce.

Clearly, future studies are indicated to examine changes in variables impacting satisfaction with Tech Prep programs in Texas, to monitor the changes that should occur within the cohort, and to follow graduates into their jobs or continued education or entry to determine future levels of satisfaction with current preparation. Furthermore, future studies with this cohort could ascertain if Tech Prep programs are preparing students for the future.

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APPENDIX A: VARIABLE SCALES

VARIABLE SCALES

"I" Input Variable Scales

Age was entered as the actual age recorded on question # 6.

Gender is a categorical variable. To enter gender data based on question # 5 of the survey, the variable was recorded by the response: Q5: male = 1, female = 2.

Ethnic choices, in question #21, were replaced by dummy variables. When a low response rate for minority groups returned, ethnicity was recoded to include minority, non-minority, and other as responses. The other category was omitted from regression analyses.

Non-minority	NONMIN:	yes = 2	no = 1
Minority	MINOR:	yes = 2	no = 1
Other	ETHOTH:	yes = 2	no = 1

Academic Preparation was an Input Variable Cluster containing the following four variables.

High school completion date was in question #4. This variable was replaced with dummy variables as follows: [Q4G was omitted from the regression analysis.]

1994	Q4A	yes = 2	no = 1
1993	Q4B	yes = 2	no = 1
1992	Q4C	yes = 2	no = 1
1991 or before	Q4D	yes = 2	no = 1
Currently in high school Tech Prep program	Q4E	yes = 2	no = 1
never graduated but completed G.E.D.	Q4F	yes = 2	no = 1
never completed	Q4G	yes = 2	no = 1

English as a native language was in question #7 and assigned values: Q7: yes = 2, no = 1.

Problems with English was in question # 26 (a) and assigned values: ENGLISH: yes = 1, no = 2.

Problems with math in was question #26 (b) and assigned values: MATH: yes = 1, no = 2.

SES was an Input Variable Cluster containing four variables that were in survey questions 11, 20 (a & b), and 24.

Eligibility for or receipt of a for PELL Grant was in #11 and was assigned the values:
Q11: yes = 1, no = 2.

Father's educational level in # 20 (a). Educational level responses were given values ranging from 1 for some grade school or less to 8 for has a graduate degree. Missing values were recoded using mean substitution.
FATHER: [value by choice] a = 1, b = 2, c = 3, d = 4, e = 5, f = 6, g = 7, or h = 8.

Mother's educational level in #20 (b). Educational level responses were given values ranging from 1 for some grade school or less to 8 for has a graduate degree. Missing values were recoded using mean substitution.
MOTHER: [value by choice] a = 1, b = 2, c = 3, d = 4, e = 5, f = 6, g = 7, or h = 8.

Eligibility for or receipt of AFDC was in # 24 and assigned the values:
Q24: yes = 1, no = 2

Family Responsibilities was an Input Varaiable Cluster containing the following two variables.

Marital status was in question #22.

a)	single, widowed, divorced	= 1
b)	married	= 2
c)	separated	= 3
	missing	= 0

Number of Dependent Children was in question #23.

a)	none	= 1
b)	1	= 2
c)	2	= 3
d)	3	= 4
e)	4 or more	= 5
	missing	= 0

Expectancy was an Iput Variable Cluster. Expectancy referred to those expectations a student holds for himself or herself. This study included two 'expectancy' variables.

Purpose at time of enrollment, in question #8, was treated as a dummy variable. For analysis, Q8A was omitted.

		marked	not marked
Q8A	No definite purpose	= 2	= 1
Q8B	Take a few courses, self improvement	= 2	= 1
Q8C	Take a few courses, job-related or job-required	= 2	= 1
Q8D	Transfer to another 2-yr college	= 2	= 1
Q8E	Transfer to a 4-yr college	= 2	= 1
Q8F	Certificate	= 2	= 1
Q8G	Associate degree	= 2	= 1
Q8H	Complete a vocational Program	= 2	= 1

Intent to complete program was in question #13 and assigned the values: Q13: yes = 2, no = 1.

"E" Environmental Variable Scales

External involvement was an environmental variable cluster containing four environmental variables.

Residence was in question #16. Because of multi-colinearity, the choices were regrouped to reflect on-campus and off-campus choices. For analysis 16C was omitted.

		marked	not marked
Q16A	live off campus	= 2	= 1
Q16B	live on campus	= 2	= 1
Q16C	other	= 2	= 1

Employment status was in question #17. Missing values were recoded using mean substitution.

a)	none	= 1
b)	part-time, 1-10 hours	= 2
c)	part-time, 11-20 hours	= 3
d)	part-time, 21-30 hours	= 4

e)	part-time, 31-39 hours	= 5
f)	full-time, 40 hours	= 6
g)	full-time, more than 40 hours	= 7

Location of employment was in question #18. It was recoded as a dummy variable. For analysis purposes 18a was omitted.

		marked	not marked
Q18A	not employed	= 2	= 1
Q18B	on campus, work study	= 2	= 1
Q18C	on campus, part-time	= 2	= 1
Q18D	off campus	= 2	= 1

Relationship of employment to Tech Prep career choice was in #19 and assigned values:

Q19: yes = 2, no = 1.

College Service Involvement was an environmental cluster containing nine variables. Each of the variables was used to indicate the amount of student involvement with that facet of college services. The question number was used for the variable name in the computer. The responses for each of these variables used a three point Likert scale: Frequently = 3; Occasionally = 2; Never = 1.

Q32	academic advising/course planning
Q33	vocational/career counseling
Q34	counseling related to Tech Prep
Q35	counseling related to internship/ apprenticeship
Q36	financial aid services
Q37	veterans services
Q38	college sponsored tutorials
Q39	student employment services
Q40	job placement services

A Likert scale was selected because:

1. constructing questionnaires using a Likert scale is easy;
2. use of a Likert scale has produced meaningful results in a number of studies; and,
3. construction is highly reliable (Nunnally, 1978).

Program Involvement was an environmental cluster contining 10 environmental variables.

Program choice was in question #1. This variable was represented by dummy variables for each choice. The Q1K, 'other', choice was omitted in analysis.

		marked	not marked
Q1A	Agriculture	= 2	= 1
Q1B	Business Management/ Administration Services	= 2	= 1
Q1C	Computer Information Services	= 2	= 1
Q1D	Office Systems Technology	= 2	= 1
Q1E	Engineering-related Technologies/ Drafting/Electronics	= 2	= 1
Q1F	Manufacturing	= 2	= 1
Q1G	Mechanic and Repairers	= 2	= 1
Q1H	Health Professions	= 2	= 1
Q1I	Protective Services/ Criminal Justice	= 2	= 1
Q1J	Home Economics/Child Care	= 2	= 1
Q1K	Other	= 2	= 1

Point of entry was in question #2. This question was represented by dummy variables. The response Q2G was omitted from the analysis.

		marked	not marked
Q2A	high school, non-Tech Prep program	= 2	= 1
Q2B	high school, Tech Prep program	= 2	= 1
Q2C	after working for a period of time	= 2	= 1
Q2D	transferred from another 2-yr college	= 2	= 1
Q2E	transferred from a 4-yr college	= 2	= 1
Q2F	after completing military service	= 2	= 1
Q2G	after completing a bridge program	= 2	= 1

Receipt of credit toward or exemption from any coursework in program was in question #3. This variable was replaced by dummy variables. For analysis purposes Q3F was omitted from the regression.

		marked	not marked
Q3A	no	= 2	= 1
Q3B	yes, based on high school Tech Prep program	= 2	= 1
Q3C	yes, based on work experience	= 2	= 1
Q3D	yes based, on credit by examination	= 2	= 1
Q3E	yes, for other reasons	= 2	= 1

Number of courses completed in the Tech Prep program was question #9.

0 classes	= 1
1 - 4 classes	= 2
5 - 8 classes	= 3
9 - 15 classes	= 4
16 - 20 classes	= 5
over 20 classes	= 6

Enrollment status was in question # 10. This item had two responses full-time and part-time.

Q10: parttime = 1 and fulltime =2.

Number of hours in labs or clinicals was question #12(a).

1 - 6 hours	= 1
7 - 12 hours	= 2
13 - 15 hours	= 3
16 - 18 hours	= 4
more than 18 hours	= 5

Number of hours in class was question # 12(b)

1 - 6 hours	= 1
7 - 12 hours	= 2
13 - 15 hours	= 3
16 - 18 hours	= 4
more than 18 hours	= 5

Number of hours in preparation for class was question #27(a).

0 - 4 hours	= 1
5 - 9 hours	= 2
10 - 14 hours	= 3
15 or more hours	= 4

Number of hours spent with vocational instructors outside class or lab / clinical time was in question #27(b).

0 - 4 hours	= 1
5 - 9 hours	= 2
10 - 14 hours	= 3
15 or more hours	= 4

Number of hours spent with academic instructors outside class was in question #27(c).

0 - 4 hours	= 1
5 - 9 hours	= 2
10 - 14 hours	= 3
15 or more hours	= 4

Student's Perceived Preparation was a cluster of environmental variables containing three environmental variables.

Vocational preparation to enter workforce was in question # 28(a).
Q28A: yes = 2, no = 1.

Vocational preparation to continue education [for a 4-year degree] was in question # 28(b).
Q28A: yes = 2, no = 1

Academic preparation to enter workforce was in question #29A.
Q29A: yes = 2, no = 1.

Academic preparation continue education [for a 4-year degree] was in question # 29(b).
Q29B: yes = 2, no = 1.

Grade point average was in question # 15.

A- to A	(3.50 - 4.00)	GPA1	= 7
B to A-	(3.00 - 3.49)	GPA2	= 6
B- to B	(2.50 - 2.99)	GPA3	= 5
C to B-	(2.00 - 2.49)	GPA4	= 4
C- to C	(1.50 - 1.99)	GPA5	= 3
D to C-	(1.00 - 1.49)	GPA6	= 2
Below D	(0.00 0.99)	GPA7	= 1
Not established		GPA8	= 0

"O" Outcome Variable Scales

For outcome variables, (1) Vocational/Tech Prep instruction and curriculum and (2) Academic/Tech Prep instruction and curriculum, a five-point Likert scale based on the student's self-reported level of satisfaction was employed. The scale ranged from 0 to 4 as follows:

very satisfied = (4)
satisfied = (3)
dissatisfied = (2)
very dissatisfied = (1)
not relevant = (0)

Satisfaction with Vocational/Tech Prep Instruction and Curriculum was measured by questions #41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, and 54.

- Instructors' knowledge of their fields
- Instructors' varied teaching techniques and activities
- Instructors' ability to relate to students
- Instructors availability outside of class time
- Quality of instruction overall
- Course sequencing
- Course objectives
- Course content (relevant to career/job area)
- Balance of theoretical and practical
- Academic content in vocational coursework
- Balance of class and lab time
- Laboratory/workshop space
- Available equipment
- Job sites for student internships or clinicals.

Satisfaction with Academic/Tech Prep instruction and curriculum was measured by questions # 57, 58, 59, 60, 61, 62, 63, 64, and 65.

- Instructors' knowledge of their fields
- Instructors' varied teaching techniques and activities
- Instructors' ability to relate to students
- Instructors availability outside of class time
- Quality of instruction overall
- Course objectives
- Balance of theoretical and practical
- Vocational/technical applications in academic coursework
- Course content (relevant to career/job area)

Students' overall satisfaction with Tech Prep programs was measured by questions 14, 30, 31, 55, 56, 66, and 67.

Question 14 asked if the student were starting over would he or she take the program again.
Q14: yes = 2, no = 1.

Questions 30 asked, "How satisfied are you with the overall learning environment in you Tech Prep program?" The response was based on a four-point Likert scale:
strongly agree (4)
agree (3)
disagree (2)
strongly disagree (1)

Question 31 sought to determine if the student would recommend the Tech Prep program to a friend.
Q30: yes = 2, no = 1.

Questions 55, 56 ,66, and 67 were related to the student's level of satisfaction with his or her preparation. These questions were measured using a five-point Likert scale:
very satisfied = (4)
satisfied = (3)
dissatisfied = (2)
very dissatisfied = (1)
not relevant = (0)

- Vocational preparation enter the workforce
- Vocational preparation to continue for a 4-year degree
- Academic preparation to enter the workforce
- Academic preparation to continue for a 4-year degree.

APPENDIX B:

1995 SURVEY OF COMMUNITY COLLEGE TECH PREP STUDENTS

1995 Survey of Community College Tech Prep Students

Name First: MI: Last:
Address: City: State: Zip:
Phone: ( ) Birthday: / / Social Security Number:

Survey Response Number

3 9 3

Directions:

- Use a blue or black ink pen.
- Fill in your responses completely

Wrong
Wrong
RIGHT

- Please do not leave any item blank.

BACKGROUND

1. In which vocational / Tech Prep program are you enrolled:

- Agriculture
- Business Management/Administration Services
- Computer and Information Services
- Office Systems Technology
- Engineer-related Technologies/Drafting/Electronics
- Manufacturing
- Mechanics and Repairers
- Health Professions
- Protective Services/Criminal Justice
- Home Economics/Child Care
- Other

2. Which of the following was true at the time you first enrolled in a Tech Prep class at this two-year institution.

- Entered directly from high school non-Tech Prep program
- Entered directly from high school Tech Prep program
- Entered after working for a period of time (do not include summer work)
- Transferred from another 2-year college
- Transferred from a 4-year college
- Entered after completing military service
- Entered after completing a bridge program

3. Did you receive any credit toward or exemption from any coursework in your program? (Mark only one.)

- no
- yes, based on high school Tech Prep program
- yes, based on work experience
- yes, based on credit by examination
- yes, for other reasons

4. Year graduated from High School?

- 1994
- 1993
- 1992
- 1991 or before
- Currently in a high school Tech Prep program
- Never graduated but completed G.E.D.
- Never completed high school

5. Sex

- Male
- Female

6. Age as of December 31 of this year?

7. Is English your native language?

- Yes
- No

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8. For what purpose did you enroll in this Tech Prep program? (Mark only one.)
   - ◯ No definite purpose in mind
   - ◯ To take a few courses for self improvement
   - ◯ To take a few courses, job-related or job-required
   - ◯ To take courses necessary for transferring to another 2-year college
   - ◯ To take courses necessary for transferring to a 4-year college
   - ◯ To obtain a certificate
   - ◯ To obtain an associate degree
   - ◯ To complete a vocational program

9. How many courses in a postsecondary vocational/Tech Prep program have you completed? Include both career and academic courses, do not include remedial or bridge classes.
   - ◯ 0 classes
   - ◯ 1 4 classes
   - ◯ 5 8 classes
   - ◯ 9 - 15 classes
   - ◯ 16 - 20 classes
   - ◯ over 20 classes

10. Current enrollment status
   - ◯ full-time, 12 or more credit hours
   - ◯ part-time, less than 12 credit hours

11. Are you eligible for or do you receive a PELL grant?
   - ◯ Yes
   - ◯ No

12. How many hours a week are you: (Mark one for lab/clinical and one for class.)

	in labs or clinicals?	in class?
1 6 hours	◯	◯
7 12 hours	◯	◯
13 - 15 hours	◯	◯
16 - 18 hours	◯	◯
more than 18 hours	◯	◯

13. Do you expect to complete this program?
   - ◯ Yes
   - ◯ No

14. If you could start over, would you take this vocational/ Tech Prep program again?
   - ◯ Yes
   - ◯ No

15. Indicate your overall college grade point average: (Mark only one.)
   - ◯ A- to A (3.50 - 4.00)
   - ◯ B to A- (3.00 - 3.49)
   - ◯ B- to B (2.50 - 2.99)
   - ◯ C to B- (2.00 - 2.49)
   - ◯ C- to C (1.50 - 1.99)
   - ◯ D to C- (1.00 - 1.49)
   - ◯ Below D (0.00 - 0.99)
   - ◯ Have not established a college grade point average

16. Where do you live this semester?
   - ◯ With parents or relatives
   - ◯ Your own private home, apartment or room (owned or rented)
   - ◯ College dormitory
   - ◯ Other student housing
   - ◯ Other

17. How many hours a week are you employed? (total at one or more jobs) (Mark only one.)
   - ◯ none, do not have a job
   - ◯ part-time, 1 - 10 hours
   - ◯ part-time, 11 20 hours
   - ◯ part-time, 21 - 30 hours
   - ◯ part-time, 31 - 39 hours
   - ◯ full-time, 40 hours
   - ◯ full-time, more than 40 hours

18. Where are you employed?
   - ◯ not employed
   - ◯ on campus, work study
   - ◯ on campus, part-time
   - ◯ off campus

19. Is work related to your vocational/Tech Prep or career choice?
   - ◯ Yes
   - ◯ No

20. What is the highest level of formal education obtained by your parents? (Mark only one for each parent.)

	Father	Mother
Grade school or less	◯	◯
Some high school	◯	◯
High school graduate	◯	◯
Postsecondary school other than college	◯	◯
Some college	◯	◯
College degree	◯	◯
Some graduate school	◯	◯
Graduate degree	◯	◯

21. Ethnicity (Mark all that apply.)
- ◯ White/Caucasian
- ◯ African American/Black
- ◯ Native American
- ◯ Asian American/Asian
- ◯ Mexican American/Chicano
- ◯ Puerto Rican
- ◯ Other Latino
- ◯ Other

22. Marital Status (Mark only one.)
- ◯ single, divorced, or widowed
- ◯ married
- ◯ separated

23. Number of dependent children
- ◯ none
- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4 or more

24. Are you eligible for or do you receive AFDC (Aid to Families with Dependent Children)
- ◯ Yes
- ◯ No

25. Are you differently abled? (i.e. visually or hearing impaired, physically challenged)
- ◯ Yes
- ◯ No

26. Do you have problems with English or math that prevent you from taking the courses you would like to take?

English	◯ Yes	◯ No
Math	◯ Yes	◯ No

27. Approximately, how many hours do you spend: (Mark only one for each a, b, and c.)

	0-4 hours	5-9 hours	10-14 hours	15 hours or more
a. in preparation for class?	◯	◯	◯	◯
b. with vocational instructors outside of class or lab/clinical time?	◯	◯	◯	◯
c. with academic instructors outside of class time?	◯	◯	◯	◯

28. When you finish your vocational coursework you will be prepared to:

	strongly agree	agree	disagree	strongly disagree
a. enter the work force	SA	A	D	SD
b. continue for a 4-year degree	SA	A	D	SD

29. When you finish your academic coursework you will be prepared to:

	strongly agree	agree	disagree	strongly disagree
a. enter the work force	SA	A	D	SD
b. continue for a 4-year degree	SA	A	D	SD

30. How satisfied are you with the overall learning environment in your Tech Prep Program?
- ◯ very satisfied
- ◯ satisfied
- ◯ dissatisfied
- ◯ very dissatisfied

31. Would you recommend this vocational/Tech Prep program to a friend?
- ◯ Yes
- ◯ No

College Service Programs

The following questions refer to how frequently you use college services. (Mark only one in each row.)

How often do you use the following college services?

	Frequently	Occasionally	Never
32. Academic advising/course planning	F	O	N
33. Vocational guidance/career planning	F	O	N
34. Counseling for Tech Prep program	F	O	N
35. Counseling related to internship/apprenticeship	F	O	N
36. Financial aid services	F	O	N
37. Veterans services	F	O	N
38. College sponsored tutorial services	F	O	N
39. Student employment services	F	O	N
40. Job placement services	F	O	N

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SATISFACTION WITH TECH PREP

Please indicate your overall level of satisfaction with each of the following.
The levels of satisfaction include:
very satisfied, satisfied, dissatisfied, very dissatisfied

Vocational/Tech Prep Instruction and Coursework

The items in this section refer to experiences within your vocational/Tech Prep program. Think about the instructors and coursework you have had, not just today or this semester, but over your course of study at this institution. Your responses will help evaluate instruction, courses, environment, and preparation for the vocational component of your program. (Mark only one in each row.)

How satisfied are you with the following vocational (Tech Prep) instructional areas?

	Very Satisfied	Satisfied	Dissatisfied	Very Dissatisfied	Not Relevant
41 Instructors' knowledge of their fields	VS	S	D	VD	NR
42. Instructors' varied teaching techniques and activities	VS	S	D	VD	NR
43. Instructors' ability to relate to students	VS	S	D	VD	NR
44 Instructors' availability outside of class	VS	S	D	VD	NR
45. Quality of vocational instruction	VS	S	D	VD	NR
46. Course sequencing	VS	S	D	VD	NR
47. Course objectives	VS	S	D	VD	NR
48. Course content (relevant to career/job area)	VS	S	D	VD	NR
49. Balance of theoretical and practical	VS	S	D	VD	NR
50. Academic content in vocational coursework	VS	S	D	VD	NR
51. Balance of class and lab time	VS	S	D	VD	NR
52. Laboratory/workshop space	VS	S	D	VD	NR
53. Available equipment	VS	S	D	VD	NR
54. Job sites for student internships or clinicals	VS	S	D	VD	NR
55. Preparation to enter the work force	VS	S	D	VD	NR
56. Preparation to continue for a 4-year degree	VS	S	D	VD	NR

Academic Instruction and Coursework

The items in this section are similar to those of the previous section. These items refer to experiences within academic courses required by your vocational/Tech Prep program. Your responses will help evaluate instruction, courses and preparation from the academic component of your program. (Mark only one in each row.)

How satisfied are you with the following in academic instructional areas?

	Very Satisfied	Satisfied	Dissatisfied	Very Dissatisfied	Not Relevant
57. Instructors' knowledge of their subjects/fields	VS	S	D	VD	NR
58. Instructors' varied teaching techniques and activities	VS	S	D	VD	NR
59. Instructors' ability to relate to students	VS	S	D	VD	NR
60. Instructors' availability outside of class	VS	S	D	VD	NR
61. Quality of academic instruction	VS	S	D	VD	NR
62. Course objectives	VS	S	D	VD	NR
63. Balance of theoretical and practical	VS	S	D	VD	NR
64. Vocational/technical applications in academic coursework	VS	S	D	VD	NR
65. Academic course content relevance to career area	VS	S	D	VD	NR
66. Academic preparation to enter the work force	VS	S	D	VD	NR
67. Academic preparation to continue for a 4-year degree	VS	S	D	VD	NR

Thank you for your participation!

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Designed by Lyn Holmes @ TTUHSC Computer Services 743-2870 CSMLH@TTUHSC.EDU

APPENDIX C: 1995 COMMUNITY COLLEGE TECH PREP STUDENT SURVEY DISTRIBUTION AND RETURN MATRIX

Table C.1: 1995 Community College Tech Prep Student Survey Distribution and Return Matrix

Consortium	College	# of students	% of total	# of 2500	# sent	number returned	% returned
Alamo	Palo Alto	171	0.68	17.05	15	7	46.67
	San Antonio College	1454	5.80	145.01	140	0	0.00
Brazos Valley	Blinn College	95	0.38	9.47	10	1	10.00
Capital	Austin CC	1002	4.00	99.93	100	9	9.00
Central Texas	Central Texas College	235	0.94	23.44	25	0	0.00
	Temple Jr. College	85	0.34	8.48	10	0	0.00
	TSTC - Waco	11	0.04	1.10	5	0	0.00
Coastal Bend	Bee County College	534	2.13	53.26	55	39	70.91
	Del Mar College	975	3.89	97.24	95	46	48.42
Concho Valley	TSTC - Sweetwater	371	1.48	37.00	35	0	0.00
Deep East Texas	Angelina	487	1.94	48.57	50	0	0.00
East Texas	Kilgore College	198	0.79	19.75	20	13	65.00
Global Edge	Collin County CC	234	0.93	23.34	25	0	0.00
Golden Crescent	The Victoria College	397	1.58	39.59	40	0	0.00
Gulf Coast	Alvin	24	0.10	2.39	5	0	0.00
	Brazosport	111	0.44	11.07	15	0	0.00
	College of the Mainland	83	0.33	8.28	10	0	0.00
	Galveston College	154	0.61	15.36	15	0	0.00
	Houston CC	29	0.12	2.89	5	0	0.00
	North Harris Montgomery	474	1.89	47.27	45	0	0.00

Table C.1: Continued

Consortium	College	# of students	% of total	# of 2500	# sent	number returned	% returned
	San Jacinto - North	37	0.15	3.69	5	0	0.00
	San Jacinto - South	299	1.19	29.82	30	20	66.67
	San Jacinto - Central	535	2.13	53.36	50	31	62.00
	Wharton County Jr. Col.	79	0.32	7.88	10	1	10.00
Heart of Texas	Hill College	81	0.32	8.08	10	0	0.00
Lower Rio Grande	TSTC - Harlingen	513	2.05	51.16	50	0	0.00
North Central	DCCC - Brookhaven	729	2.91	72.71	70	0	0.00
	DCCC - Cedar Valley	239	0.95	23.84	25	0	0.00
	DCCC - Eastfield	756	3.02	75.40	75	7	9.33
	DCCC - El Centro	1216	4.85	121.27	120	0	0.00
	DCCC - Mountain View	560	2.23	55.85	55	0	0.00
	DCCC - North Lake	374	1.49	37.30	35	0	0.00
	DCCC - Richland	924	3.69	92.15	95	0	0.00
	Navarro College	334	1.33	33.31	30	2	6.67
	Tarrant County - NE	2316	9.24	230.98	225	0	0.00
	Tarrant County - S	1721	6.87	171.64	170	0	0.00
	Tarrant County - NW	652	2.60	65.03	65	0	0.00
	Weatherford	510	2.03	50.86	50	43	86.00
North Texas	Vernon Regional Jr. Col.	268	1.07	26.73	25	3	12.00
Panhandle	Amarillo College	1659	6.62	165.46	165	120	72.73
	TSTC - Amarillo	257	1.03	25.46	25	21	84.00

Table C.1: Continued

Consortium	College	# of students	% of total	# of 2500	# sent	number returned	% returned
Permian Basin	Howard College- Big Spring	74	0.30	7.38.	10	0	0.00
	Midland College	487	1.94	48.57	50	46	92.00
	Odessa College	413	1.65	41.19	40	0	0.00
South Plains	South Plains College	630	2.51	62.83	60	5	8.33
South Texas	Laredo CC	136	0.54	13.56	15	0	0.00
Southeast Texas	Lamar - Orange*	132	0.53	13.16	15	0	0.00
Star	South Texas Jr. Col.	89	0.36	8.88	10	1	10.00
Texoma	Grayson County College	716	2.86	71.41	70	69	98.57
	North Central Texas CC	1030	4.11	102.72	100	23	23.00
Upper East	--------						
Upper Rio Grande	El Paso CC	146	0.58	14.56	15	0	0.00
West Central	Ranger Jr. College	11	0.04	1.10	5	5	100.00
	Western Texas	20	0.08	2.00	5	0	0.00
TOTAL		25,067	100	2500.01	2500	512	20.48

APPENDIX D: SAMPLE LETTERS

April 6, 1995

Administrator
Two Year Institution
Campus
Address
City, State Zip

Dear _____:

The packet contains _____ copies of the 1995 Survey of Community College Tech Prep Students. These surveys are a part of a Carl Perkins grant designed to identify and disseminate information concerning effective Tech Prep policies and practices in Texas. Since Tech Prep is relatively new, it is essential to determine if the program is meeting the career needs of the students.

Twenty-five hundred surveys are being distributed to two-year institutions across the state. You have received a portion of the surveys based on the approximate number of students enrolled in Tech Prep programs at your institution. In order to obtain information from as many programs as possible, please distribute surveys to instructors in each of your state approved programs. Wherever possible, it is desirable to surveys given to students in intact, advanced-level Tech Prep classes.

The instructors should have students complete and return surveys during class. The instructors should return the completed surveys to your office for return to Texas Tech. Postage paid mailers are enclosed for the return of surveys.

The data gathered will be used to prepare a state report and for my dissertation. To be included in the final report, surveys need to be returned as soon as possible or by **April 24, 1995**. All institutions participating in the survey will receive a copy of the final report submitted to the Texas Higher Education Coordinating Board.

The input from your students is critical to the success of this project. Your assistance is invaluable to this research project. If you have any questions, please call Kay Hodge (000) 000-0000 or (000) 000-0000.

Sincerely,

Kay Hodge

enclosures: questionnaires
cover letter to instructor
cover letter to students
postage paid return mailers

April 6, 1995

Dear Instructor,

You have received a packet from your Administrator for Vocational Education. This packet contains:

⇒ Copies of the 1995 Survey of Community College Tech Prep Students,
⇒ Cover letter for students, and
⇒ An instruction page for administering the survey.

This survey is part of the state evaluation of Tech Prep programs. The information gathered from this survey will be used in preparing a report to be submitted to the Texas Higher Education Coordinating Board and for my dissertation. Input from your students is critical to the success of this project.

Please administer this survey to students in one or more intact Tech Prep class(es). Since you will probably not have enough surveys for all of your Tech Prep students, administering the survey to advanced-level classes is preferable. This survey takes 15 - 20 minutes for students to complete. The students should complete the survey and return it to you before leaving the class.

Please distribute the survey to your students at your earliest possible convenience. After your students have completed the surveys, return the completed surveys to your administrator for return to Texas Tech. To be included in the final report, surveys need to be returned by **April 24, 1995**.

I realize that your time and the time of your students is valuable. Thank you for your assistance with this study. Your cooperation is essential for the success of this project.

Sincerely,

Kay Hodge
Doctoral Candidate, Texas Tech University
Research Assistant

April 6, 1995

Dear Student:

You have received this survey because you are enrolled in courses which are a part of a state approved Tech Prep program. Since Tech Prep is a new vocational / technical program, it is essential to determine if the program is meeting your needs. To determine if Tech Prep is doing what it should, please fill out and return this survey to your instructor before leaving class.

The survey will be used to identify strengths and weaknesses of the Tech Prep program. Based on the results of this survey, we hope to make recommendations for modifying the programs to better meet the needs of students to provide you with the best training possible, and to help you be successful in your chosen career.

As you complete this survey, we ask for your honest and candid responses. Please be sure to respond to every item. It should take you 15 - 20 minutes to complete the survey. The survey requests your name, address, and social security number. This information may be used for follow-up surveys, after you complete your present program.

Your responses will be kept confidential by using the nine digit Survey Response Number in the top left hand column of the first page. Your name will not be entered with nor linked to your responses to survey items.

Your response is voluntary. Your input, however, will help to make Tech Prep a successful program now and for future students. We appreciate your response.

Sincerely,

Kathryn Hodge