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Factors Affecting the Longevity of the Department of Industrial Technology and Education at Utah State University 1985-2005: A Case Study

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FACTORS AFFECTING THE LONGEVITY OF THE DEPARTMENT OF INDUSTRIAL TECHNOLOGY AND EDUCATION AT UTAH STATE UNIVERSITY 1985-2005: A CASE STUDY

by

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ABSTRACT

Factors Affecting the Longevity of the Department of Industrial Technology and Education at USU 1985-2005: A Case Study

by

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A qualitative case study method was used to discover the factors involved with the longevity of the technology education program at Utah State University (USU). The problem was that while there were studies reporting the many technology education programs that have been closed, there had been no studies on individual programs that have remained open. This study also contains a consolidation of relative information on the program. The primary data were obtained from interviews with the professors involved with the program during the timeframe of the study. The data obtained from the interviews were evaluated and set into themes. The factors were derived from the themes. The many factors presented in this study are evidence of the need to do this holistic study of the problem. The findings from this study provide a basis for study of other successful Technology Education programs.

(111 pages)

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Jerry Cloward

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CHAPTER I

INTRODUCTION

Technology education, formerly known as industrial arts, has a rich and meaningful history spanning more than 120 years that is used to understand and develop the field. Throughout this time, there have been college and university programs that have taught technology education and trained technology education teachers. This history also contains numerous stories of influential individuals and their contributions to technology education. However, in the past 30 years there has been a decline in technology education programs at universities in the United States. At a time when technology education and being technologically literate is so important in education the decline in technology education programs is alarming.

Utah State University (USU) has had technology-education-related courses since the school opened in 1890. Since 1912, the program has had teacher preparation courses (Agriculture College of Utah, 1912) and is currently one of the leading schools for teaching technology education and professional teacher training. This presents the question, "What are the factors associated with the technology education program at USU that have kept it open and viable?"

The purpose of this study was to compile, organize, analyze, and preserve data and personal information about the technology education program in the Department of Industrial Technology and Education (ITE) at USU from 1985 to 2005 and to determine the factors related to the vitality of the program. Data were gathered using typical qualitative methods for case studies including interviews and documents. While there

have been numerous studies and articles written about teacher shortages in technology education and the decline of university technology education programs, there have not been any studies about factors affecting the individual programs that have remained opened and successful. Similar qualitative studies about various schools, departments, and programs in the United States demonstrate that the qualitative research method is worthwhile to determine the effectiveness and factors associated with the viability of these programs. A narrative of the ITE Department and those individuals involved with the program at USU will be an important project to preserve this data, record stories, and use them for analysis to determine the factors associated with the vitality of the program and for future planning. Some of the factors predicted to be associated with the success of the program include the professional association membership of the professors, publications, curriculum, programs, associations with other organizations, and instructor dynamics.

This case study is bounded by time and location. The technology education program in the ITE Department at USU from 1985 to 2005 was the focus of the study. There were several reasons for choosing this time limitation. The beginning time period was when the field of industrial arts changed its name to technology education and the end of this time period, 2005, the department changed its name from ITE to Engineering and Technology Education (ETE). Another reason for choosing this period was that most of the professors in the department during this time were still at USU. In addition, this time frame included the tenure of one department head. Another reason is that there have been many significant events and changes that influenced general education and

technology education during this time. Finally, this is a time when similar programs at other universities have been eliminated (Gray & Daugherty, 2004; Volk, 2000). Valuable information may be lost if the stories of the individuals involved with technology education at USU are not recorded.

Statement of the Problem

The problem for this research is that while there were studies on the decline of technology education programs and the shortage of technology education teachers, there were no studies on individual successful university technology education programs and the factors that were associated with their success. There is an inadequate record of the technology education program at USU. In addition, there is a great loss when information about individuals involved with the program and its development is missing or not compiled in one document. While having an accurate record may not, in and of itself, be an important problem, the problem is having an accurate record to support and analyze the data from the contributions of those involved with the technology education program.

Purpose of the Study

The purpose of this study was to discover key factors or actions affecting the longevity of the technology education program at USU from 1985 to 2005 as well as to compile, organize, analyze, and preserve data about this program. It is hoped that this study will evoke conscientious discussion, give proper perspective, and provide possible

research paradigms for other technology education programs. The importance of doing this research now is that while primary sources are still readily available, they may become inaccessible as time passes.

Limitations

This case study was limited or bounded to the technology education program and the personnel in the ITE Department at USU from 1985 to 2005.

Guiding Questions

The questions guiding this research were as follows.

1. What contributions have the professors made that may give insight into the success of the technology education program?
2. What changes have been made in the program?
3. What knowledge can be gained from stories that can be told about the technology education program and which will be of the most worth?
4. Can these stories, if told, help develop or change technology education?

These questions grounded the research for this project. Some modifications were made as the research progressed (Stake, 1995, p. 9). One aspect of qualitative research is the flexibility required so the research questions can be developed and refined to frame the topic (Marshal & Rossman, 1989, p. 26). The research topic evolved as the study progressed (Gay & Airasian, 2003; Lincoln & Guba, 1985).

Organization of This Study

This dissertation is organized into five chapters. Following this introduction, a review of literature presents literature on technology education in the United States, the technology education program at USU from 1890 to 1985, literature on qualitative case study, and finishing with examples of similar qualitative studies to substantiate this method used in this study. Chapter III describes the methods used in this study. The findings of the study are presented in Chapter IV, and Chapter V gives the researchers summary of the study, discussion on the findings, and recommendations.

CHAPTER II

REVIEW OF LITERATURE

In this review of literature, the researcher first, presents what technology education is in the United States and the use of narrative in technology education. Second, an overview of the history of technology education at USU relating its transformation from 1890 to 1985 will be presented to set the stage for the time period of this case study. Third, the literature on qualitative case study research and narrative will be reviewed to explain and clarify the research method used for this study. Finally, a review of similar studies from the literature will be offered to demonstrate the increase use of qualitative research methods to study college and school programs.

Technology Education in the United States

To avoid confusion in this study, the term "technology education" is used as an umbrella term for manual arts, manual training, industrial arts, and technology education. Industrial education, industrial technology education (Hansen & Reynolds, 2003), and mechanical arts are names used for programs at universities and colleges where technology education is taught. At USU, these programs have always had close ties to engineering.

Technology education has its roots in industrial arts (Herschbach, 1997) or as Volk (1996) stated, "evolved," from industrial arts. Industrial arts, which had its humble beginning as simple shop work (Warner, 1951, p. vii), was also known at various times by the terms "manual training" or "manual arts" (Griffith, 1924; Mays, 1934). "Shop

class" is a more common name used by many when talking about the discipline (Hall, 2001; Rogers & Rogers, 2005). Some use this as a "pejorative" term (Pearson, 2004). Zargari and MacDonald (1994) stated technology education has been around "…in one form or another throughout time" (p. 10).

The many definitions for technology education (Chaplin, 1980; Dugger, 1994; International Technology Education Association [ITEA], 2000; Savage & Sterry, 1990; Zargari & MacDonald, 1994) are all modified (Brown, 1977; Foster, 1995; Volk, 1996) from the original definition for industrial arts given by Bonser and Mossman (1923); "Industrial arts is a study of the changes made by man in the forms of materials to increase their values, and of the problems of life related to these changes" (p. 5).

Technology education should not be confused with computer education or computer programming. Computers are a technological tool and an important part of technology education. In addition, technology education should not be confused with instructional or educational technology, which use computers to help deliver instruction (Custer, 1999; Gilberti, 1999; ITEA, 2000).

Narrative in qualitative research is the presentation of data in text form (Creswell, 1994, p. 159). Narrative has been used to teach and provide an understanding of technology education for over 100 years. Numerous narrative studies in books and articles have been written on the subject describing the development of technology education (Akmal, Oaks, & Baker, 2002; Barlow, 1967; Bennett, 1926, 1937; Foster, 1995; Row, 1909; Smith, 1981) the relationship of industrial arts and technology education with general education (Gilberti, 1999; Starkweather, 1979; Wilber, 1951), and

relating technology education to vocational education and disassociating technology education from vocational education (Steeb, 1979).

Pannabecker (1995) said that much of the history of industrial education such as Bennett's work (1926, 1937) was too "internalist" or focused "on aspects associated with industrial education but rarely interprets them in the broader social context" (p. 43). He said that a current trend is to use a contextualist approach to writing history, one that can "emphasize the particularities of the social and historical conditions…. In so doing, they have avoided the excessively deterministic implications of so many internalist histories" (p. 45). It is also the case that there is very little personal information written about many educators that were, and still are influential in industrial arts and technology education in the twentieth and twenty-first centuries. For example, Lois Coffey Mossman, the woman who coauthored the original definition of Industrial Arts (Bonser & Mossman, 1923), had very little personal information written about her short of her obituary (Foster, 1995, p. 22). Another example is Dr. Donald Hackett. In 1960, Dr. Donald Hackett and a group of his graduate students from Georgia Southern College developed an industrial arts program called the Georgia Plan (Hackett, 1964). Most of the information about the Georgia Plan was written with an internalist view omitting much of the social context and the rich description of those involved in the program development.

Technology Education at USU

Technology education at USU has a rich history. The program has existed in various forms since USU opened in 1890. The university was then known as The

Agricultural College of Utah and the program was called mechanic arts (Agricultural College of Utah, 1890). Mechanic arts was listed under the courses in mechanical engineering. The opening statement of the course description was “The growth of industrial arts springs from recent development of science” (p. 24). When the first section of the main building on campus was completed the shop classes were held in the basement (Agricultural College of Utah, 1891).

When the college first opened, there was no regular instructor of mechanical arts so a rigorous course of instruction was established to maintain integrity to the program (Agricultural College of Utah, 1890). The courses were shopwork (this is the form as it appeared in the text), skill in carpentry, and blacksmith and forging (p. 17). Shopwork was required of freshmen in agriculture (p. 20), and the freshman and sophomore year for mechanical engineering and civil engineering (p. 25). In 1894, J. Walter Mayo (The Agricultural College of Utah, 1894), “Teacher of drawing and shopwork” (p. 8), was added to the staff. The list of courses that year included technical instruction, mechanical drawing, benchwork in wood, wood turning, iron forging, steel forging, and cabinet making (p. 54). In 1897, the Department of Manual Training appeared with August J. Hansen, foreman of the woodworking department, and Julian P. Griffin, foreman of the iron working department (Agricultural College of Utah, 1897, p. 8).

Mechanical arts was listed as a department of Mechanical Engineering until 1903 when the two were combined into the School of Engineering and Mechanic Arts (Agricultural College of Utah, 1903). That same year, Sloyd was added to the coursework “for younger students not sufficiently developed to carry the heavier work of mechanic

arts" (p. 105).

In 1898, the legislature passed a law amending section 2087 prohibiting the college from offering courses in engineering and no new students were allowed in the program (Agricultural College of Utah, 1905). In 1906 engineering was dropped and The School of Mechanic Arts appeared (Agricultural College of Utah, 1906). That same year a technology course was added that

> …intended to give students an understanding of the nature of production and physical properties of the constructive materials with which he has to work…[and] practical knowledge of various forms of motion, its production and modifications as used in the class of machinery he expects to handle. (p. 105)

The Act of 1911 restored agriculture engineering to the college (Agricultural College of Utah, 1911). In addition, in that year the technology course was expanded to include sections in materials, advanced materials, and properties and characteristics of materials (p.119). Sloyd courses were dropped from the list in 1911.

The seniors in 1912 were offered a "practice teaching in shops" course (Agricultural College of Utah, 1912). This same year the technology course added shop theory and strength of material classes. In 1914, the course "automobiles" was added under the main heading of technology of mechanic arts (Agricultural College of Utah, 1914) and in 1917 aviation and aeronautics was included in the program (Agricultural College of Utah, 1917).

A major change occurred in March 1927 when Governor Dern signed the "Course of Study Bill" allowing the reinstatement of the School of Engineering. At this time, mechanic arts became a division of the School of Engineering (Agricultural College of Utah, 1927). This division offered "…a four year course leading to the degree of

Bachelor of Science in Mechanic Arts with the object in mind of training…high school shop teachers…" (p. 53).

In 1929, the legislature changed the name of The Agricultural College of Utah to Utah State Agricultural College (Utah State Agricultural College, 1929). The change to the current name, Utah State University, came about in 1957 (USU, 1957).

Principles of industrial education and history of industrial education were added to the courses in 1938 (Utah State Agricultural College, 1938) and an industrial arts major was announced in 1939 (Utah State Agricultural College, 1939). During this time, it is interesting to note that The School of Education offered a philosophy of vocational education class, methods in teaching shopwork, and practice in teaching shopwork classes (Utah State Agricultural College, 1938).

The years from 1940 to 1947 showed considerable growth and changes in the School of Engineering and the divisions. In 1947, the School of Engineering became the School of Engineering and Technology (Utah State Agricultural College, 1947). The industrial education program under the division of technology of the School of Engineering included courses in industrial arts, industrial education, and commercial photography. Driver training was taught as one of the courses in industrial arts. One of the graduates from the industrial division this year was Austin Loveless, a future professor (USU, 1962) and department head (USU, 1978) of the Department of Industrial Technology at USU. Lucy V. Heaton, a photography instructor, appears to have been the first female instructor in the department (Utah State Agricultural College, 1949).

The 1950s brought continued change to the Division of Technology of the School

of Engineering and Technology. A description given in the catalog (Utah State Agricultural College, 1951) of the Division of Technology stated,

> Beginning as a department of Mechanic Arts in 1888, this work has expanded and developed into the present Division of Technology with seven separate departments. This growth is a result of efforts of this Institution to provide for the "liberal and practical education of the industrial classes" as outlined in the original charter for land-grant colleges and universities. (p. 200)

The three major programs were: (a) industrial technology, (b) industrial education, and (c) vocational technical. The industrial arts curriculum was under the industrial education program and consisted of courses in driver training, sheet metal, recreational crafts, observation and direct teaching, curriculum problems in industrial arts, art metalwork, and plastics. The total graduates from the class of 1950 with a bachelor of science degree from the industrial education program was 53 and the industrial technology program had 74. To date, this was the largest number of graduates for both programs.

A year after Utah State Agricultural College became Utah State University, the School of Engineering became the College of Engineering (USU, 1958) with the ITE Department. In 1971, the ITE Department included two programs or divisions—teacher education and industrial technology with a head over each program (USU, 1971). In 1980, they combined the two divisions under one department head (USU, 1980). The name, the Department of Industrial and Technical Education, would remain until 1982 when the department changed its name to Department of Industrial Technology and Education (USU, 1982). In 2005, the department changed its name to the Department of Engineering and Technology Education (ETE; USU, 2005).

The period from 1985 to 2005 is a particularly interesting period of time in the

history of the technology education at USU. Many important events in technology education and general education happened just before and during this time. For example, the Jackson's Mill Industrial Arts Curriculum Theory (Snyder & Hales, 1981) was developed and published in 1981 to "…provide rationale and direction for the future of industrial arts…" (p. ii). This project was regarded by many as "…the major and most significant event that gave birth to the "modern" day technology education" (Martin, n.d.).

In addition, in 1983 the National Commission on Excellence in Education published *A Nation at Risk* and recommended developing standards to raise expectations of student achievement (Bybee, 2003; National Committee on Science Education Standards and Assessment [NCSESA], n.d.). Patzner (2001) said,

> No set of educational issues or themes dominated the decade of the 1980s more than those of workplace change and educational reform, and no single event captured the essence of many of these issues and concerns as well as the 1983 publication of the report *A Nation at Risk*. This report rocked the nation and the educational community…. (p. 43)

The publication of this document linked standards in education with national economic competitiveness in the United States (Lewis, 2000). The Nation at Risk document (A Nation at Risk, 1983) presented the dilemma the United States was in during the early 1980s concerning the country falling behind other nations in productivity, technology, science, and education. The document claimed that low educational performance was largely to blame for the country's inadequacies. The document recommended increasing required math and science credits and changing graduation requirements. This change decreased the time for electives including

technology education, thus reducing enrollment in technology education programs (Hansen & Reynolds, 2003).

In 1985, the name of the American Industrial Arts Association (AIAA) was changed to the International Technology Education Association (ITEA; Kirkwood, Foster, & Bartow, 1994). This name change reflects the emphasis on technology. The change came at a time when the shift from the industrial age to the information and technology age were well under way, computers were gaining a foothold in education and the internet was emerging.

In 1990, Savage and Steery proposed a standard, problem-solving model, sanctioned by the ITEA, called "the technological method" (Lewis, 1999). This model presented seven goals for technology education students to become technologically literate. The goals were: (a) to use the technological method to solve problems; (b) to recognize that problems and opportunities exist that can be addressed by technology; (c) to understand that technological processes can be used to satisfy human wants and needs; (d) to identify, select, and use resources within constraints to satisfy human purposes efficiently and effectively; (e) to identify select, and efficiently use appropriate technological knowledge to satisfy human wants and needs; (f) to evaluate technological processes and products in order to enhance the quality of life and the environment; and (g) to manage technological activity (Savage & Steery, pp. 31-32).

In 2000, the *Standards for Technological Literacy* were introduced after 6 years of development (ITEA, 2000). These standards, developed by IETA in partnership with the National Science Foundation and the National Aeronautics and Space Administration,

are what students should be able to know and do to be technologically literate (ITEA). Two professors in the ITE Department at USU were listed as reviewers for the *Standards for Technological Literacy* (ITEA, p. 234).

In 1985, the department name at USU was Industrial Technology and Education (ITE; USU, 1984) and in 2005 it changed to the Department of Engineering and Technology Education (ETE; USU, 2005) to emphasize the importance and the association of engineering with technology education. The department has had one department head throughout this period of time ("Parting Thoughts," 2006, p. 13).

Case Study Research and Narrative

Stake (1995) said, "Case study is the study of the particularity and complexity of a single case, coming to understand its activity within important circumstances" (p. xi). The interest in the case study is with people and programs; to understand their "uniqueness and commonality" (p. 1). Historical organizational case studies (Bogdan & Biklen, 1992; Borg & Gall, 1989) research is a common form of qualitative case study research, but with a retrospective focus. It is similar to other forms of qualitative research in data collection and interpretation (Gay & Airasian, 2003). Narrative is used in historical research. It is called various names including, stories of experience, life narrative, biography, life history, oral history, autoethnography, and autobiography (Merriam, 2002, p. 286).

"Story is a fundamental way of human knowing,"… (Doyle & Carter, 2003, p. 130) and "story is our oldest, proven motivational tool…[and] carries the shared culture,

beliefs and history of a group" (Durrance, 1997, p. 26). Wright and Barella (1981) said, "Any decisions about the future…depend upon an interpretation of history. Yet the study of history by itself cannot solve our present problems. It can, however, help us see the problems with more clarity and plan for their solution more intelligently" (p. 16). "As a story is told and questions are asked, the meaning of the story becomes clearer for the teller as well as the listener(s)" (Norum, 2000). Eisner (1991) said, "We make our experience, not simply have it" (p. 60). Stories or narratives and the use of narratives give first-person accounts of experiences (Merriam, 2002, p. 286).

Staudenmaier (1989) said, "Historical research is a dynamic process punctuated by moments of choice when one or another of activities comes to central focus" (p. 19). Unlike traditional research, historical research and the use of story does not break down, reduce, or decompose into discrete or single variables, but uses design methods to study the problem capturing the complexity, entirety, and interconnectedness of the phenomenon (Carter, 1993, p. 6; Flick, 1998, p. 5). The historical researcher looks at the larger structure and the individual to gather and interpret information about social networks and social interactions, ideologies, and cultural issues to make sense of themselves and the environment (Creswell, 1998, p. 51; Musson, 2004, p. 34).

Validity in qualitative studies is not obtained the same way as in quantitative studies. The debate over validity in qualitative and quantitative studies is a complete study in itself (see Creswell, 1998; Light & Pillemer, 1982; Lincoln & Guba, 1985; Patton, 1990). Patton said,

> Validity in quantitative research depends on careful instrument construction to be sure that the instrument measures what it is supposed to measure…. In qualitative

> inquiry *the researcher is the instrument*. Validity in qualitative methods, therefore, hinges to a great extent on the skill, competence and, rigor of the person doing the fieldwork. (p. 14)

Stake (1995) said, "Quantitative researchers have pressed for explanation and control; qualitative researchers have pressed for understanding the complex interrelationships among all that exist" (p. 37).

Trustworthiness, a term used by qualitative researchers, is a "reformulation of the concept of validity" (Flick, 1998). Guba (1981) presented four terms for trustworthiness, in place of the conventional terms, that fit the naturalistic or qualitative method. Credibility, the truth value, is used in place of internal validity; transferability, or applicability, replaces external validity or generalizability; dependability, or consistency, for reliability; and confirmability, the neutrality aspect, is used in place of objectivity. Credibility is obtained by prolonged engagement, persistent observation, triangulation, peer debriefing, member checking, and negative case analysis. Transferability is obtained by using thick description (Lincoln & Guba, 1985). According to Patton (1990), thick description is solid descriptive data (p. 357). Stake (1995) said, "Thick description is not complexities objectively described, it is the particular perceptions of the actors…stimulating of further reflection, optimizing readers' opportunity to learn (p. 42)." This thick description is presented using "…extensive quotations, to make the subjects' experience come alive for the reader" (Slavin, 2007, p. 143).

Creswell (1998) recommended using at least two of the following procedures or techniques to obtain trustworthiness or validity in a qualitative study: (a) prolonged engagement and persistent observation; (b) triangulation or using multiple and different

methods, investigators, and theories to corroborate evidence; (c) peer review or debriefing to provide an external check on the research; (d) negative case analysis is where the researcher refines or changes the hypotheses as the work advances; (e) clarifying researcher bias so the reader understands the researchers position or biases; (f) member checks is taking data and analysis back to the participants so they can judge the accuracy and credibility of the account; (g) rich, thick, or detailed description allowing the reader to transfer information to other settings; (h) external audits allow external consultation with an auditor that has no connection with the study (see also Guba, 1981, p. 219; Merriam, 2002, p. 31).

Analysis of Similar Qualitative Studies

The purpose of this study is to collect, organize, analyze, and preserve data and personal information about the technology education program at USU. Evidence from similar studies on other schools, programs, and departments affirm that this type of research is valuable.

An electronic review of journals associated with technology education did not reveal qualitative studies of specific technology education university programs. The journals reviewed were the *Journal of Industrial Technology Education* (*JITE*), *Journal of Technology* (*JTE*), *Career and Technical Education Research* (formerly the *Journal of Vocational Education Research*), *Journal of Career and Technical Education*, and the *Journal of Technology Studies*. A review of the Technology Education Graduate Research Database (TEGRD): 1892-2000 revealed only two (Barber, 1977; Ezell, 1982)

qualitative studies on university technology education programs. Since only two studies on technology education programs were found, the search was broadened to include other qualitative studies on university programs and departments. An electronic review of the library digital dissertations abstracts/ProQuest revealed ten historical qualitative studies (Abreo, 2001; Barber, 1977; Barnette, 2001; Burley, 2004; Ezell, 1982; Liverman, 2000; Moerer, 2005; Morrison, 2005; Smith, 2005; Tuman, 1993) of universities, university departments, university programs, a foundation and a high school. Of these studies, only two, the same two from the TEGRD search, were qualitative historical studies on specific university technology education programs.

The Moerer (2005) study used a longitudinal case study including phenomenological methods. However, a close look at the Moerer study reveals that the method she used had a common theme with the other studies examined for this review. This is evident from the purpose of the Moerer study, which is to record experiences of former collegiate counselors and make a significant historical contribution to increase research to build upon. The phrases "record experiences," "make a significant historical contribution," and "increase research" are similar to terms used in the other studies.

Smith (2005) used the phrase "organize and present history" and "provide direction and guidance for future planning and goal setting." This is similar to Ezell's (1982) purpose to compile and interpret a comprehensive and accurate history. The study by Abreo (2002) was to "understand the dynamics" and "provide a framework of study." Morrison (2005) "determined significant events of the history" in his study. To "analyze events that shaped the program," "gather scattered records," "review concepts," and

"contribute to the body of knowledge" were the words Tuman (1993) used. Burley's (2004) purpose was to explore the historical emergence of the department. Compare that to Barnette's (2001) purpose to study the emergence and subsequent growth with special attention to the instrumental figures in the department's history. In addition, Liverman's (2000) purpose was to write a definitive history. Liverman also specified that "the significance of this effort must not be lost" (p. 3), a reminder to the importance of this study.

The main focus of most of the studies (Abreo, 2002; Barnette, 2001; Burley, 2004; Ezell, 1982; Liverman, 2000; Moerer, 2005; Tuman, 1993) reviewed were implied or embedded in the text of the report; however, Barber (1977), Smith (2005), and Morrison (2005) gave specific points they were examining. Barber's research was broken down to study enrollment trends, faculty, curriculum, and physical facilities. Smith focused on institutional purpose, faculty, curriculum, accreditation, student access, funding, facilities, Board of Regents and political support, urban growth, business support, and alumni support. The perceptions of corporate decisions, factors that influenced the decision making process, and to consider mistakes and missed opportunities were the main focus of Morrison.

The data collection from all of the studies were from interviews and documents except for the Ezell (1982) dissertation, which only reported using historical records, periodicals, and publications, no interviews. The documents that were specified in the other studies were: archival documents, memos, correspondence, minutes, and speeches (Smith, 2005); media articles, reports, and a dissertation (Abreo, 2002); university

records and documents Morrison, 2005); archival data (Moerer, 2005); logs, reports, minutes of meetings, diaries, and newspaper accounts (Tuman, 1993); university histories, reports of the presidents, institutional documents from the university archives, letters, individual department histories, and course announcements (Burley, 2004). Liverman (2000) reported using quantitative records and data from documents. In addition to interviews Barber (1977) collected data from bulletins, official university records, department records, and a study.

Summary

In this chapter, a brief history of technology education was presented with definitions of the program. Then the history of the technology education program at USU from the opening of the school in 1890 to 1985 was given. Next, the literature on qualitative studies, particularly case study and narrative was reviewed. Finally, the data was presented in this review of literature, which validates reasons for conducting a similar qualitative study of the technology education department at USU. There have been comparable studies of other programs, departments, and institutions that demonstrate the value of this method to organize, understand, expand, and present data of historical and social importance that can be used to evaluate, improve individuals and programs and add to the knowledge base. In the next chapter, the methods used in this research will be described.

CHAPTER III

METHODOLOGY

A naturalistic inquiry using case study methods was made of the technology education program in the ITE department at USU. The purpose of a qualitative case study is to seek greater understanding and advance knowledge of a given topic (Stake, 1995; Yin, 2003). A case study has clear boundaries (Cresswell, 1998) and includes historical and qualitative data to search for meaning and understanding (Cresswell; Merriam, 2002). The purpose of this study was to compile, organize, analyze, and preserve data and personal information about the technology education program in the ITE Department at USU from 1985 to 2005 and to determine the factors related to the vitality of the program.

In case study, as in all qualitative studies, the researcher is the primary instrument of data collection and analysis (Borg & Gall, 1989; Merriam, 2002). The primary source of data for this study was taken from transcripts of interviews with the professors in the technology education program of the ITE Department at USU from 1985 to 2005. Historical documents, newsletters, reports, journal articles, newspaper articles, other published materials, and personal observations and communications were used as support or secondary data.

Purposeful selection (Bogdan & Biklen, 1992; Lincoln & Guba, 1985; Patton, 1990) was used to select those interviewed. This type of sampling provides rich information that we can learn from (Patton). The stories or narratives obtained through the interviews provided first-person accounts of experiences (Merriam, 2002, p. 286).

The professors who were selected to be interviewed were Maurice Thomas, Kurt Becker, Gary Stewardson, Ed Reeve, Doug Hammer, Ward Belliston, and Jay Hicken. These were the department professors who were directly involved with the technology education program during the period of the study.

One difficulty with working on this case study was that the names have not been replaced with pseudonyms. Great care was taken to provide anonymity to quotes. Permission was granted from professors when their name was linked with direct quotes that were used in the narrative. Other quotes from the interviews that bring out or emphasize themes were used for triangulation (Stake, 1995). No identification was made on these quotes. The generic term "professor" was used.

Data Collection

Permission to conduct this research was obtained from the USU institutional review board. Written permission was acquired from those interviewed (see Appendix A). All recorded material was kept in a secure location. The researcher transcribed the information from the audio taped interviews and the information on the audio tapes was destroyed after transcriptions were completed. Confidentiality was maintained by coding the interview transcriptions and determining themes specific to the purpose of the research. Permission to use identified direct quotes taken from the interviews was obtained from the individuals interviewed. The participants were selected according to their involvement with the ITE Department at USU from 1985 to 2005.

A pilot interview was conducted with an instructor in the School of Engineering

to check questions, researcher's questioning ability or form, and equipment. The interview was recorded on a cassette recorder using the condenser microphone built in the recorder. However, the condenser microphone had too much interference from the recorder mechanism so individual microphones were used for actual interviews.

The initial contact for permission to interview the participants was in person, by phone, or email. A mutual time and location was agreed on for the interviews. Three interviews were held in a private conference room, two were held in the participant's office, and two were held in the participant's homes. One interview was interrupted briefly while the participant answered a phone call. The interviewer began with a brief description of the study and provided time for the interviewees to read and sign the interview permission form (Appendix A). The interviews took place in May 2007. Interviews were of the unstructured type (Fontana & Frey, 2005) using in-depth, open-ended questions. The interviews lasted from approximately 45 minutes to an hour and a half.

Data Analysis

Data analysis was open ended and inductive. This method provided a continuing unfolding of inquiry and lead to maximum understanding of the phenomenon being studied in its context (Borg & Gall, 1989; Johnson, 2004; Lincoln & Guba, 1985). According to Patton (1990, pp. 374-376), you can obtain descriptive analysis by grouping together answers from common questions that are asked to different people about different views on central issues. Descriptive analysis answers basic questions for

programs (Patton). Description comes first using "thick description so others reading the results can understand and draw their own interpretations" (Patton, p. 375). Stake's (1995) definition of thick description was, "Not complexities objectively described, it is the particular perceptions of the actors.…stimulating further reflection, optimizing readers' opportunity to learn" (p. 42). Lester (n.d.) suggested using extensive quotes from the participants to illustrate points. The researcher used extensive quotes to identify and elaborate on the themes.

Member checking was used for validation of data from the interviews (Appendix B). The researcher outlined the interviews and sent the outlines to those that had been interviewed to obtain "meaning" (Bogdan & Biklen, 1992; Stake, 1995). The intention is to try to get the participants interpretation of the interview as close as possible (Stake, p. 32). Member checking was also used to verify personal data in the biographies and content, meaning, and permission to use identified quotations.

Reading a transcript from an interview can be very different and more difficult than reading something that has been thought out and written (Stake, 1995, p. 66). Some thoughts changed in mid sentence or were not completed. Conversational language can be coarse and jumpy or "disjointed" as one professor stated after reading a quote from his interview. The researcher found that even in the direct quotes used in the outlines of the interviews, the interviewee would change the wording to be more grammatically correct or sound better. The researcher felt this changed the spontaneity or "voice" of the original text from the interview. Some of the identified quotations were edited, with the professors' permission, to read better and not be so disjointed.

Many times the person being interviewed would get off topic and drift to other topics and jump around with various answers. These diversions could cover a half a page or more in the transcript. The researcher found that these diversions provided additional useful data.

The method of using an outline of the interview transcripts not only helped the researcher extract themes, it condensed the data and made it easier to find themes and categorize. As the researcher reviewed the notes from the interviews and reread the transcripts, the data from the outlines had minimal if any change in meaning even after a period of time between the reviews of the transcripts and outlines.

Outlines of the interviews were sent to the professors for review/edit prior to the actual interview. Doctors Thomas, Belliston, and Becker made no changes. Dr. Reeve made some comments and some additions. Dr. Hammer made some changes, comments for clarification, and added information for his vita. Dr. Hicken made some minor changes mostly to clarify information and some comments. Dr. Stewardson made some minor changes. A professor not involved with this research provided a peer review of the paper.

Themes began to emerge from the very first interview. These themes were written down as notes by the researcher as the interview proceeded. The themes continued to appear throughout the interview process, the transcribing, outlining, reading, review, and rereading. The themes were then grouped into categories. Originally, there were four main category headings for the themes: relationships, leadership, program direction and changes, and other. These four were condensed into two main categories—relationships

and program direction. Relationships appeared to encompass the data from the leadership category. Program direction and changes was shortened to just program direction. The themes where: faculty, relationships with the State Office of Education, relationships with the deans, relationships with industrial technology, relationships with the College of Engineering, the stepchild of engineering, relationships with the College of Education, relationships with other colleges and departments at USU, relationships with professional organizations and other universities and institutions, international relations, curriculum, inservice/workshops/extension, the technology education name, the graduate program, and the professors' philosophy of technology education.

When the interviews and transcriptions were completed the researcher made a theme page for each interview. The themes from the individual interviews were then grouped on one main theme page under the major themes with significant quotes related to that theme.

A detailed description of the case and its setting is an important aspect of data analysis in a case study (Creswell, 1998, p.153). A description of the setting of the ITE Department was presented with the findings.

Researcher Bias

Having received two degrees in ITE at USU and working on a Ph.D. in curriculum and instruction with an emphasis in ETE, the researcher has definite ties and bias toward the program and department. In qualitative research, the researcher detects bias and uses various strategies to minimize the effects of the bias on the research (Gay &

Airasian, 2003). Therefore, as with all qualitative research, the burden of neutrality will shift from the researcher or methods to the confirmability of the data using triangulation (Guba, 1981, pp. 81-82). Triangulation is using more than one method of looking at data (Patton, 1990). Stake (1995, p. 147) used different quotations from interviews to define or describe a theme giving validation by triangulation. This procedure was used extensively throughout this study. In addition, analyzed data from the interviews was member checked and peer reviewed to provide multiple perceptions to clarify meaning (Stake, 2005).

CHAPTER IV

FINDINGS

The purpose of this study was to discover key factors affecting the longevity of the technology education program at USU from 1985 to 2005, as well as to compile, organize, analyze, and preserve data about this program. According to Creswell (1998), a detailed description of the case and its setting is an important aspect of data analysis in a case study (p. 153).

In this chapter, the stage will be set for the findings by first describing the setting of USU and the technology education program during the period of the study. The themes and the categories of the themes that were derived from the interviews will be presented and these will be validated by triangulation using quotes from the different professors interviewed (Stake, 1995). The faculty will be introduced, brief biographies of the seven professors interviewed will be given, and the findings of their interviews presented. Finally, the professors' thoughts on the future of the technology education program at USU and a summary of the findings will be given.

USU is a land-grant institution founded in 1888. It opened its doors to students in 1890. The current campus student body consists of approximately 15,000 with an enrollment in all its programs and on all campuses about 23,000. The on-campus student enrollment in 1985 was 11,804 (*USU Bluebook*, 1985) and in 2005 the on-campus school enrollment was 14,458 with 275 students enrolled in the ETE program. Of those 275 students enrolled in ETE, 38 were enrolled in teacher education (Enrollment History, n.d.; Enrollment Summary, 2005). These numbers vary slightly depending on the source.

During the time of this study, the ITE Department was in the College of Engineering. Dean Bruce Bishop was the dean of the college from 1982 to 2002 and Dean Scott Hinton became dean in 2002.

The university is located in the city of Logan, Utah, in Cache Valley on the north side of the state. One professor described it this way.

> [T]he quality of life here in Logan is: it's a safe family environment. It's a good place to raise a family. You have a beautiful valley here. People say you have a beautiful valley and you pay ten thousand dollars for a view of the mountains in salary. So I think that's another factor. It's been a good quality of life here for the most part. Sometimes the culture can get to you. It's a religious culture here….You have to be able to adapt to the culture. If you don't adapt, if you are not a member of the predominate religion…you won't stay long. I've seen that happen. People move in who could not really adjust to the cultural lifestyle. It's a unique cultural lifestyle.… It's not like anywhere else you go in the world can be the same thing, but you have to adapt. If you can't adapt you are going to fail.

The student body population for undergraduates in the technology education program consists mainly of white males with very few females and usually no minority or foreign students enrolled for each of the last 10 years of the study (Appendix D). The low numbers of females and minorities in technology education programs, or Engineering for that matter, has been a point of discussion and research for many years.

One professor shared this insight into the reason students come to USU's technology education program. "A lot of them come here just because they want to come to USU, then they try to find a program. They don't come here for the program all the time…." He also added, "We had a lot of students that changed majors and decided they didn't want engineering and came over to our program."

The technology education program at USU during the research period was housed mainly in the Industrial Science building near the east portion of the campus. It is a one-

story building with a partial basement. The building was constructed in the later part of the 1960' ("New Industrial Science Building," 1968). The building originally had four main labs, one smaller lab, a couple classrooms, a conference room, and some offices on the main floor. The small lab was originally used for crafts and industrial plastics, then for principles of technology, and currently for project development. One of the labs has always been used by the Department of Manufacturing Engineering. Another main lab was used as the welding lab, but during the period of the study, welding was moved to the Technology building just south of the Industrial Science building. The lab was divided into a classroom, computer graphics/communications lab and the computer electronics lab. The other main labs in the building used by the ITE Department have always been the wood-based manufacturing/building construction systems lab and the metals/manufacturing systems lab. Except for some rearranging of equipment and acquisitions of some new equipment, there had been few changes to these two labs during the time of the study. One of the professors made the comment that when he was hired he was glad to see they had not disposed of all the equipment.

In 1982, portions of the basement, which had been used for storage and a fallout shelter, were remodeled into two manual drafting labs. One of the labs has been updated through the years to include a computer-drafting lab with various computer aided drafting (CAD) programs being taught at any particular time. Dr. Hammer (personal communication, May 2007) said when he began teaching in 1984, he had the challenge of running the drafting program using only an old Apple IIe in a basement room that was originally designed as an elevator shaft. "We put together a pretty decent CAD program

over the next 3 or 4 years." Another room in the basement was used as a graphic arts lab. In the late 1990s it was converted into the graduate student offices—a long, narrow room with some surplus desks and file cabinets. This researcher often called it "the cave."

Emergence of Themes

In the introduction section of this study, some factors were presented, or predicted, that may have been associated with the success of the technology education program at USU during the period of the study. These factors were professional association membership of the professors, publications, curriculum, programs, associations with other organizations, and instructor dynamics. The study revealed some themes, presented by the professors in the interviews, that are similar and some that contrast with the factors originally predicted.

From the beginning of the interview process, themes began to emerge and more appeared as the interviews progressed. During the transcribing process, additional themes became apparent and the themes continued to develop as the transcripts were read and reread, outlined, and reread again. The themes were placed into two categories: (a) relationships and (b) program direction. The themes will be presented in this order, first: relationships with faculty including brief biographies of the professors who were interviewed, relationships with the State Office of Education, relationships with the deans, relationships with industrial technology, relationships with the College of Engineering, Stepchild of engineering, relationships with the College of Education, relationships with other colleges and departments at USU, relationship with professional

organizations and other universities and institutions, and international relations. Under the category of program direction, the themes were curriculum, inservice/workshops/ extension, technology education name, the graduate program, and the professors' philosophy of technology education.

The interviews revealed positive and negative aspect of these themes. The quotes presented from different professors for each theme validate the findings. Examination of these themes revealed factors related to the longevity of the technology education program.

Relationships with Faculty

During the period of this study, the technology education program at USU had a stable and diverse faculty who worked well together. All professors interviewed for this study were with the technology education program during the research period. These brief remarks from the professors about other faculty members describe their traits. "Faculty members…weren't stuck in a mold. They were…progressive faculty members…." "Probably one of the most positive things of being at Utah State is the camaraderie within the department, of the professors, the willingness to work together." "We were…lucky for a period of time to hire a core of faculty members that have pretty much stuck with us and they've been well known nationally." "There [has been an] absence of any reluctance on the part of the key faculty to embrace the philosophy of technology education.… We had a diverse core that could work together." "We…came with good strong tech ed backgrounds. I think that's a real important factor. And they are

all a little bit different. They are not all the same and that's real important." "There's been very little bickering."

This extensive description of the faculty in the technology education program was given by one professor:

> At that time there were hard workers, extremely hard workers, there were no slackers involved. Often we got paid ten months and we worked eleven or twelve months. People were here early and we stayed late. Most of my career I worked Sunday…. We always worked fifty, sixty hours. You would come in here in the evening. You would always see your colleagues. That was important that we all had this. A blue collar work ethic, we were hard workers. Everyone worked all the time. I guess you could ask our spouses. A big factor is that…we didn't have any slackers in the Tech Ed side. Everybody worked here. It was very common to see people working on the weekends here and the off summer months. We weren't getting paid but we were still trying to work…. A lot of people weren't getting paid. They were just doing it because they enjoyed it and it was part of their job. So for many, many years part of the factor, people worked, I can't say without pay…the monetary pay, it was job satisfaction, working to the department, working to what you believed in and you didn't really care about the money…. So that is one important factor, work....most of my career here has just been unbelievable.

That does not mean it was always smooth sailing. Sometimes there were feelings of lack of support as made evident by this remark, "I've also felt…like I was on a limb to succeed or to fail all by myself…not what I would consider a great deal of department support." Sometimes there was resistance to changes. One professor observed:

> We got the new dean in place and…[he] indicated that our department will become more focused on research…. I think some went along with that and some did not. So others in the department have done similar to what I have. They have embraced this and moved forward. Others have resisted and are trying to hold on to the old way in some ways, but it's just very difficult to do…. As much as some people would like…some days I feel the same way, (laughter) to go back to the way it was…. I just taught my classes and had a good relationship with students. It's not a bad deal.

Another professor made this comment, "Some would like to see it go back to what it was,

I'm sure. And some were real hesitant in making change happen…and dug their feet in and made it really hard." Interestingly enough, one of these remarks was made in respect to the beginning of the period of this study and one was made about the last 2 years of the study.

The interview questions in this research did not focus on students. When the faculty mentioned students, it was usually in reference to participation in programs, student enrollment, or student achievement and praise. One professor provided this goal of what he wanted to accomplish as a new faculty member in the program.

> I think the most important thing you want to do, any teacher wants to do, is see their students do well. I don't think I went in necessarily wanting to change the world. I just went in ready…to give…students as much of my experience as I could, to help them to really do well and [then] get out of the way because my notion is: They can take what you can give them and then put what they've got with it and become better than you are anyway. It's exciting. It's fun to see. It's fun to take a group of students and say, "OK, here's what we've got to do. I can help pull resources. I can make things happen, but in the end you've got to put in the time and work."….[To] watch them succeed. Watch them excel. I think that's the real purpose of what we do.

Biographies

Dr. Maurice Thomas

Dr. Maurice Thomas came to USU in 1982 as the ITE Department head, a position he held until 2005. He came during a time of major change in both technology education and in the department.

Upon completion of his bachelor of science degree in ITE from USU in 1962, he taught industrial arts in Calgary, Canada, until 1965. During this time, he completed his master's degree in ITE from USU. Thomas received his Ed.D. from Texas A&M

University in 1968 at which time he became a professor at Colorado State University in the Department of Industrial Science, a position he held until his move to USU in 1982. Dr. Thomas also holds a post doctorate degree in industrial design received in 1976 from Arizona State University. He has taught at least one class every semester during his 22 year run as department head ("Parting thoughts," 2006).[1]

Dr. Thomas supported the faculty and the program in many ways. One professor said. "Maurice Thomas as department chair gave me lots of support to do things that I would be interested in…. He was very supportive in allowing me that freedom to go down that path and as long as you didn't screw up he wasn't going to get in your way. Another professor remarked, "Probably the biggest influence was the department head, Maurice Thomas, at the time. He was supportive. He was really supportive of this faculty…. When I said, 'there is an opportunity here, should I explore this?' He said, 'Go for it." In addition, "Maurice was a good mentor."

His support for the program was observed by these professors, "I think he brought a great deal of zest to our program and kind of helped us stay on track. Or get on track, maybe." Moreover, "We had a department chair who, in my perspective, hired the best people we could from across the country."

Dr. Jay Hicken

Dr. Jay Hicken came to USU in 1968. He received his B.S. in industrial arts at Brigham Young University (BYU) in 1963, a master's degree in industrial education from Stout State University in 1967, and his Ph.D. in administration and supervision in

[1] Visit the department website at http://www.neng.usu.edu/ete/faculty.htm for additional information about Dr. Thomas.

vocational education from Colorado State in 1976. He was a teaching assistant in drafting at BYU for the 1962-1963 school year. From 1963 to 1966, he was a junior high-senior high school instructor in woodworking/cabinet making and general materials and processes in the Wasatch County School District in Heber, Utah. After receiving his master's degree from Stout State, he taught senior high school woodwork, drafting, and experimental approach to plastics and new materials from 1967 to 1968 in the New Trier Township School District in Winnetka, Illinois ("Jay C. Hicken," 1969). In January of 1990, Dr. Hicken took over a year of professional leave to be the technology education specialist for the Utah State Office of Education (J. Hicken personal communication, May 18, 2007). In 1998, he was part of a team to Thailand as an international construction and carpentry specialist for the *Thailand Skills Development Project*, a project spearheaded by USU to improve the Asian economy (Shiverdecker, 1997). He retired from USU in 1999 but continued to teach various classes and do recruiting work for the department through the remaining time of this study.

Dr. Doug Hammer

Dr. Doug Hammer was a professor at USU from 1984 to 1988 teaching design drafting technology. He was involved with teacher education and was graduate program coordinator (D. Hammer, personal communication, May 22, 2007). He received his B.S. in industrial arts education from USU in 1968, his M.Ed. in educational administration from USU in 1974, and his Ed.D. from the University of Idaho in 1984 ("Doug Hammer," 1986).

Before coming to USU, he taught in Idaho: 1 year of sixth grade, 5 years of junior

high, and 4 years at the high school level. Dr. Hammer was also in a high school administration position for 2 years and 10 years in the Idaho state department as a curriculum specialist in industrial arts/technology education. During a portion of this time, he was also a research specialist at the state level (D. Hammer, personal communication, December 6, 2007; "Doug Hammer," 1986). His professional and research focus was on technology education and the transition necessary to keep up with developments in instructional technology and technology education.

Dr. Ward Belliston

Dr. Ward Belliston came to USU in 1984. He began the computer electronics program. He received his B.S. from USU in 1967, his M.A. from Arizona State University in 1973, and his Ph.D. from Colorado State University in 1977. Before Dr. Belliston came to USU, he taught electronics and drafting in the Department of Industrial Education at Eastern Arizona College, electronics and automotive at the Church (The Church of Jesus Christ of Latter-day Saints) College of Hawaii, and began his career teaching electronics at Eastern Arizona College.

From 1985 to 2003, Dr. Belliston was the division chair of the computer electronics technology program (W. Belliston, personal communication, May 21, 2007). He was an international Electronics Specialist consultant for the *Thailand Skills Development Project* from 1998-1999 (Shiverdecker, 1997). Dr. Belliston has published works on GPS systems and computer networking and has done consulting work for and rebuilt various radio stations.

Dr. Edward M. Reeve

Dr. Edward M. Reeve received all of his degrees from the Ohio State University. In 1978 he obtained his B.S., in 1979 he obtained his M.S., and in 1986 he received his Ph.D. From 1979 through 1982, Dr. Reeve taught industrial arts at Columbia High School, in Columbia Station, Ohio. From 1985 to 1987, Dr. Reeve was employed as an instructional specialist in the instructional materials lab at The Ohio State University (E. Reeve, personal communication, June 18, 2008).[2]

In 1987, Dr. Reeve took his first professorial job as an assistant professor in the ITE Department at USU. One of his early teaching assignments was in the area of communication technology. In this area, he worked with students to develop projects related to video production, and using computers for communication technology. The communications technology lab has undergone several changes in the 20 years since Dr. Reeve came. He said, "I think we had one or two Apple II computers in there when I got here" (E. Reeve, personal communication, May 22, 2007).

In 1995, the department began to "push an international agenda." During that same year, Dr. Reeve participated in a fact-finding mission to Bangladesh to learn about how vocational education was practiced in that country. In 1998, Dr. Reeve and other professors in the department began work on the Thai Skills Development Project in Bangkok, Thailand. In this project, he served as the "technical literacy" consultant. Dr. Reeve has also been Fulbright Scholar (2001) and the recipient of two Fulbright Senior Specialist grants (2003 & 2007; E. Reeve, personal communication, June 18, 2008).

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[2] Visit the department website at http://www.neng.usu.edu/ete/faculty.htm for additional information about Dr. Reeve.

In 2000, the International Technology Education Association (ITEA) *Standards for Technological Literacy: Content for the Study Technology* (2000/2002) was released. Dr. Reeve has been involved in the standards movement. He has been a national "standards specialist" for the ITEA, a reviewer of ITEA standards materials (e.g., *Advancing Excellence in Technological Literacy: Student Assessment, Professional Development, and Program Standards*, ITEA, 2003), and the primary curriculum writer of an ITEA standards-based curriculum (personal communication, June 18, 2008).

Dr. Gary Stewardson

Dr. Gary Stewardson came to USU in 1989 to run CAD program (G. Stewardson, personal communication May 23, 2007). He eventually moved to the manufacturing systems and robotics programs. Stewardson received his B.S. from Illinois State University in 1976, his M.S. from Eastern Illinois University in 1980, and his Ph.D. from the University of Maryland in 1987. He taught at Lincoln-Way High School in New Lenox, Illinois from 1976 to 1979 and taught Industrial Automation and Robotics lab at Thomas Jefferson High School for Science and Technology in Alexandria, Virginia from 1987 to 1989.[3]

Dr. Stewardson was involved with the *Thailand Skills Development Project* in 1998 as an international machining specialist (Shiverdecker, 1997). He has also been extensively engaged as a consultant on projects involving job and task analysis and skills training for organizations such as Kennecott Copper and the U.S. Department of Labor and has developed the Quick Start training program in the countries of Hungary,

[3] Visit the department website at http://www.neng.usu.edu/ete/faculty.htm for additional information about Dr. Stewardson.

Macedonia, Bulgaria, and Poland.

Dr. Kurt Becker

Dr. Kurt Becker came to USU in 1994 to oversee the CAD program and work with the teacher education program. Prior to that, he worked for 7 years at California State University at Long Beach where he coordinated the CAD program and teacher training. While at California State University at Long Beach, Dr. Becker became an associate professor. One of Dr. Becker's goals when he first came to USU was to help build the graduate program. Since 2002, he has been heavily involved in applying for and coordinating research funding (K. Becker, personal communication, May 23, 2007).

Dr. Becker received his B.S. from Southeast Missouri State University in 1977, M.S. from Sam Houston State University in 1983, and his Ph.D./M.E. from Texas A&M University in 1988.[4]

In the mid 1990s, Dr. Becker played a major role in the international direction of the ITE Department. He worked on technical training projects funded by the Asian Development Bank, World Bank, and U.S. Department of Labor, USAID. Countries where he has worked include Bangladesh, Bulgaria, China, Macedonia, Poland, Romania, and Thailand (personal communication, June 18, 2008). Dr. Becker was the instructor training specialist with the team that went to Thailand in January of 1998 as part of the *Thailand Skills Development Project* (Shiverdecker, 1997).

Dr. Becker's (personal communication, June 18, 2008) areas of research include adult learning cognition, engineering education professional development, and technical

[4] Visit the department website at http://www.neng.usu.edu/ete/faculty.htm for additional information about Dr. Becker.

training. His publications include topics in international training and technology education, and instruction.

Currently, Dr. Becker is a professor and the department head of ETE. He is the co-principal investigator for the National Science Foundation (NSF) funded *National Center for Engineering and Technology Education* and Principal Investigator for the NSF funded project: *Communities of Effective Practice: A professional STEM Development Partnership Model for Teachers of American Indian Students*. He works with the technology teacher education program in the department and teaches undergraduate and graduate courses in methods of institutions of higher education. He is currently a consultant on a USAID-funded project that involves workforce development and enterprise competitiveness (K. Becker, personal communication, June 18, 2008).

Table 1 lists the professors interviewed and dates of service in the Department of Technology Education at USU, and graduate schools attended.

Relationship with Utah State Office of Education

The first theme that came to the attention of this researcher early in the process of conducting the interviews was, as one professor put it "We've always had a real good working relation with the Utah State Office of Education." Another professor explained a reason for the longevity of the technology education program at Utah State this way,

> I think one of the things that was helpful was the fact that…[we] had a pretty good relationship with the state office and I think that…a lot of the grants came from the state and…[we] had a direct line of communication there which gave lots of support from the state. I think the state was a big issue there.

Table 1

Technology Education Department Professors, Dates of Service, and Graduate School(s)

Professor	Dates of service	Graduate Schools
Dr. Maurice Thomas	1982-2006	USU, Texas A&M
Dr. Jay Hicken	1968-1999	Stout State, Colorado State
Dr. Doug Hammer	1984-1988	USU, Idaho State University
Dr. Ward Belliston	1984-present	Arizona State, Colorado State
Dr. Edward Reeve	1987-present	The Ohio State University
Dr. Gary Stewardson	1989-present	Eastern Illinois University, University of Maryland
Dr. Kurt Becker	1994-present	Sam Houston State, Texas A&M

Another made this remark, "I think [our] State Department (Utah State Office of Education) helped keep [us] alive and will as long as [we are] worth keeping alive. Most state departments have not let them live. It can happen." Still another professor confirmed this saying, "That was an important link [with the State Office]…talking about what we have done in order to be successful. We always need that state link."

One important factor that came out of the relationship with the state office was the grant money received from the state. One professor shared this on the use of grant money from the state, "An important aspect of the close relationship with the State Office of Education was the grant money and funding provided…we would get funding from the Utah State Office of Education to help develop curriculum." Another professor gave this reason for state support, "I think we worked [well with] the State department and that's pretty critical if you're going to get… some funds that flow. There's PR that happens. There's all kinds of things that come out of that bureaucracy."

This relationship with state office required professors that knew what was

happening at the state level regarding technology education. One professor, speaking of another professor, made the comment that, "…he was really attuned to what was happening in the state of Utah. So we had this real strong connection to the…state department."

Engineering Deans

Dean Bishop

Dean Bruce Bishop[5] was the dean of the College of Engineering from 1982 to 2002. He came to the Department of Civil Engineering at USU in 1971. He was appointed to be dean the same year Dr. Maurice Thomas came to USU to be the head of the ITE Department. Bruce Bishop received his B.S. and M.S. from USU in 1965 and 1966, respectively. In 1970, he received his Ph.D. in Engineering Economic Planning in Civil Engineering from Stanford University. Dean Bishop was appointed as Acting Provost at USU in 1993. One professor said of Dean Bishop that he was influential in helping technology education move out of "second class" status in the College of Engineering. When he came, "our department was invited to the engineering retreats and a lot of the faculty meetings." Other professors made similar remarks. "I think he treated us fair so when monies came available, we may not have got the same as Civil, but we got some of it." "The other thing that [Dean Bishop] did was he gave the department viability and authenticity. For many years the faculty and the department really felt like second class citizens in the College of Engineering." "I think we had good support all the

[5] Visit Dean Bishop's website at http://www.neng.usu.edu/cee/faculty/BruceBishop.html for additional information.

way from our Dean…and I think he got to know what we did and saw the value of technology education and I think that's what the support there comes from." "When Dean Bishop was here I thought we had great support from the college. Dean Bishop was very supportive."

Here is another description of Dean Bishop.

> [He] didn't have all that keen of interest in technology education, not even Industrial Technology for that matter, but I thought he was an outstanding administrator who was fair and supportive who wasn't afraid to take a risk. He was a good judge of faculty and he was firm when he needed to be. We tried a bunch of stuff and if it didn't work out his response was, "Well, we made the best decision we could with the information we had at the time," so there was never any holding anything over your head.

Contrast those comments with this remark from a professor, "During those years we had a Dean who, I'm not sure championed us (in a questioning tone) but realized that we had a role in education and … we happened to fill that role in his college and he didn't kill us." In addition, another professor recalled:

> He was pretty loyal to Civil Engineering…but he was a good guy…. I think he worked for the College. I don't think he was really unfair to the department, but I think the department was a bit of a pain in his neck maybe once in a while, but I still think he stayed pretty fair. [He] tried to be. He didn't mind saying, "Way to go" when something worked out OK.

One professor emphasized the importance of the relationship the department head, Dr. Thomas, had with Dean Bishop saying, "It is very critical that a department head get along with the dean and that the dean understands the direction for that department to have survival. "Those two had a good working relationship. I think that was really to our strength."

Speaking of the change to the current dean and department head, one professor

remarked, "I think now the new model we have in place with this department head and the newer dean is a good working model too. But they're just different."

Dean Hinton

Dean Scott Hinton came to USU in 2002 to be the dean of the College of Engineering. He came from the University of Kansas where he was chair of the Electrical Engineering and Computer Science Department and Deane E. Ackers Distinguished Professor from 1999 to 2002. From 1994 to 1999, he was a Hudson Moore Jr. Professor at the University of Colorado at Boulder. He was a professor at McGill University from 1992 to 1994. Hinton received his B.S. in electrical engineering from BYU in 1981 and his M.S. in electrical engineering from Purdue University in 1982. He worked for AT&T Laboratories from 1981 to 1992.[6]

One finding about Dean Bishop and Dean Hinton was that they both emphasized research. These observations were made by two different professors about the two deans. One said, "…he pretty much forced our hand that we will become a research department." The other remarked, "The dean was trying to move to a much more professional or research based way….And consequentially our entire staff was influenced to go after more grants to write more papers….[This] was a thrust for us to move into research and funding…"

A factor that comes into play when the decision is made to keep a program open is the student enrollment. A professor shared this observation:

I will tell you, the dean is kind of looking over his glasses a little bit at our little

[6] Visit the college website at http://tele.engr.usu.edu/h%5Fs%5Fhinton/CV/HSH_vita_1-3-2008.pdf for more information about Dean Hinton.

> numbers in technology education and if we gave him a good reason he would probably say let's get rid of that, but for now he's giving us flexibility because we are growing in the graduate program.

Relationships with Industrial Technology

Throughout the history of the technology education program at USU, there has always been a relationship between technology education and industrial technology. One professor said, "I don't think you can talk technology teacher education without talking a little about Industrial Technology." Of this relationship a professor remarked, "Over the many years they've been inseparably linked and working together and there have been times when there was a serious dichotomy in some peoples' minds." Sometimes they were separate departments with different heads and other times they were combined. During the timeframe of this study, the two programs were under the same head.

The relationship between technology education and industrial technology included sharing courses. According to one professor, "Maybe one third of my classes were also Industrial Technology students." Another professor remarked,

> As a faculty over many years that we would teach courses, you had both sides of the road, and we always had a bit of both sides of the road, physically (The Industrial Technology classes were mostly in a building across the street.) and figuratively, the students from the Industrial Technology side and the technology education side took common courses. Our students took courses that they offered. They took courses that we offered.

The association between the two programs helped when it came to enrollment numbers and in other ways. One professor explained,

> Having a strong sister program such as our aviation program in our department helps us as well because when we look at the numbers, there's five departments in the College of Engineering, we [are] as strong as any of them with the number of

> faculty we have and the number of students. But we're riding the coat tails of the aviation program. But in addition to that the aviation program is riding our coat tails because they are taking advantage of the research that we do, the other reputation we have through that so they've been able to strengthen their cause. We're able to use them. So I think the two programs working together, Teacher Ed and aviation have caused us to be not so vulnerable where as other programs around the country may be in a different situation where they don't have the strength of another program tied to them and that causes issues with numbers.

This observation was given by one professor, "I don't think that any program around the country, even the strongest ones, in teacher education can stand alone. They all have to have an industrial technology component to them, which most of them do."

Commenting on one of the factors related to the longevity of the technology education program at USU, another professor discussed this important tie with industrial technology.

> We had to use Industrial Technology and with that I'll group aviation and welding and the rest of those. We had strong student enrollment. If you take the whole package for many, many years we had four hundred majors in this department. We would graduate the largest group from the College of Engineering. For many years we graduated about seventy people, which was for a number of years more than anyone else. So we weren't taking a back seat as far as the numbers were concerned. The graduates were all hirable, all getting good jobs.

One conflict between technology education and industrial technology was that technology education had more faculty than industrial technology, but industrial technology had more students. In response to this Dr. Thomas (personal communication, May 21, 2007) recalled, "I had to defend that quite often. The defense was: most of the tech ed faculty were teaching classes that the Industrial Technology students were taking." Another reason was it was difficult to get instructors on the Industrial Technology side that had a doctorate and the technology education professors all had their Ph.D.

One professor had no complaints about the relationship between the two programs. He said, "I really enjoyed working with the industrial technology faculty. I always thought there was a real good relationship there." Another professor remarked that there "were some conflicts," but they worked together most of the time. According to another professor, "The technology ed faculty that had moved over to teach Industrial Technology, this is a general sweeping observation, they became unloyal to tech ed."

Relationship with the College of Engineering

The technology education program at USU has always been associated with Engineering except for a few years in the early 1900s when the state legislature did not allow engineering programs on campus (Agricultural College of Utah, 1905). One professor described the association with engineering this way, "The relationship with the Engineering Department was pretty positive." This statement contrasts with a related theme that began to stand out during the interview process and is evident in one professors statement that names the theme, "Technology education …[was] often perceived as the *ugly stepchild*," or the stepchild of engineering.

Pearson (2004) said that image has been a problem with technology education for years. Similar terms or phrases that validate this theme were repeated by all of the professors during the interviews. They were: "We felt like a stepchild in the College of Engineering." "Technology education…[was] not held at [the] same status with other programs in Engineering, the bastard child." "We were never a part of the entire engineering faculty." "ETE is kind of a stepchild in the College of Engineering." "We

were the ugly stepchild." "Our department [was] a 'pain in the neck' to [the] engineering dean." "Our department [was] last in pecking order in the College of Engineering." "I don't think the other departments (in engineering)…say, 'Wow! You guys are really part of the equation' or they say, 'Well, you're in here and we'll put up with you,' as opposed to just to trying to get rid of you. At least it's not 'let's get rid of you."

Some stereotypical images of technology education are portrayed in these remarks given by some professors on how others see the program. "The College of Engineering says, 'You don't take enough science and math…." "The College of Education says, 'Oh, you are the vocational woodshop people." "We have always had an image problem."

The technology education program stayed alive because it was in the College of Engineering even if it was a stepchild. One reason is the funding available through the college. They understood the needs of a department that required considerable capital outlay. This was confirmed by one professor.

> My first thought was, hey, I would rather be a stepchild in Engineering than a fully fledged department in the College of Education because if you went anywhere else and ask for thirteen thousand dollars to buy a [piece of equipment] it would just blow their mind. They're not a tuned for that kind of thinking. But that's what it takes if you're going to update your facilities. And in engineering at least we have that right. And I think whenever we wanted to upgrade our facilities I think [the dean was] very quick to respond to us upgrading our facilities.

Another professor added:

> I think being in the College of Engineering has helped us because we are able to get engineering initiative money which helps us with facilities, …allows us to keep up with the technology somewhat. If you're in HASS or one of the other liberal [arts] type programs you don't have the ability to get those kinds of money…this is a technology intensive type program, laboratory intensive and so it requires the continued insurgence of funding. Most programs around the country deal with advisory boards and industry because they have the industrial piece to help them. We are in the College of Engineering so we get engineering

initiative money and that's how we keep ourselves going.

A professor also verified this factor with by remarking, "[B]eing last in the pecking order in the College of Engineering was probably better than being in the middle in the College of Education because our colleagues understood what it cost to set up a lab, manage a lab, and keep up with the current technological equipment."

These two professors' comments also confirm the relationship between ITE and the College of Engineering, "The debate continued about whether teacher education should be in the College of Education or the School of Engineering. It seemed that the School of Engineering better understood our mission related to prevocational and technology education." "I think we are in the right college in spite of what some people think."

Relationships with the College of Education

The ITE Department had close ties with the College of Education because of the teacher education program and the Ph.D. program operates through the Department of Curriculum and Instruction. The relationship between the College of Education and the ITE Department has been described as a necessity.

> Our students obviously go through an extensive College of Education core for licensure. The College of Education with its writing exam and some of the entrance [requirements]…. I think it keeps the bar high. I'll say high, it keeps us honest. We are not just going to be able to push anyone through the program. There is some rigor in their classes and…the subject matter is important. It's a very formalized process and I think that's good.

Other professors shared similar views, "It was necessary to work with them because we were in teacher ed and they were always supportive at least the part that I was involved

with." "[The] College of Education had…their policies and procedures…[and] all of the students have to go through the secondary ed [program]. So they've influenced what we've done here." "What affected us [was] the rules…the certification requirements and standards had to be articulated, communicated between them and us to make sure that our students were able to teach in Utah or whatever states we wanted to work with."

Here are some other reasons that a professor shared about the technology education program's relationship with the College of Education.

> I think that having a good relationship with the College of Education has been very good for us. We have a good relation…through our Ph.D. program that has enabled us to [participate in] joint research with that college. That's been a very strong ally for us…. We've also done real well with the College of Ed working with programs such as Elementary and Secondary Education as well as Instructional Technology.

Relationships with Other Colleges and Departments at USU

"I think we were…pretty busy working with departments across the campus because all of us could benefit from working together."

One professor related the similarities between the agriculture program and the technology education program, "We had a good relationship with the College of Agriculture because they train Ag teachers, we train tech ed teachers so we each [share] committee members because we [require] outside committee members for graduate committees…." Dr. Hicken (personal communication, May 18, 2007) stated some course offerings were also traded with the Department of Agriculture like welding and science courses. Other relationships with other departments and colleges that were mentioned by the professors were: The Space Dynamics Lab to send seeds into space; the Department

of Chemistry working with polymers; build models for the water lab; build models for the Department of English; The School of Graduate Studies; interior design; instructional technology.

International Relationships

There are some themes that come to light in the interviews that have minimal data but are important to mention. One is the international relations of the ITE Department. Some of the data that support this theme appears in the professors biographies. In addition to that information, one professor shared this comment specifically addressing international relations and its benefits:

> I've been trying to spread the word globally if you will. By being out there where we become better teachers, researchers, [we] get a different perspective. Logan, Utah is…not the real world unfortunately. I think that through international experiences you get to see that. You become better all around.

International relationships were, "a big shift in our department at that time," remarked one professor.

Another professor made this observation about international relations, "It hasn't always been supported here by the administration to do international work. It's more: they want you to work domestically. So that's a little bit frustrating." He continued with this outlook, "We are trying to become globally engaged. I think that our central administration at Utah State is becoming a little bit more cognizant of the fact that we do need an international [presence]."

The Technology Education Name

What's in a name? The theme of the technology education name appeared in the interviews as a controversial issue in some instances and an identity problem in other instances. This is apparent with the professor that pointed out, "The problem with technology education…I feel is our name. It's too bad. People think of technology and most of our studies, as you know, say that people think of computers, but we're not, we're more than computers. We're about the human designed world."

One professor feels the name can be misleading or is too broad.

> The big problem I've had for several years is that it's been too undefinable. [The] technology education term is still to general and generic. It is not near specific and therefore we've got everybody doing everything and in my view if we maintain that very long we won't be unique.

Another professor made this remark about how some people understand the name technology education, "What do you mean, technology education? Isn't that computers?" One related his feelings and gave some recommendations about the name this way.

> When the name change came along the idea of changing from Industrial Education to technology education, I was on several committees…and in that meeting we had a lot of discussions about this. I felt that my personal opinion was that technology education was way too generic. Even if it was Industrial technology education or something else because at the same time Instructional Technology was calling theirs Instructional technology education…the computer people were calling theirs simply Technology and Computers. I just felt that it was way too liberal and it's proved to be that, by the way. So anyway we fussed around with it at Utah State, about the name change and I think I made the proposal that we change to technology education since that's what the… national association decided. They wanted to use this name…. I suggested we change but not unless we were going to do something different in our programs. We had to do something different.

Another professor shared some more thoughts on the topic, "I think this field has

sometimes struggled over what technology education is so I think the *Content Standards* identified what the content we should be teaching. I think that was an important step for the field here even though I don't know if it's been embraced."

When the name of the department changed to its current name one professor remarked, "When you say engineering technology education you're playing with a lot of words."

One professor made this observation on the process of the department name change from ITE to ETE and why technology remained in the name:

> When the Dean (Bishop) left and the new Dean (Hinton) came there was a huge change in the sense that the word technology became a dirty word…. Because we get accredited through technology education we were able, somewhat surprisingly, to keep technology in our name. So we ended up with Engineering and technology education, although we haven't been able to keep technology in the names of the doctoral program and things like that.

Relationships with Professional Organizations

"I've been active in the profession. That's very, very important." That was the first response one professors made when asked, "What have you changed in the department?" He continued, "You have to be in the national profession. Also, I tried to be active in the local and state association."

The entire faculty in the technology education program at USU has been very active in professional organizations. This activity includes being on committees, running for and holding offices, and presenting at conferences. The foremost professional

organization memberships of the professors were in ITEA and ASEE,[7] two of the prominent national professional organizations.

Pertaining to the longevity of the program one professor remarked, "I think that is one of the factors, is our strong association with the state organizations including the directors and the state professional organization." He then made this observation and recommendation, "If anybody talked about technology teacher education we were the first they thought about. I don't know whether that's true or not today. I wonder….If we learned anything from that. Maybe we ought to make it a higher priority."

Early in his career one professor was critical about actions taken by the national organization. He recalled, "I decided that I shouldn't criticize without being a part of trying to change it. So I applied to become a representative of ITEA." He continued with this observation, "We made connections with some really up and coming people and I began to realize that this national association really was a great benefit to our funding from the national monies…"

Dr. Reeve and Dr. Stewardson were also members of CTTE, one of the accreditation organizations.

The Mountain States Conference was another organization many of the USU technology education faculty were associated with. This organization began in 1964 with the first participants comprised of Industrial Arts teacher educators and Industrial Arts supervisors from USU, BYU, Montana State College, Arizona State College, Arizona State University, Colorado State University, Colorado State College, and various school

[7] See faculty/staff bios at http://www.neng.usu.edu/ete/faculty.htm for additional information on college faculty and staff.

districts and state departments from these states. Membership grew to include members from Wyoming, Nevada, New Mexico, and Idaho.

This conference was modeled after the Mississippi Valley Conference in the Midwest. The group realized that the western states had common problems of their own and needed a means to address these problems to provide improvement of Industrial Arts instruction. The group would meet annually in the fall (Mountain States Conference, n.d.). Of the association with Mountain States Conference one professor recalled, "[They were] a pretty impressive bunch of people to work with." When they would meet he said, "They would come through and see how we were doing and we'd show off as much as we could, hide what we couldn't (slight snicker), and had a great time."

Another professor provided this insight:

> We had a little network and that's kind of diminished right now…. It was a viable conference, but we lost technology education teacher educators in the region. We did not have enough of them to support the conference. The last conference was in about 2000.

This conference was one of the main links between the Department of Technology Education and other universities and colleges. Working in the realm of teacher training in the state one professor remarked, "I think we've always had a good working relationship with the BYU and a little bit with SUU [Southern Utah University]."

Program Direction

The category of program direction includes themes related to factors of importance to the program. The themes identified include: curriculum, the professors philosophy of technology education, the graduate program, inservice/workshops/

extension, and predictions or looking forward.

Curriculum

The curriculum was a reoccurring theme in the interviews. One professor gave this description of the technology education curriculum and reasons it is an important factor,

> There's few curriculums in the system that are more comprehensive and yet more beneficial and the reason it's that way is because of the depth and the application to what's really going on. And so I believe that technology education is, especially partnered with almost any of the other applied area of academics, it becomes applied academics. It's incredibly important and strong in the general scope of the system. It contains the elements that prepare people for a foundation that's transferable to a lot of things. It can be whatever you choose almost. It's not that loose, but you can choose a variety of occupations and make professional changes and still be within the umbrella of technology education.

Another professor added to the description of technology education curriculum in these words, "Our model, of course, was built after Jackson's Mill…the manufacturing and construction, communication, [and] transportation…."

According to another professor, "We were on the front edge, I think, in a lot of the new developments. We were on the front edge with…the equipment and the development of programs…. All of us were involved with the teacher education part of it. As a result, I think we all taught technology ed versus shop.

A factor that affected the curriculum and was suggested by one professor as a factor in the longevity of the program was that the faculty taught in their specialty areas most of the time. He related it this way:

> It's been kind of a unique faculty. We all, early in our careers, had a specialty area…. All the areas kind of built upon our strengths and also I think we did well there. A lot of times people are put in an area they don't want to teach. You are

> hired in manufacturing and you're put into construction. But here I think everybody had this uniqueness, that their background matched the curriculum they were teaching. So we were able to match our strengths, our interests too, in what we taught. I think that was important, a real big factor.

Changes in the curriculum occurred for various reasons and in turn affected the program direction. At USU some of the changes in the technology education curriculum were in response to NCATE (National Council for Accreditation of Teacher Education) and CTTE (Council on Technology Teacher Education) accreditation. One professor's view was, "We wouldn't have changed to a real Tech Ed program unless [NCATE] certification required it." He described NCATE certification as a "big club" and said, "I'm not sure we would have changed without this big club over our head. I'm pretty sure most schools wouldn't have changed without this big club over their head."

There were various activities for students to participate that supplemented the curriculum and also provided publicity for the program. Two activities specifically mentioned in the interviews were the *High Mileage Challenge* (J. Hicken, personal communication, May 18, 2007) and *The Poster on the Hill* (W. Belliston, personal communication, May 21, 2007).

Dr. Hicken gave this explanation about the *High Mileage Challenge* activity.

> A primary goal of the race was to get students and teachers more aware of how they could improve fuel efficiency, or even avoid the use of fuel, if possible. We want students to learn about optional energy sources, or just become more aware of how to conserve fuel. This race can help them better understand that concept. (Loftin, 1997)

The objectives of this competition were to: provide a challenging activity for technology education students; introduce students to interdisciplinary application of skills such as manipulative skills, math, physics, and energy conservation; promote teamwork;

promote technology education in the state of Utah (Becker, 1995; Reeve, 1993).

The Poster on the Hill was an opportunity for students to display their work to the state legislature. Dr. Belliston (personal communication, May 21, 2007) gave this description of two students' experience with this activity:

> Two of our students, for a senior project, designed a digital television receiver which had a disc which pointed to a satellite to pick up digital television. The bottom line was to take that and tune that in so you could drive across the country and that satellite disc would follow the satellite and you could watch TV in your car going across country. They went into the parking lot and demonstrate that to us. It was a pretty good research project.

Projecting ahead on the direction of the curriculum one professor said, "Modeling is…going to take on more meaning. To model production or model projects where students can actually have hands on doing of things that have intrinsic value."

In 2003, a program change was made in the College of Engineering that influenced the curriculum of the ITE Department. After receiving input from department heads and faculty, Dean Hinton announced the closing of four Industrial Technology programs: welding engineering, computer electronics, computer-aided drafting and the aviation maintenance programs. The reasons cited for the program closures were the budget and the change of direction to a research based school (Burton, 2003; Parrot, 2003). The relationship between technology education and industrial technology has been established previously in this paper. The closing of these industrial technology programs will affect the future of the technology education program and its curriculum at USU.

Philosophy of Technology Education

The professor's philosophy of technology education is a factor in the curriculum.

The professors presented their philosophy during the interviews. The main consensus appears to be that technology education is an important component of general education for all students K-12. These descriptions of the nature and content for technology education were taken from the professors philosophies of technology education: "There are no disciplines in the system that are more comprehensive and yet more beneficial. I believe that technology education enhances any of the other applied areas of academics. It is applied academics." "General ed for all students K-12. [It is a] fun subject, minds on, hands on. Students learn to succeed. Students [become] problem solvers. [It] gives students self worth." "Hands on, something a lot of kids can benefit from. Technology education is good general education." "Technology literacy for all. Technology [is] more than just computers. [It is] part of general education. There is a need." "Process is our content. The process of design. The process of problem solving. The process of inquiry. Being able to figure out something, figure out a solution to a problem." "[The] application of science and math and how that is applied to engineering." "I'm a believer that there is a need for our type of system in the general public's eyes. Giving kids the ability to see technology and [become] involved with technology on the level of more than just computers." "The changes that have been made from industrial arts to technology education have been good. We live in a manmade world and we have to understand how it works and how things are produced."

The Graduate Program

According to Rogers (2001), "[G]raduate level technology teacher education has not kept pace with the need for qualified faculty (p. 1)." The graduate program in the ITE

Department at USU from 1985 to 2005 was in many ways an exception to this statement. Having a technology education graduate program was another theme revealed in the interview process. This is an important factor when it comes to the technology education program remaining viable. One professor described this factor in relation to the dean, "The growth of our graduate program has been one contributor to our survival. When you have a strong graduate program…the dean will notice." This was confirmed by Waetjen (1991), "With graduate programs comes research and research on the effectiveness of technology education programs is what deans, superintendents, and school boards look at when it comes to supporting these programs" (pp. 3-4).

USU had master's degree programs throughout the period of this study. The Ph.D. program was offered through the College of Education in curriculum and instruction with an emphasis in technology education.

Some of the professors had a goal of helping the graduate program grow. One professor recalled, "…I did want to help build the graduate program….That was one of the things that I thought that the program needed was a stronger graduate program." He continued, "So I would say that was probably one of the goals that Maurice Thomas, the department head at the time, and I talked about when I was hired was how are we going to build a stronger Ph.D. program." Another professor remarked, "I was attracted to Utah State because they had a doctoral program." He had a goal of working with doctoral students and explained, "I don't know if I achieved [that goal] because the doctoral program was on the books and they had one student, one of the students…had graduated two years before I arrived…. And so I saw a doctoral student. That meant they had an

active doctoral program. They really didn't."

Just before the time of this study, the doctoral program through the department was dropped with "the stroke of a pen." Dr. Thomas recalled:

> Before your study we had quite an active doctoral program…. The federal money that supported graduate students during the hot time, which would have been the sixties and early seventies, had dried up…. We tried to combine forces with education and tried getting a companion program with Ag Education, Business Education, or Home Ec. We even had a specialization with our interdepartmental degree in adult education. We tried that being the theme. I think we could have carried our part. Business already had an avenue. Home Ec. and Ag couldn't carry their part. So it wasn't until we were able to combine under Curriculum and Instruction [through the College of Education] that we had much success at the doctoral level.

Having a graduate program was an important factor in the longevity of the technology education program at USU. The Ph.D. program may have struggled and been nonexistent for a period of time, but the master's program was strong and gave vitality to the program. One professor explained, "That's been another factor, we offered a one month master's summer program. The out of state tuition was waived. We would bring in teachers from all around the west region.… It helped give us visibility and help continue to grow. Another professor added, "We never had a dry spell at the master's level. We always had good summer enrollments."

Commenting on factors related to the longevity of the technology education program one professor said, "…then in the summertime you have a good bunch of Masters students in here so you are able to work off of that."

At one point, the master's program was offered to teachers in Southern Idaho. The professor described it this way, "We did a cohort up in southern Idaho. Masters programs, we got a group of faculty up there together [and] made something happen that

couldn't happen any other way. Idaho wasn't going to deliver. We met with them. We talked to the state department. We talked to the University of Idaho."

The graduate program also attracted foreign students. According to one professor, "Multiple faculty members now are spending lots of time overseas and we are getting graduate students from overseas. We've had good success with getting them in the program and graduating them with master's and Ph.D.s in the program."

The department graduate program had some difficulty with the School of Graduate Studies. One professor described them this way:

> Well I think…there was a problem we had with this department in the eyes of the School of Graduate Studies. The Dean of Graduate Studies didn't think highly of the type of research and the number of publications that our faculty had early on when I first came here…we were struggling with being accepted from the graduate school and being able to serve on Ph.D. committees. One, we didn't have many Ph.D. students; two, our publication record was not at a level that he thought it should be and so we struggled there. But as soon as that dean left [and] the new one came in, kind of at the same time, there were several factors that came together…[and] that raised us up in image in the eyes of the College of Education…. We started to bring in good strong graduate students. And then the graduate school looks at that in a positive way. So we've really through our working relationship with the College of Ed and through the Graduate Studies College we've improved our relationship with them and shown that we've got the ability to produce good quality graduates.

The future appears good for the department graduate program as described by this professor:

> We're developing a new Ph.D. program in addition to the one we have in the College of Education. We'll have a program in Engineering Education in the College of Engineering. So we will have two Ph.D. programs in the next year or so and I think that's going to really change the way we look around here…. Currently people are interested in what we're doing but they still have to get the degree through the College of Education.

Inservice/Workshops/Extension

Inservice sessions, workshops, and extension classes were provided through the technology education program at USU to update schoolteachers, supervisors, and administrators in the state and region on new technologies, programs, standards, curriculum, safety, activities, equipment, and lab maintenance. This was an important theme and a factor related to the survival of the program as one professor confirmed, "This is an important point, at taking workshops to teachers…. When we started doing Tech Ed…when Tech Ed became a philosophy and teachers needed inservice, [the professors] went out in the state doing workshops to help teachers learn how to teach Tech Ed. Very important.

This professor gives two more reasons for inservice classes, "We were running summer programs where [teachers] could come in and get squared away, get caught up. Working with our State Department making sure the curriculum up and down state was consistent. Another professor shared this reason for the longevity of the technology education program at USU.

> Another factor [was]…our involvement with inservice [to] teachers outside of Utah State.…For a long time, for most of my career we taught off campus courses…. That was a good program.… We were able to connect with the community…. We had a Masters program we offered for Salt Lake and also offered the Ogden area. For a long time one of us would go down and teach in Salt Lake in the evening after teaching all day here. We used to take one or two graduate students with us. It was a great experience for the teachers around the state. Some of us also got involved in doing some work with in-service teachers, especially with those in the career and technical area, vocational fields.

Dr. Hicken described in some detail the inservice and workshops he prepared and participated in. From this we learn the importance of workshops. It describes the hard

work and dedication of the faculty, and the visibility of the program provided to the teachers, state, college, university, state, and nation.

> So, one other thing that I felt was my responsibility in line with the technology education I wrote a proposal to the State Office of Education and I think I got something like twelve thousand dollars…. It purchased the first robot and the first CNC machine for the department. We lined up a few graduate students and we took all these different aspects that…were in technology education and put a workshop together and ran it up and down this state and into Idaho…. That workshop covered communications, manufacturing, power and energy, and construction. It was fantastic. It probably made more difference in technology education in this state than any other single thing that we had done to that time because teachers were able to see what was going on.
>
> We didn't only have presentations. We had them do a lot of it. I remember one supervisor, we had a little computer experience, and because computers weren't very popular at the time, we had one computer experience, and one of the supervisors said when he came over, "it's been a long time." And I said, "like never."(laughter) That loosened him up and he went ahead and tried his experiments.
>
> The little robots became very popular and became a part of what was called TLC (Technology, Life, and Careers). I was a part of the TLC program and have done virtually all the in-service training, with other people helping, to classroom teachers and all. For several summers we ran all the in-service for the technology education, agriculture section. That was a very fun experience. The State Office provided the funds for the in-service and half the funds for the equipment. The district provided the other half of the money for the equipment and paid for the travel to bring the teachers in. They stayed here doing one week and sometimes two weeks depending what we had.
>
> During that time we had one or two people come from other states. Mark Bass came from Springfield, Missouri and in a national paper he wrote that it was one of the most effective workshops that he had ever attended in his career….It was pretty unique.
>
> The TLC program provided the teachers with all the equipment, all the written material. A remarkable amount of inservice [took place] during those one or two weeks to take the program back in what we called, "plug it in." Because they had the computers, they had the VCR's, they had the camcorders, they had the robots, they had virtually every piece of equipment needed to run the TLC program for the vocational, agriculture section of Technology Life and Careers.

Dr. Stewardson presented robotics curriculum workshops during the summer. Students and teachers from Utah and neighboring states were invited to the workshops held on campus. The curriculum was designed to provide the participants with hands on experiences which assist in the comprehension and retention of the concepts (Stewardson, 1993).

In more recent years, there has been a change with inservice, workshops, and extension programs provided by the department. This professor describes what was being missed by not having as many experiences with these programs. "We are still doing some of that, but it's adjuncts, which is unfortunate. Going out in the community is really rewarding, personally and professionally. Personally just working, finding out what's going on, what's happening out there in the state."

Another professor offered additional insight into why inservice is important to the longevity of the program and how it affected other programs at USU.

> If we learned anything from [having inservice classes] maybe we ought to make it a higher priority. We took classes and degrees. I know that it's somewhat inconsistent with today's thrust, but why did Business Ed lose their program? They had administrative changes, dropping enrollment. [There was] nobody at the state level saying you absolutely can't do this. I think there is something in that.

One professor summed up the importance of the extension programs with this:

> I think there has been a vigorous effort at Utah State to move with the needs and stay updated. I think extension is very good for Utah State because it forces the teachers to get out in the public schools and realize what the real problems are. I'm afraid a lot of that has been lost in the last three or four years because the emphasis is different. I think when we miss what our role is in preparing teachers in the public schools and that working with the districts is very critical. They are very powerful. They have the money and they support a program that provides them with good teachers. I think that has been very good for us. Every time we came up with something new here or something they wanted, we prepare it and went out and taught it to the teachers. That happened…with computer aided

> drafting;…it happened with CNC when all that took place, and that's what kept Utah State alive. I think the latest shift to engineering is a lot bigger step from where we have been. I think Utah State has always been very, very quick to move when we could see the need and the purpose for adjusting the programs

Looking Forward

Various remarks by the professors provide their personal insight into the future of the technology education program. One remarked:

> Do I think it will survive? It could…It has no life without good people. I don't think it will live for very much longer unless somebody just keeps pushing. It's just not got life of its own quite. I think the next two years will determine if this one lives depending on how much snap it puts together, or doesn't.

Another professor made this observation and projection with the new programs the department is involved in, "We've gotten the Center (National Center for Engineering and Technology Education, NCETE) and some other projects. I think there is definitely a redirection. It's given us a lot of opportunities. Will we be around in another ten years? I'm not sure."

One professor gave this thought on the program direction:

> We're trying with some of the NSF grants and with the National Center for Engineering and Technology Education as well as the teacher professional continuum NSF project that deals with engineering, math, and science. Those are some of the things that we need to continue to do. But that's not really my philosophy. I think that it's a growing thing that I'm not willing to say. I think the jury is still out. Ten years from now we'll know. I think that it's an exciting thing and that it's a good thing and I'm involved in it and I like it and I want to see us do well, but I don't know if that's going to be a philosophy of mine until I see how it ferments over time.

Finally, this professor presented the challenges the program will face in the not too distant future:

> This change is just bigger and consequently teachers need to adjust to it. I think we're in real trouble down the road because we've got a lot of teachers that are teaching traditional programs in the public schools not willing to change, that we're not training anybody to replace them. So what's going to happen when they retire? Are they going to close the program? Are they going to find somebody that can come in and take a traditional program and turn it into a Technology Ed. program?

Summary

In this chapter, the findings were derived from the primary data acquired from the interviews of the professors involved with the technology education program at USU from 1985 to 2005. Secondary data were also taken from journals articles, newsletters, newspapers, and other published material. Themes were taken from the findings, organized under categories, and presented in a narrative.

The facts obtained from the data in this study were as follows.

1. The faculty in the department: came from diverse backgrounds with strong technology education training; were affiliated with and participated in professional organizations; taught courses to both technology education students and industrial technology students; had various teaching experiences before coming to Utah State; each make contributions to the program.

2. The relationship with industrial technology has always existed and ensured high student enrollment and graduate numbers for the department.

3. Relationship with the State Office of Education provided grants, opportunities to give inservice training, and visibility for the program to the State Office of Education administration.

4. Inservice/workshops/extension provided training for technology education teachers and supervisors in the state and region, program exposure across the state and region, department faculty with opportunities to get out and see what was happening in the schools.

5. The technology education program is a stepchild of the College of Engineering.

6. The department head plays an important role in promoting the program to the dean and giving support to the faculty.

7. The relationship with the College of Engineering is necessary because they understand the cost of maintaining the labs and they can assist with funding.

8. The master's degree program was strong and the doctoral program is developing.

9. The program continues to go through name changes.

CHAPTER V

SUMMARY, DISCUSSION, AND RECOMMENDATIONS

Summary

The purpose of this study was to discover the factors involved with the success of the technology education program at USU from 1985 to 2005 and to consolidate information regarding the program. A qualitative case study method was used. Interviews with the professors involved with the program during the timeframe of the study provided the primary data. The guiding questions for this research were: (a) What contributions have the professors made that may give insight into the success of the technology education program? (b) What changes have been made in the program? (c) What knowledge can be gained from stories that can be documented about the technology education program and which will be of the most worth? (e) Can the telling of these stories help develop or change technology education? These guiding questions were used to develop the interview questions. The data obtained from the interviews was evaluated and set into themes. The factors for the longevity of the technology education program were derived from the themes. In this chapter, the researcher will discuss the findings of the study and make implications and recommendations for future actions and research.

The original problem was that while there were studies reporting the many technology education programs that have been closed; there have been no studies on individual programs that have remained open. The many factors presented in this study demonstrate the complex interrelationships (Stake, 1995) involved with the program and

are evidence of the need for this holistic study of the problem. The themes that appeared from the data collected in the interviews are in large part the factors, some of which may be more important or play a greater role in the longevity of the program. The themes were arranged under two categories, relationships and program direction. Under the category of relationships were: faculty, relationships with the State Office of Education, relationships with the deans, relationships with industrial technology, relationships with the College of Engineering, Stepchild of Engineering, relationships with the College of Education, relationships with other colleges and departments at USU, relationship with professional organizations and other universities and institutions, and international relations. Under the category of program direction, the themes were: curriculum, inservice/workshops/extension, technology education name, the graduate program, and the professors' philosophy of technology education. These themes were presented in the findings.

Discussion and Recommendations

When asked directly, the professors interviewed responded with what they perceived as the factors related to the longevity of the program (see Appendix C). These are key points that others may consider in planning and setting goals for technology education programs. A summary of the factors given are listed below.

1. The program has a good history and world class reputation.
2. The influence of the Dean and department head.
3. The relationship with the State Office of Education.

4. The progressiveness, diversity, and longevity of a hard working faculty.
5. The faculty's philosophy of technology education.
6. The graduate program.
7. The relationship with the College of Engineering.
8. The relationship with industrial technology.
9. The inservice/workshops/extension provided by the department.
10. The professors in the program have maintained funding.

A predominant finding in this research was the importance of the relationship of the technology education program at USU with the State Office of Education. No other research was found to support this factor at other institutions. Common sense dictates this is an important factor in the longevity of technology education programs, and is a main link between public education and university programs. Grant money was provided through this connection to provide inservice and workshop opportunities. The sources and amount of money available from the state have changed in the past few years. Other sources of support need to be located to provide money for the continuation of technology education inservice and workshops with schoolteachers. Creative ideas need to be developed to obtain interest for providing grants for technology education from foundations—both public and private.

The link with the state also facilitates exposure to administrators and directors of schools and programs throughout the state. In some of the interview responses, there was concern that this relationship may be diminishing.

Another factor requiring a close watch is the relationship of the technology

education program and industrial technology. Will the closures of industrial technology welding, drafting, and computer electronics programs in 2003 affect the technology education program in the future? The answer is yes. The technology education program has relied on the student enrollment numbers from the combined programs. The programs also share labs and the professors teach the same students. Technology education students rely on these programs for the content and experience to teach related courses. In many instances the only exposure these technology education students will have to these subjects is from their university coursework. Reduction of, or eliminating courses in industrial technology may hamper the effectiveness of future technology education teachers. The closure of these courses has required that the information and training received from these courses be included in other courses or they are not taught at all. Further research is required to see what the long-term affect of these program closures may have on the technology education program at USU.

The graduate program, particularly the Ph.D. program through the center (NCETE) gives hope to the future of technology education by providing fresh blood to the ranks of technology teacher educators that will go out to other universities to teach technology education teachers. As the center becomes more established more research will be done. The continuation of funding for the center is required to keep it going when the current funding ends.

Some additional questions to consider when making implications about this study are: Which of the factors related to the program are most important? Can you remove or change one or more and have a successful program? Do other institutions with successful

technology education programs share the same or similar factors?

Some of the factors summarized above that were important to the longevity of the technology education program may not be factors in the future longevity of the technology education program at USU, or any other program. They are having a good reputation, world-class program, and a progressive, diverse, hard working faculty. These factors are more difficult to control and can change at any time. Professors can retire or leave. Sometimes replacements do not have the same qualifications or philosophy. Sometimes professors are not replaced. As for having a good reputation or world class program, there have been other world class programs with good reputations that have been closed with the stroke of a pen for some reason. Usually it is for budget reasons, low student enrollment, or the philosophy that technology education and related programs do not fit with the mission or goals of the institution.

The influence of the dean will always be a critical factor in the life of the technology education program. Add to these the influence of other university administrators and state and federal legislators. There needs to be continual reminders communicated to the dean and administration of the importance of technology education. The faculty will play an important role maintaining or improving the status of the technology education program. As one professor stated, “It has no life without good people. I don’t think it will live for very much longer unless somebody just keeps pushing.” The program direction is influenced by the faculty by how they develop curriculum and teach. Add to this their relations with other departments, colleges, their affiliation with professional organizations, and work with other institutions. These

relations should always demonstrate positive progress, cooperation, and collaboration. Membership in professional organizations increases strength to these organizations. These organizations provide opportunities for professors to improve and they also work with legislators to support technology education.

There have been and continues to be identity problems with the program. They are: technology education has been considered the stepchild in the College of Engineering and the technology education name is misunderstood and usually associated just with computers. Even though the theme of being the stepchild of engineering appeared in all of the interviews in one form or another, this researcher does not feel it is a likely factor in the longevity of the technology education program. The data from the transcripts shows there was a better relationship between the College of Engineering and the personnel in the ITE Department during the administration of Dean Bishop, but there was still the feeling of being the stepchild. However, it is important data and may be a factor in the closing of other similar programs.

Some negative stereotypes have been made concerning the program as evidenced in comments like "You don't take enough science and math" and "Oh, you are the vocational woodshop people." One might ask how a program with this image could remain viable for so many years. Is it a factor that affected the longevity of the program? Although it may not be a factor now, it but may become one in the future. The philosophy shared by many of the professors interviewed was that technology education is a minds on, hands on, fun program. Many times students learn and understand math and science principles in technology education courses better than in regular math and

science classes. Technology education is an excellent way to diversify learning.

The name change to ETE in 2005 may have some influence on the identity problem regarding the misunderstanding of the name Technology education and the common misconception that it is just about computers. Time will tell how this change might affect the understanding of what the program is about.

Newberry (2001) revealed an increased interest in many states on the importance of technology education and the need for students to be technologically literate. The preparation of qualified technology education teachers is a continual concern, and having successful university programs is vital for this preparation. The factors revealed in this study will add to the data institutions may use to determine ways to retain existing programs and the development of new technology education programs. The benefit may be a reduction in the shortages of qualified technology education teachers.

A study by Baltzer, Lazaros, and Flowers (2007) reviewed 19 current doctoral programs in technology education in the U.S. and Canada. USU was one of the programs that participated in the study. The results of the Baltzer study were generalized to all of the programs in the research without providing specific recommendations for any one program.

In contrast, this study presents specific factors related to the technology education program at USU. The graduate program was an important factor involved with the longevity of the technology education program. This information may be made applicable or transferred to other similar graduate programs or studies.

Besides programs in technology education, other related programs that may

benefit from this study are industrial technology, occupational/career education, and agriculture science education. These programs have had similar problems with program closures and teacher shortages.

The technology education program continues to be an outstanding program with the direction change to ETE. I hope that this research adds to the knowledge of what is required for a technology education program to remain successful.

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APPENDICES

Appendix A

IRB and Informed Consent Letter

Dept. of Engineering and Technology Education
6000 Old Main Hill
Logan UT 84322-6000
(435) 797-1797
Fax: (435) 797-2567

Informed Consent

Factors Affecting the Longevity of the Industrial Technology Education Department at USU 1985-2005: A Case Study

Introduction/Purpose: Professor Maurice Thomas in the Department of Engineering and Technology Education (ETE) and Research Assistant, Jerry Cloward are conducting research. During the past twenty years many technology education programs at various universities have been discontinued. From 1985 to 2005 the Industrial Technology Education (ITE) program at USU (USU) has remained viable. At a time when technology education and being technologically literate is so important in education the decline in technology education programs is alarming. The purpose of this research is to determine what factors relate to the longevity and vitality of this important program.

Procedures: If you agree to participate in this research study, you will be asked to be involved in an audio recorded interview about your contributions, feelings, and participation in the ITE Program at USU. These unstructured interviews will include an initial interview of about 90 minutes and possibly two follow-up interviews of approximately 30 minutes each for clarification or member checking.

Confidentiality: The interview recordings, transcripts, and personal information will be kept secure and confidential by coding names and identifying information. This coding information will be kept separate from the data and stored in a locked file cabinet in a locked room of Dr. Thomas. Any personal identifiable information will be destroyed by the end of July 2007. Personal permission will be obtained from you to present any quotes and other specific personal information. To maintain confidentiality all data obtained from the interviews will be coded and placed in categories, subjects or themes that relate to the research topic By using this method there will be no way to identify who said what unless there is a specific quote that permission has been granted to use.

Voluntary Participation & Explanation to Offer Questions: Participation in this study is entirely voluntary. You may refuse to participate or withdraw at any time without consequence. You will be informed of any changes that may cause you to change your mind about participation. If you have any questions about this research study you may contact the Research Assistant, Jerry Cloward at (435) 750-0354 or by email at jcloward@cc.usu.edu

Risks/Benefits: There is minimal risk in participating in this study. There may not be a direct benefit to you at this time; however, researchers hope that this study will provide better understanding of the factors involved with a quality technology education program.

Dept. of Engineering and Technology Education
6000 Old Main Hill
Logan UT 84322-6000
(435) 797-1797
Fax: (435) 797-2567

Informed Consent

Factors Affecting the Longevity of the Industrial Technology Education Department at USU 1985-2005: A Case Study

Copy of Consent: Two copies of this consent form have been provided for your signature. Please sign both copies, keep one for your records and return the other to Jerry Cloward.

IRB Approval Statement: The Institutional Review Board (IRB) for the protection of human participants in research has approved this research. If you have any questions or concerns about your rights, you may contact them at (435) 797-1821.

Researcher's Statement: "I certify that the research study has been explained to the individual by me or my Research Assistant, and that the individual understands the nature and purpose, the possible risks and benefits associated with taking part in this research. Any questions that have been raised have been answered.

Dr. Maurice Thomas Principal Investigator (435) 797-1797	Jerry Cloward Research Assistant (435) 750-0354 jcloward@cc.usu.edu

Signature of Participants:

By signing below I agree to participate in this research.

Signature of Participant	Date

Appendix B

Member Checking Clarification Letter

July 6, 2007

Dear [interviewee's name]:

I would appreciate if you would take a moment and review the attached outline of your interview you had with me. This is known as member-checking and is an important part of validating qualitative research. This outline takes the relevant material from our interview and puts it in capsule form to help me develop themes.

As you review the outline remind yourself that this research is about the factors related to the success of the technology education program at USU during the period of time from 1985 to 2005. If there are any corrections or clarification or anything else you may want to add please write them on the outline and return to me.

Thank you again for your willingness to participate in this study and the time you have taken to help me with my dissertation.

Sincerely

Jerry Cloward

Appendix C

Examples of Significant Statements

Samples of Significant Statements

Significant statements in response to the question, "Why do you think this program has stayed alive and viable, a working program, when others in the country have failed or closed up?

- "I think you have a good history and you continue that history."
- "…the absence of any reluctance on the part of the key faculty to embrace the philosophy of Technology Education. If they decided they were going to go and do all those things they've been doing we couldn't have progressed like we did. Everybody got on board."
- "I think something else that's kept us alive was a stable Tech Ed faculty. We've been here a long, maybe too long. (said with a smile)"
- "I think we were productive. I think everybody in our faculty was being productive. And I think too, this is another factor, we were, except for drafting, most of us actually doing Tech Ed type courses….Teaching in one field is important. We all teach in one field."
- "I think people look to Utah State to see what the standard is. At Utah State you're working with people that were inventing the standard or else they were doing it themselves. They set the standard. You go to a national conference Utah State has presentations. Utah State will be in the leadership. That's how it works."
- "And then in the summertime you have a good bunch of Masters students in here so you are able to work off of that.
- "[We had] faculty members that weren't stuck in the old mold. They were… progressive faculty members."
- "We had a department chair who, in my perspective, hired the best people we could from across the country."
- "We had to use Industrial Technology and with that I'll group aviation and welding and the rest of those. We had strong student enrollment. If you take the whole package for many, many years we had four hundred majors in this department. We would graduate the largest group from the College of Engineering."
- "The way that we were managed with that academic freedom and that professionalism, we were able to disagree and come to consensus on a lot of ideas."

- "I think one of the things that was helpful was the fact that…[we] had a pretty good relationship with the state office…. I think the state was a big issue there."

- "We had this real strong connection to the state we're existing in, the state department."

- "We had a diverse core that could work together. There wasn't what would be considered inbreeding where you take your undergraduates, you give them masters, you give them doctorates, then you hire them and you just stay stagnant."

- "I think we had good support all the way from our dean. And the College of Education were supportive of our program….What's kept us going was good support from the dean's office and the department head."

- "Well it's riding on its reputation…frankly it's a world class reputation."

- "I think one of them is we had a very strong advocate at the State Office."

- "Working with our State Department making sure the curriculum up and down the state was consistent.

- "During those years we had a dean who, I'm not sure, championed us?.(kind of questioning tone) But realized that we had a role in education and we happened to fill that role in his college and he didn't kill us. And I think he treated us fair so when monies came available…we got some of it."

- "We were doing things. I think that's why it's alive because somebody is still doing things…. if it's going to live it's because they've been out and continue to lead. [We] are not satisfied with just watching to see what happens. [We] are pushing the front edge. I don't think it will live for very much longer unless somebody just keeps pushing. It's just not got life of its own quite. It's not there."

- "The growth of our graduate program has been one contributor to our survival. When you have a strong graduate program, that helps....in other words the dean will notice."

- " I think in the last few years coming on with the PhD level was a big boost. When enrollment has been more of a struggle and Industrial Technology took that enormous hit we had something to replace it with, and that was the PhD program and the associated National Center. You know, who's going to argue with two million dollars a year particularly when the associate dean is the PI on the project and she's always speaking in the ear of the Dean.

- "…we were doing workshops all over the country in Technology Ed and the Principles of Technology. We were running summer programs where people could come in and get squared away, get caught up."

- "And having a strong sister program such as our aviation program in our department helps us as well because when we look at the numbers there's five departments in the College of Engineering and we are as strong as any of them with the number of faculty we have and the number of students. But we're riding the coat tails of the aviation program. In addition to that the aviation program is riding our coat tails because they are taking advantage of the research that we do. The other reputation we have through that so they've been able to strengthen their cause. We're able to use them. So I think the two programs working together, teacher ed and aviation have caused us to be not so vulnerable where as other programs around the country may be in a different situation where they don't have the strength of another program tied to them and that causes issues with numbers. I don't think that any program around the country, even the strongest ones in teacher education can stand alone. They all have to have an industrial technology component to them, which most of them do. In our case we just have the aviation department which gives us those numbers. Any strong teacher education program around the country, the University of Wisconsin Stout, Illinois State, The University of California, Pa., Millersville, all of those programs have strong Industrial Technology programs along with the teacher ed program. So we all require assistance to give us the numbers."

- "And that we had nothing to be ashamed of as far as our own faculty were concerned. By the mid nineties…we had on board a dang good group of faculty. There's been very little bickering….and they've been strong professionals focused on a common goal."

- "I think being in the College of Engineering has helped us because we are able to get engineering initiative money which helps us with facilities, allows us to keep up with the technology somewhat. If you're in HASS or one of those other liberal arts type programs you don't have the ability to get those kinds of money. And as you are aware this is a technology intensive type program, laboratory intensive and so it requires the continued insurgence of funding. Most programs around the country deal with advisory boards and industry because they have the industrial piece to help them."

- "We didn't have a Dean of Education or Dean of Engineering trying to downsize us. I give a lot of credit to the leadership, the dean and the department chair. We were able to accept different viewpoints."

- "I think there has been a vigorous effort at Utah State to move with the needs and stay updated. I think extension is very, very good for Utah State because it forces the teachers to get out in the public schools and realize what the real problems are. I'm afraid a lot of that has been lost in the last three or four years because the emphasis is different. But I think when we miss what our role is in preparing teachers in the public schools that working with the districts is very critical. And they are very powerful, they have the money, and they support a program that provides them with good teachers. I think that has been very good for us. Every time we came up with

something new here or something they wanted, we prepared it and went out and taught it to the teachers."

- "We've managed to maintain funding and we've managed to please the Dean with the things we've done."

- "…the other factor was the Dean protected us pretty much."

- "I think Utah State has always been very, very quick to move when we could see the need and the purpose for adjusting the programs and I think that happened with Technology Ed….Different people on the staff have been part of the Standards program…. I think we've had a great staff that have moved in that direction."

- "We've been well known nationally. The faculty has taken the opportunity to attend meetings and participate nationally."

- "Well, to be honest I don't know how alive and viable we are. We're buying time right now because we're in a strong department. In other words, [with] the aviation department that has good strong numbers we are kind of left alone by the dean because the teacher education piece is very small. We only have forty-five students. That's a small program.

- "We've managed to maintain funding and we've managed to please the dean with the things we've done. And I think we are in the right college in spite of what some people think. I just think the fact that we kind of played into their hand a little bit has always been healthy to us. Years ago a lot of engineers became engineers because they took industrial education. They use machinery, they did planning. They learned to work with materials. They loved that. And today it's just a little different level and could very well go the same way. It might be the strongest program ever eventually. I think we've always had a really good staff that worked well together. I don't think we've ever had, at least in the teacher ed. side, we've never had conflicts. People worked well together, they pulled together. Staff meetings are congenial and pleasant. That hasn't always worked across Industrial Technology, the other half of our department, but mostly there too."

Appendix D

ETE Majors Undergraduate Student Enrollment 1994-2006

UNDERGRADUATES 1994-2006
ETE MAJORS only

Fall Enrollment	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Aeronautics total	8	13	14	15	17	10	17	10	12	13	3	2
women	1	0	1	1	1	1	1	4	1	2	0	0
minorities	0	1	1	1	2	1	1	0	0	0	0	0
foreign	0	0	0	1	1	1	0	0	1	1	0	0
Drafting total	36	32	22	25	22	20	21	30	28	17	1	1
women	7	7	6	6	4	3	5	8	7	3	0	0
minorities	1	1	1	1	1	1	0	0	0	0	0	0
foreign	0	0	0	0	1	1	1	0	0	0	0	0
Maintenance Mgt	21	26	24	26	20	18	13	13	18	34	52	51
women	1	2	1	1	0	0	0	0	1	0	2	4
minorities	1	0	0	2	1	1	0	0	0	1	3	2
foreign	2	4	4	2	2	0	1	1	0	1	4	5
Electronics/Comp total	43	35	34	36	43	58	52	55	34	20	7	1
women	2	2	1	1	2	11	8	4	2	1	0	0
minorities	3	4	2	1	2	4	3	5	2	1	0	0
foreign	1	0	0	0	0	7	2	4	0	0	2	0
Professional Pilot	85	81	94	95	133	194	226	191	186	169	167	175
women	4	6	8	11	13	12	10	14	20	19	12	12
minorities	1	0	1	2	3	6	7	5	6	6	4	7
foreign	2	2	2	2	2	2	0	0	0	0	7	4
Engineering & Tech Ed	47	32	26	18	24	25	28	32	26	31	38	36
women	3	1	3	2	1	4	3	4	3	6	7	6
minorities	1	1	0	0	0	0	0	0	1	2	2	0
foreign	1	0	0	0	0	0	0	0	0	0	0	0
Welding Engr Tech total	26	34	41	42	39	37	40	49	46	20	5	1
women	0	0	1	1	1	1	1	1	1	0	0	0
minorities	1	1	1	0	1	2	3	3	1	1	1	0
foreign	0	0	0	0	1	0	0	0	0	0	0	0
ETE TOTALS:	266	253	254	257	298	362	397	380	350	304	268	267
women	18	18	21	23	22	32	28	35	35	31	21	22
minorities	8	8	6	7	10	15	14	13	10	11	10	9
foreign	6	6	6	5	7	11	4	5	1	2	13	9
Engineering & ETE	1432	1419	1443	1378	1349	1462	1580	1701	1741	1628	1516	1595
women	201	177	173	161	149	126	146	172	182	152	149	168
minorities	46	38	34	50	49	49	62	59	60	87	61	61
foreign	48	62	52	41	40	58	66	69	57	45	81	76

Source: usu.edu/budget/factsfigures

VITA

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EDUCATION

2009 - Ph.D., Education (Engineering and Technology Education). Utah State University, Logan, Utah.

2007 - School Administrator/Supervisory Certification. Utah State University, Logan, Utah.

2005 – Master of Science, Industrial Technology Education. Utah State University, Logan, Utah.

1983 – Bachelor of Science, Industrial Technology Education. Utah State University, Logan, Utah.

PROFESSIONAL EXPERIENCE

August 2007 to Present- Eastern Illinois University, Assistant Professor. Teaching Industrial Technology courses including Material Science, Material Technology, Manufacturing Technology, Manufacturing Fabrication Processes, Career and Technology Education Seminar in Teaching Technology Education, Computed Aided Engineering Drafting (CAED), and Science and Technology of Leadership.

January 2007 to May 2007- Utah State University, Instructor. Taught Undergraduate Technology Education class in Energy, Power, and Transportation.

August 2006 to December 2006 – Administrative Internship. Adams Elementary School, Logan, Utah.

August 2005 to January 2006 – Administrative Internship. Mount Logan Middle School, Logan, Utah.

August 2002 to May 2006 – Utah State University, Instructor. Taught undergraduate Technology Education classes in Materials and Processing Systems and Wood Based Manufacturing Systems.

August 1998 to May 2002 – Tom Browne Middle School, Corpus Christi ISD, Instructor. Taught Industrial Technology Education in a Synergistic Lab. Served on the school Planning and Decision Making Committee for two years. Trained other teachers in the District on the teaching, management, and maintenance of technology labs.

1997 to 1998 – Austin Woods, Corpus Christi, Texas, Custom cabinet maker.

1986 to 1997 – Davis School District, Utah, Instructor.
Woods Cross High School (1986 - 1992, 1994 – 1997). Taught vocational cabinet making and millwork, graphic arts, and math.
Clearfield High School (1992 – 1994). Taught building construction.

1991 – 1997 – Davis School District, Utah, Supervisor. Coordinated summer program for construction of portable classroom and school construction maintenance program.

1984 – 1985 – Cottonwood High School, Granite School District, Salt Lake City, Utah, Instructor. Taught drafting and graphic arts.

RELEVANT EXPERIENCE AND SKILLS

- Expert teaching skills with over 16 years of public school classroom teaching experience and over seven years of teaching at the university level.
- Experience with curriculum implementation, budgets, staff development, teacher evaluations, and student discipline.
- Worked with committees on student achievement, and developing dress code standards, scheduling, and coordinating school activities.
- Leadership qualities that are recognized and appreciated by both administration and peers.
- Maintained an extensive shop which included efficient running and maintenance of equipment, supplies, and inventories, as well as budgets and bookkeeping of expenses and ordering materials.
- Elected to the Eastern Illinois University Council on Teacher Education for 2008-2011
- Elected to and counseled with the Joint Staff Study Committee at the high school level.
- Elected to planning and Decision Making Committee at middle school level.
- Coordinated development of plans and cost estimates for the layout of various parts of a new high school. Participated on the planning committee involved in the assessment of the entire project.
- Constant dedication to the teaching profession and continual upgrading of skills.
- Ability to relate to students and teach concepts in an easily understood and usable manner.

- Able to recognize and quickly grasp complicated materials and concepts surrounding a variety of diverse subjects, and then to analyze and teach those subjects to others.

PROFESSIONAL CERTIFICATION/LICENSES

Utah Secondary Education (Expires June 2013)
Technology Education (Applied Technology Education/General) Endorsement
Applied Technology Cabinet Making & Millwork/Carpentry Endorsement

Texas Secondary Certificate (Life)
Industrial Technology
Construction Carpentry and Mill and Cabinet Making Vocational Approval

Utah Administrator/Supervisory Certification (Expires June 2013)

PRESENTATION

2008 NAIT annual conference: *The Interaction of Students Online to Collaborate the Development, Design, and Completion of CAED Group Based Projects* with Dr. David Melton

2005 Annual Session American Society for Engineering Education/Rocky Mountain Section: *Awareness of Technology Education by Engineering Professors Working in K-12 Education*

HONORS

2004 ITEA annual conference FTE Outstanding Graduate Student Citation for Utah State University

GRANTS

2008 Redden grant for $1075. Production Lab Special Operations Video Project

PROFESSIONAL ORGANIZATIONS

National Association of Industrial Technology
Association for Supervision and Curriculum Development