A STUDY OF THE PROFESSIONAL MISSION OF THE TECHNOLOGY EDUCATION MAJORS AT THE UNIVERSITY OF WISCONSIN STOUT

by

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ABSTRACT

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A STUDY OF THE PROFESSIONAL MISSION OF THE TECHNOLOGY EDUCATION MAJORS AT THE UNIVERSITY OF WISCONSIN STOUT

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The purpose of this descriptive study was to determine the professional mission of the technology education majors at the University of Wisconsin Stout. The data for the study was obtained using a questionnaire designed and implemented by the researcher. Over a span of two weeks, 143 students, consisting of first year, sophomore, junior, and senior level technology education majors completed the survey.

The study was designed to address the following objectives:

1. What are the choices of classes that the University of Wisconsin Stout technology education majors would want to teach related to the most popular classes currently being taught throughout the country?
2. Are the technology education majors' choices of classes to teach different with respect to their different levels of education (i.e. first year students, sophomores, juniors, seniors)?
3. Do the technology education majors' choices of classes to teach reflect their high school technology education experience?
4. Do the technology education majors' choices of classes to teach reflect their favorite technical classes in which they took at the University of Wisconsin Stout?

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CHAPTER 1
Background of the Problem

In the Wisconsin's Model Academic Standards for Technology Education, State Superintendent John T. Benson said,

> Wisconsin has long been a model for other states in terms of education quality. However, the world is rapidly becoming a more complex place. As a result, we must expect greater academic achievement from our children today if they are to be adequately prepared for the challenges of tomorrow (Wisconsin Department of Public Instruction, 1998, p. V).

"What we describe as our world of technology has evolved exponentially in the span of one person's lifetime" (Johnson, 1985, p.5). This rapidly changing world of technology requires the same exponential growth in the way we educate about technology. Technology education instructors must practice teaching current curriculum content in order to keep up with this trend associated with technology. If curriculum fails to remain current, the people of our nation face the threat of becoming technologically illiterate. Failure to meet this expectation has been identified in the past by various experts from education, industry, and technology. One such expert is Ken Starkman, Technology Education Consultant for the state of Wisconsin. He identified in his study on technology education that more than 73% of the teachers surveyed agreed technology education is needed to update the technical theories of industrial arts (Starkman, 1989).

It wasn't long ago that society began to realize that the industrial arts education content was not adequate for educating our youth. The traditional industrial arts content does not allow for the rapid increase and change in our technological society. Many technology education instructors still emphasize industrial arts curriculum, teaching very specific skills within a narrow content area. Bonser and Mossman define industrial arts here in the article "Technology Education: AKA Industrial Arts." "Industrial arts is a study of changes made by man in forms of materials to increase their values, and of the problems of life related to these changes" (Foster, 1994, p. 1). These materials usually consisted of woods and metals. With the exponential growth of technology, the specific skills and content emphasized by industrial arts involving the manipulation of woods and metals became obsolete very quickly. Traditional industrial arts teaching methods and curriculum content cannot keep up with societies educational needs.

Unlike many industrial arts programs, technology education stresses a total understanding of the origin of technology and that it is created or destroyed to meet human needs (Swyt, 1986). The Maryland curriculum guide, Technology Education: A Maryland Curricular Framework, defines technology education as follows, "Technology education is a comprehensive, experience-based curriculum in which students learn about technology - its evolution, systems, techniques, utilization, and social and cultural significance" (Maryland State Department of Education, 1994, p. 3).

Although the definitions seem very much the same, technology education concentrates more on embedding fundamental concepts of technology that will benefit everyone. Technology education not only teaches students technological skills, but also stresses knowing and valuing technology, adapting to technological change, and becoming a lifelong learner across a broad range of topics (Fraser, 1999).

The goal of technology education is to reach everyone and give everyone a general background of technology so they are “technologically literate.” In today’s world this is so important because almost every facet of living involves technology somehow.

The need for technological literacy stems from the ultimate power of technology (International Technology Education Association, 1996). Technology has mechanized work, increased our ability to receive information, and allowed us to live healthier lives (Johnson, 1985). Technology has also created many problems and ethical dilemmas such as pollution, destructive weapons, and high levels of stress from information over-load. All of these have given people a sense of numbness to the outside world. "As a result, it is necessary that all of us understand technology so that we can live comfortably with it, use it to its potential and our maximum benefit, and direct it intelligently by helping to make good decisions about further development and application" (Sterry & Hendricks, 1999, Forward).

The state of Wisconsin has taken on the responsibility of making sure everyone is technologically literate. They are continually developing technology education curriculum to change the scope of traditional industrial arts. The Department of Public Instruction (DPI) developed academic standards for technology education. The Wisconsin's Model Academic Standards for Technology Education for k-12 was first introduced in 1998. The development and implementation of these standards is designed to specify a framework of what students need to know about technology. They provide goals for students and educators to meet along with suggestions on topics and classes to teach. These standards are designed for all students, no matter what they choose as an occupation later in life. However, they are merely a guide and not required by law to be implemented into the schools. Since the standards are merely a guide and there is no technology education requirement at the high school level, there are literally hundreds of different classes, which do not have the recommended content for all students to have the opportunity to meet the standards. The goal is to develop and implement curriculum to meet the standards in all of Wisconsin's schools (Wisconsin Department of Public Instruction, 1998). One challenge, without a mandated, broad-based technology curriculum, is to convince teachers, still teaching industrial arts curriculum content, to actually implement this current curriculum into their programs and schools.

Another challenge, once a broad-based technology curriculum is developed and implemented, is to get students to enroll in technology education classes. In Wisconsin, students are not required to take a technology education course in high school. The decision is often left up to individual districts. Without a required course, it makes it difficult to implement a broad-based technology education curriculum across the state that can reach all students and cover a wide range of technology topics. With that in mind, not only what students are required to take, but also what is taught is ultimately up to the school district and the technology education instructor.

The University of Wisconsin Stout is the largest technology education teacher education program in the state. A large percentage of the technology education students at Stout will remain in the state to teach. Therefore, current Technology Education students at the University of Wisconsin Stout will play a large role in the implementation of a current, broad-based technology curriculum. In order to implement this change, it is important that the students understand what current technology education consists of and what curriculum content and teaching methods are best to prepare all young people to be technologically literate in our technology rich society.

STATEMENT OF THE PROBLEM

Many experts agree that everyone needs to receive a broad-based technology education. The University of Wisconsin Stout's technology education, teacher preparation department focuses on this need for teaching technological literacy. Many students entering the University of Wisconsin Stout's teacher education program are coming from traditional programs still focusing on industrial arts curriculum content. Because of this, there are many different perceptions on what technology education is and what curricular content is important to teach at the high school level. Without a mandated broad-based technology education curriculum in the state of Wisconsin, the choice of what to teach and how to teach it often falls solely upon the shoulders of the technology education teacher. Thus, the mission of the technology education teacher plays a large roll in what curricular content is taught.

PURPOSE OF THE STUDY

The purpose of this study is to identify the professional mission that the University of Wisconsin Stout's technology education majors have regarding what curriculum content they will teach. The key to gaining accurate data and assessing the results will be in the development of a questionnaire that can measure the students' choices on what curriculum they will most likely implement when they graduate and become technology education teachers.

OBJECTIVES

The objectives in this study will be addressed by the following questions:

1. What are the choices of classes that the University of Wisconsin Stout technology education majors would want to teach related to the most popular classes currently being taught throughout the country?
2. Are the technology education majors' choices of classes to teach different with respect to their different levels of education (i.e. first year students, sophomores, juniors, seniors)?
3. Do the technology education major's choices of classes to teach reflect their high school technology education experience?
4. Do the technology education majors' choices of classes to teach reflect their favorite technical classes in which they took at the University of Wisconsin Stout?

SIGNIFICANCE OF THE PROBLEM

This study will:

1. attempt to determine the future trends of high school technology education classes taught by the University of Wisconsin Stout technology education majors.
2. aid in determining if students are getting a broad technical education through their experience at the University of Wisconsin Stout.
3. attempt to determine if technology education majors change their perceptions on what technology education is and isn't through their educational experiences at the University of Wisconsin Stout.

LIMITATIONS OF THE STUDY

1. Even by administering the survey to 100, 200, 300, and 400 level classes, an equal representation of first year, sophomore, junior, and senior level students may not be achieved.
2. In dealing with questions number one and five, students may have to generalize class names to be able to match them to the common names listed in the study done by Sanders.
3. In dealing with question number four, students in the earlier stages of the program (i.e. first year, sophomore) may not have had the opportunity to take many technical courses yet.
4. In dealing with questions number one and five, course names do not always reflect the content actually taught in the classroom.
5. In dealing with question number four, there may be other technical classes offered at Stout that could substitute for the listed courses.

DEFINITION OF TERMS

Cognitive Knowledge – the level of understanding just beyond comprehension (basic understanding of meaning). This may include the application of rules, methods, concepts, principles, laws, and theories.

Curriculum – the subject matter that teachers and students cover in their studies. It describes and specifies the methods, structure, organization, balance, and presentation of the content.

Design – an interactive decision-making process that produces plans by which resources are converted in products or systems that meet human needs and wants or solve problems.

Knowledge – 1. the body of truth, information, and principles acquired by mankind. 2. Interpreted information that can be used.

Literacy – basic knowledge and abilities required to function adequately in one's immediate environment.

Problem Solving – the process of understanding a problem, devising a plan, carrying out the plan, and evaluating the plan in order to solve a problem or meet a need or want.

Technological Literacy – the ability to use, manage, understand, and assess technology.

Technology – 1. Human innovation in action that involves the generation of knowledge and processes to develop systems that solve problems and extend human capabilities. 2. The innovation, change, or modification of the natural environment to satisfy perceived human needs and wants.

Technology Education – a study of technology, which provides an opportunity for students to learn about the processes and knowledge related to technology that are needed to solve problems and extend human capabilities.

Vocational Education – training within an educational institution that is intended to prepare an individual for a particular career.

These definitions were taken from the Standards for Technological Literacy: Content for the Study of Technology.

CHAPTER 2
Review of Literature

HISTORY OF TECHNOLOGY EDUCATION

A brief overview of the history of technology education is needed to develop a greater understanding of the evolution of the field and the need for technological literacy. Although the evolution of technology education can be traced back to the ancient Greeks shortly after the death of Christ, this study will begin with the manual training movement in the United States. Technology education has evolved from the combination of three main movements. They are manual training, manual arts, and industrial arts. This section will not focus on the history of the definition of technology education, but rather the evolution of technology education (Barlow, 1967).

The primary goal of this section is to provide the reader with a general knowledge base, which will help in understanding the current philosophies and the future scope of technology education. It is not the point of this study to argue the differences between the philosophies of industrial arts and technology education, but rather to research this "theory-practice" gap in which the content within industrial arts and technology education are practiced and will continue to be practiced by future technology education teachers.

The history of technology education will be written in a fashion that stresses the need for technology education as general education in our society. Four main books will be used to reflect the philosophies that have lead to the current status of technology education. These books give the history by recalling specific events, people, and theories, which greatly influenced the movement towards technology education. The books include the History of Manual and Industrial Education up to 1870 and the History of Manual and Industrial Education 1870 - 1917, both written Bennet, the History of Industrial Education in the United States by Barlow, and An Interpretive History of Industrial Arts written by The American Council on Industrial Arts Teacher Education. Further explanation of technology education, the need for technological literacy, and the current status of the field will also be explained with the aid of articles from various professional publications.

MANUAL TRAINING

Manual training, first envisioned in America in 1877, was the first organized movement towards technology education. Professor C.M. Woodward, dean of the Polytechnic School at Washington University, had a vision that shopwork would be a core subject taught in schools along with other subjects. This philosophy stemmed from his observation of engineering students who had the engineering knowledge, but could not put it into practice because they did not have the skill level to operate hand tools. His manual training plan was built upon the Russian system of technical training. "The Russian system of technical training, upon which the plan for manual training was built, had as its purpose the technical training of engineering students in the use of tools, materials, and processes" (Bennet, 1937, p.332). The manual training movement was to provide skills for the working class. In May of 1878, in front of the St. Louis Social Science Association, Professor Woodward spoke of his vision.

> To Russia belongs the honor of having solved the problem of tool instruction. Others had admitted that practice in using tools and testing materials should go hand in hand with theory; but Russia first conceived and tested the idea of analyzing tool practice into its elements and teaching the elements abstractly to a

> class. In their hands, manual tool instruction became a science…" (Bennet, 1937, p.332).

Professor Woodward traveled about the country, speaking of his vision of manual training as general education. Professor Woodward opened his instruction shops. They consisted of a blacksmith shop, a machine shop, and a woodworking shop.

A few years later, the St. Louis Manual Training School at Washington University was opened (Barlow, 1967). The theory behind Woodward's instruction is as follows,

> The process of instruction must precede that of construction; that is, the students must learn the use of tools before he is required to construct anything. Here is the point where the best manual training schools differ radically from the ordinary system of apprenticeship (Woodward, as quoted in Bennet, 1937, p.337).

Manual training of this sort consisted of much rote and repetition while practicing the skill of mastering a specific tool.

MANUAL ARTS

By the end of the 1890's, a new philosophy called manual arts started to take precedence over the old manual training ideas. The manual arts concept was highly based off the European, Swedish Sloyd system of hand tool education. Donald F. Smith states the difference between the manual training movement and the manual arts movement here. "The former was based on teaching the use of specific tools by completing exercises or making incomplete articles without attention being given to the individual needs and capacities of the child. Sloyd, on the other hand, used the Froebelian idea of harmonious development of children" (American Council on Industrial Arts Teacher Education, 1981, p.182).

Manual arts was a combination of the skill work behind manual training and the knowledge and creativity behind drawing and design. Charles A. Bennet, considered the "father of manual arts," said, "manual training should touch the child's nature on the side of the feelings as well as on the side of the will" (Smith, as quoted by the American Council on Industrial Arts Teacher Education, 1981, p.185). The philosophy of manual arts stressed not only the skills of using tools (referring to the word "manual"), but also aesthetic design and creative thinking (referring to the word "art"). This new "freedom of thinking" and concentration on design and innovation made a large impact on the profession and society as a whole. By the 1900's, many manual training schools had switched to Charles A. Bennett's philosophy of manual arts.

INDUSTRIAL ARTS

The industrial revolution took off in America around the turn of the century. Industry had a huge influence on educational. In order to reflect this, a change in curriculum and the theory of Manual Arts was needed. Charles Richards, editor of Manual Training Magazine, said this about the change.

> It is no longer merely a question of improving an indefinite title, but of replacing one that is inappropriate and incorrect in its implication…Now that we are beginning to see that the scope of this work is nothing short of the elements of the industries fundamental to modern civilization, such a term becomes at once a stumbling block and a source of weakness…(American Council on Industrial Arts Teacher Education, 1981, p.187).

In 1904, Charles Richards coined industrial arts as the new definition to take over the former manual arts era. However, it wasn't until the forties that this name gained widespread acceptance.

The technical aspect of industrial arts came from the word "industry" and the aesthetic and creative values pertained to the word "art." Realizing the need for the study of industry, Dean James Russel, Charles Richard's superior, and Gordon Bonser, an elementary school instructor, began identifying content to be used in the instruction of industrial arts. The basics of the study involved manufacturing and the function of the industrial society. Gordon Bonser's definition of industrial arts, as stated in 1923, goes as follows.

> The industrial arts are those occupations by which changes are made in the forms of materials to increase their values for human usage. As a subject for educative purposes, 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 (American Council on Industrial Arts Teacher Education, 1981, p.188).

Russel and Bonser believed in the industrial arts education for elementary students only. Their idea was for children to go on into a vocational education after seventh grade. During the 1930's, William E. Warner was the first to implement Russel and Bonser's philosophy into secondary education. (Colelli, 1980). Williams later went on to found the main organization of the field, the American Industrial Arts Association (now known as the International Technology Education Association) (Sanders, 1985).

Industrial arts content throughout the mid 1900's consisted of mostly skill training in the areas of woods, metals, and drafting. Industrial arts grew in number of students from 1917 to 1964 from 50,000 to 4,000,000 (Barlow, 1967, p.239). By the 1950's, however, industrial arts started to receive an image of training only those students who did not do well in the core academic subjects. Many industrial arts programs were not keeping up with the current technologies. They were concentrating too much on developing specific tool skills (i.e. hand tools, table saw, etc.) and not on instructing general knowledge that would benefit everyone and uphold the intended industrial arts and general education philosophy.

The 1960's brought on many changes and innovations to the field of industrial arts. The Maryland Plan, the American Industry Project, and the Industrial Arts Curriculum project were all aimed at upgrading and validating industrial arts curriculum. These three projects looked to identify the changes that had occurred in industry due to the exponential growth of technology and its impacts on society. Paul Devore and his colleagues identified three activities that humans have been involved with since the beginning of time. Those activities are producing, communicating, and transporting. The areas that students should study needed to then be production (manufacturing), communication, and transportation (Colelli, 1980).

Around this time period, The National Industrial Arts Programs Project did a study on the content taught in industrial arts curriculum. They found out that the majority of programs were still teaching the use of basic hand tools in the areas of metals, woods, and drafting (Colelli, 1980). With this method of instruction, industrial arts was clearly not keeping up the exponential growth of technology. In an article written by Sanders, published in "The Technology Teacher," he said, "The discipline seemed on shaky footings as it became increasingly difficult to justify traditional content in view of the rapidly changing society" (Sanders, 1985). Again, a change in the scope of industrial arts was needed.

TECHNOLOGY EDUCATION

The industrial arts philosophy and the technology education philosophy have many similarities.

> However, (in most industrial shops) the movement from student irritation with a problem that needed a solution to an examination of actual conditions never crystallized. The problems posed by industrial arts teachers primarily involved machine operation and tool manipulation. The industrial arts paradigm seldom articulated the full intent of Dewey's concern to break down the dichotomy between means and ends (Archambault, 1964). The tools and machinery served as the means to produce a functional product (project) that was an end in itself (Clark, 1999, p.4).

In order to have a better understanding of the need for change in the educational methods commonly practiced in industrial arts, the link between education and technology must be discussed. According to Dennis A. Swyt, education and technology are related in four ways.

The TIPE theory is explained here.

<u>Technology</u> - the creation of technology

<u>Industry</u> - the assimilation of the technology into industry

<u>People</u> - the development of people skilled in the technology

<u>Education</u> - the shaping of education to teach the technology

(Swyt, 1986, p.5)

This system will allow us to be more responsive to the technological changes in our society. Thus, the rapid advancement of technology has driven us to once again change the teaching methods stressed in the traditional industrial arts curriculum.

Hendricks and Sterry define technology, in their book Exploring Technology as "know-how that extends human potential" (Hendricks & Sterry, 1999, p.1). Dennis A. Swyt says, "technology is created as the necessary means to meet human needs." These needs include such things as food and shelter. It is the creation of technology that allows humans to meet these needs. Technology, however, is increasing at an exponential rate. As outlined in the first three levels of the TIPE theory above, the rapidly changing world of technology requires the same exponential growth in education. Thomas A. Hughes, Jr., former ITEA president said this about the change from industrial arts to technology education content. "The profession is moving into a new era in the spiraling process of change, growth, and improvement. We have reached a time when the professionals are saying if we represent the study of industrial or technological aspects of the current world, we me must have a more appropriate identity" (Hughes, 1985, p.3). The new curriculum content to reflect this change is called technology education.

In talking about the change from industrial arts to technology education Thomas a Hughes, Jr. says, "This is surely a period of rebirth or renaissance as we attempt to do what your question asks: line up with what's happening in our technological world today and in the future" (Hughes, 1985, p.4). Like the initial philosophy of industrial arts, technology education is concerned with all students learning how to use technological devices, but this is not the main goal. One of the main goals of technology education is to embed in students fundamental concepts of technology and to teach about the social and cultural significance and impacts that technology has on society (Hendricks & Sterry, 1999). The content to accurately do this involved a much broader curricular content than merely woodworking, metalworking, and drafting.

Technology has mechanized work, increased our ability to receive information, and allowed us to live healthier lives. (Johnson, 1985). Technology has also created many problems and ethical dilemmas along with its benefits. Some of these cultural problems include pollution, destructive weapons, and high levels of stress from information overload.

> As a result, it is necessary that all of us understand technology so that we can live comfortably with it, use it to its potential and our maximum benefit, and direct it intelligently by helping to make good decisions about further development and application" (Sterry & Hendricks, 1999, forward).

The rapidly changing world of technology requires everyone to be technologically literate. This need has called for many new developments in technology education. In 1980, the Jackson's Mill Industrial Arts Curriculum Theory was established to better define technology education content. This theory organized technology education into four areas of study. Those areas were construction, manufacturing, transportation, and communication (Sanders, 1985).

Technology education stresses a total understanding or the origin of technology and that it is created or destroyed to meet human needs (Swyt, 1986). The Maryland curriculum guide, Technology Education: A Maryland Curriculum Framework, defines technology education as follows. "Technology education is a comprehensive, experience-based curriculum in which students learn about technology - its evolution, systems, techniques, utilization, social and cultural significance" (Maryland State Department of Education, 1994, p.3). Industrial arts curriculum stressed the development of psychomotor skills in a time when many occupations relied heavily on "hands on" tasks. With the rapid development of technology, many of these "hands on" jobs are becoming automated by machines and computers requiring a different kind of 'know-how" to successfully operate. Technology education not only teaches students technological skill, but also stresses knowing and valuing technology (Fraser, 1999). The goal of technology education is to reach everyone and give everyone a general background of technology. Almost every job involves technology somehow. The need for technological literacy stems from the ultimate power of technology (International Technology Education Association, 1996).

TECHNOLOGICAL LITERACY

> One of the issues with the change in curriculum and teaching methods from industrial arts philosophy to current technology education trends is the confusion over what it means to be "technologically literate." Literacy is defined here in regards to reading and writing, "Stripping away the verbiage, literacy is the ability to encode and decode a message." "The same conditions must apply to technological literacy. That is, technological literacy requires the ability of an individual to code and encode technological messages" (Waetjen, 1993, p. 6).

A challenge we are facing with traditional industrial arts programs is that many programs are still teaching do-it-yourself skills and hobbies. Many of these classes have become places where "non-academic" students are placed because they do not exceed in other areas. Students who believe they want to be doctors, lawyers, teachers, businessmen, etc. do not take technology education classes because they are coined non-academic. This results in a problem because these professionals do not end up understanding the technical aspects of their jobs and the impact in which technology has on society. This problem is much the same as the problem Professor C.M. Woodward had with his engineering students not having the skills to do "practical engineering" (Bennet, 1937). This statement about technological literacy was made in the Technology for All Americans handbook.

> Indeed, technological literacy is vital to individual, community, and national economic prosperity. Beyond economic vitality is the realization that how people develop and apply technology has become critical to future generations, society, and even the Earth's continued ability to sustain life (International Technology Education Association, 1996, p.6).

Croft went so far as to develop and implement a Delphi study to research the term “technological literacy.” Rather than actually defining technological literacy, he developed a list of characteristics of a technologically literate person. They are as follows:

A technologically literate person:

1. has the abilities to make decisions about technology
2. possesses the basic literacy skills required to solve technological problems
3. has the ability to make wise decisions about uses of technology
4. has the ability to apply knowledge, tools, and skills for the benefit of society
5. has the ability to describe the basic technology systems of society.

(Waetjen, 1993, p. 7)

Kendall N. Starkweather, Executive Director of the International Technology Education Association made this comment in the 1998, September issue of "The Technology Teacher" about the role of technology education instructors. "Our challenge is to provide generation after generation of technological thinkers who have the capability to keep our nations at the forefront of innovation and maintain our prosperity and integrity as kind and sharing people" (Starkweather, 1998, p.13).

In the spring of 2001, the International Technology Education Association administered the ITEA/Gallup Poll to research American citizens' knowledge and attitudes about technological literacy. Three major conclusions were drawn from the study. They are:

1. The American public is virtually unanimous in regarding the development of technological literacy as an important goal for people at all levels.
2. Many Americans view technology narrowly as mostly being computers and the Internet.
3. There is near total consensus in the public sampled that schools should include the study of technology in the curriculum.

(Dugger, W.E., Jr. & Rose, L.C., 2002)

As quoted in "The Technology Teacher" magazine, James R. Johnson, retired executive scientist and laboratory director at 3M, said this at the 1985 ITEA conference,

> Much has been said of "technological literacy," usually meaning that nontechnologists must learn some technics. But this is not enough. Modern technology and its societal meanings require a holistic, integrated understanding

> that permeates all segments of our society. This is for education a goal whose time has come (Johnson, 1985, p.6).

THE NEED FOR CHANGE

"Technology education has and continues to undergo a transformation. The transition from the traditional "shop" of yesteryear to the tech lab of tomorrow has brought about the need for a new model technology teacher" (Burke, 1999, p.5). The following section highlights some of the comments made by professionals in the field of technology education on the need for a new way of thinking about technological literacy and the way we teach technology. As pointed out by many, the future technology education teacher is the backbone for implementing this new way of thinking.

> The discipline seemed on shaky footings as it became increasingly difficult to justify traditional content in view of the rapidly changing society. Rather than educate young people for the industrial society, the profession began to fall under fire, both from within and without, for teaching our youth antiquated content with traditional methods (Sanders, 1985, p.22).

When on thinks carefully about technological literacy, it is easy to recognize it as an outcome measure. That is, it comes as a result of what is in the curriculum and methods used by the teacher to impart the curriculum. But from whence comes the curriculum? From individual teacher whimsy? From the opinions of an "expert?" The proper answer is that "…the inherent structure of any discipline is the only proper source of learning content;…' (Inlow, p. 15, emphasis added). "Does technology education have a structured body of knowledge, of organization concepts, of underlying ideas and fundamental principles that define it as an academic discipline" (Waetjen, 1993, p.8).

As described earlier, referring to the curriculum projects of the 1960's, there have been many attempts to organize a structured body of knowledge. However, the theory-practice gap does not display this. "Irrespective of these individual and collective efforts, change has come very slowly (Sanders, 1985, p.27), (LaPorte, 1982).

> In spite of relatively unilateral agreement that traditional programs are no longer representative of industry and technology, the profession appears to resist change. Even with a smorgasbord of differing models to choose from, it seems educators stay with traditional programs and practices. When the data is laid out on the table, the vast majority of programs are basically woodworking, metalworking, and mechanical drawing (Dugger et al., 1980), (Sanders, 1985, p.27).

"For more than 30 years, members of the profession have warned of the need to restructure our curricula about the concepts of contemporary industry and technology. They suggest that by clinging to traditional programs, technology education (industrial arts) will be judged as obsolete and, thus, eliminated from secondary schools" (Sanders, 1985, p.28).

In response to American technology teaching compared to other countries, Kendall N. Starkweather said,

> What they often find is that they have narrowed their focus and philosophy far more than they had ever realized. They are like a grocery store that sells only vegetables, or a hardware store with supplies only for bricklayers. Their practices have become limited through their own habits. They have become limited like a customer in one of those stores who carries his purchases in his arms because he no longer uses a basket or cart (Starkweather, 1998, p.12).

"As the gifts of technology become more pervasive and its concomitant problems more critical, there is a compelling need for broader understanding" (Johnson, 1985, p.6). An understanding that cannot be met solely by the content of traditional industrial arts.

> The emerging paradigm of technology education, which is the alternative to industrial arts education, eliminates the dedication to special-interest groups and moves back into the general education curriculum with a program designed to serve the needs of all students – a general education course dealing with an understanding of today's technological society (Clark, 1999, p.3).

"The distinction that must be made here is between theory and practice, between the real and the ideal – what Colelli (1989), in the context of old industrial education, has termed the "theory-practice" gap" (Foster, 1999). The technology education teacher is the catalyst in closing this theory-practice gap.

Since the curriculum projects of the 1960s and the name change from industrial arts to technology education in the 1980s, many curriculum initiatives have been taken to make the transition from the industrial arts paradigm to the technology education philosophy easier for instructors. Some initiatives very influential to the field include <u>Technology for All Americans: A Rationale and Structure for the Study of Technology</u>, the <u>Standards for Technological Literacy: Content for the Study of Technology</u>, <u>Project 2061: Benchmarks for Science Literacy</u>, <u>Technically Speaking: Why All Americans Need to Know More About Technology</u>, the development of the Consortium to Advance the Teaching of Technology and Science (CATTS), and countless other national, state, and local curriculum projects.

With these rationale and curriculum projects now in place, it is up to the technology education teacher to enforce this new model of instruction.

THE TECHNOLOGY EDUCATION TEACHER

The following quote is in regards to the change from industrial arts content to current technology education philosophy implemented by teachers at Burnaby High School.

> This agreed –upon philosophy, then, has guided Burnaby's curriculum development and has served as a source of empowerment to help us overcome a tendency, when things get tough, to revert to the shelter of that which we know best and are most comfortable with. The curriculum is not predicted on what teachers enjoyed teaching nor on what students were currently electing, but rather on what we believed would be "the new basics" that would have direct and immediate relevance to life in the 21st Century (Fraser, 1999, p.13).

Once again, the technology teacher is the key in implementing this change.

> Technology educators of the next century will take on a new and revitalized stature. Failure to prepare teachers for tomorrow will result in the untimely demise of the profession known as technology education. This is true of all content areas as the expectations of local schools become more intense and the budgets of school systems continue to be reduced (Burke, 1999, p.7).

With the nature of technology increasing at such a rapid pace, the task to keep up for the technology instructor seems almost impossible. With this in mind, technology instructors must make an effort to teach students transferable technological concepts and skills, which will remain relevant for years to come and allow students to adapt to our technological society.

> Students must be prepared to be productive in a world that will require them to cope with continuous technological change. We must learn the lesson of the 20th century and not become complacent about what teachers know and do. Will Rogers once said, “Even if you’re on the right track, you’ll still get run over if you’re standing still.” Technology education can and should take a leadership role in the future (Burke, 1999, p.9).

SUMMARY

Results from the ITEA/Gallup Poll show that there is a considerable amount of work to be done in changing the way we educate about technology as stated here:

> Leaders in the technology teaching profession know that technology education cannot be a stagnant subject if properly taught. Technology is a dynamic, constantly changing subject area in which the teacher must be ready to make frequent changes to stay current with advancing innovations. Technology teachers are expected to constantly explore advancements in the technological world for implementation into their curriculum and to lead their students in making similar explorations (Starkweather, 2002, p.31).

The need for technological literacy for everyone seems almost like common sense to educators in the field. School districts are beginning to recognize the need for technology education and are relying on institutions like the University of Wisconsin Stout to produce teachers that can implement a broad-based technological literacy curriculum.

The traditional methods of industrial arts education must change and it up to the current and future technology education instructors to implement this change as noted here.

> This way of thinking cannot continue if we expect technology to become a core subject in our schools, money to be available to support technology programs, assistance in producing teachers for our field, legislation that includes technology teaching, and a better position in people's minds about the worth of technology teaching (Starkweather, 2002, p.32).

CHAPTER 3
Methodology

The main purpose of this study is to examine the professional mission of the technology education students at the University of Wisconsin Stout. The professional mission of the technology education students in this case refers to the classes in which they want to teach when they become licensed technology education teachers. This section will provide a review of the sampling procedures, an overview of how the survey instrument was developed and administered, and the data analysis procedures used to determine the relationships of the subjects responses.

SUBJECTS

The population for this study consisted of undergraduate technology education majors at the University of Wisconsin Stout. In order to get an accurate representation of the technology education majors and an equal representation from first year, sophomore, junior, and senior level students, surveys were administered to ten different classes, both technical and professional, from 100, 200, 300, and 400 level classes. Only technology education majors were allowed to take the survey. Students receiving the survey in multiple classes only filled out the survey once. Surveys were not given to senior level students who were currently student teaching so those responses, which could be influenced by the student teaching experience, would not influence the overall data.

INSTRUMENTATION

The purpose of this instrument was to survey the professional mission of University of Wisconsin Stout technology education majors as it related to the classes they would most like to teach upon becoming a secondary technology education teacher. The survey instrument was developed by the researcher. The instrument was in the form of a questionnaire. It consists of three main sections consisting of instructions, a scenario paragraph, and questions. The instructions informed the subjects to not put their names on the questionnaire in order to remain anonymous, what to do with the completed questionnaire, and who to contact with questions regarding the survey.

The second part of the instrument, the scenario paragraph, set the tone for the subjects' responses in question number one by placing them in the shoes of a student teacher applying for their first teaching job. The scenario was developed to try to get the subjects to answer the questions in regards to their own thoughts and opinions rather than that implied by professionals and the current status of the field.

The third part of the survey consists of five questions for the subjects to answer. As explained in the previous paragraph, question number one is in response to the "first job" scenario written by the researcher. In this question, subjects were asked to circle their top five choices of classes they would like to teach upon taking a high school technology education teaching position. The subjects were to then rank those five classes in order from their most favorite (1) out of the five to their least favorite (5) out of the five.

In order to keep some consistency amongst class names, a list of the twenty most commonly taught technology education classes was provided. The list of the twenty most commonly taught technology education classes was taken from the "Technology Education Programs Survey" (TEPS) done by Mark Sanders in 1999. Sander's study was designed to describe current programs and practices in technology education in the United States. One of the research questions that frame the TEPS study is as follows: "What course titles are currently being used in technology education programs and what do these titles suggest about the profession?" The TEPS survey asked participants to list all the technology education courses taught in their programs. The data resulted in a list of 1,756 different course names. These courses were then grouped into twenty categories. These top twenty categories were used as a means of "common ground" list for the participants of this study to choose from (Sanders, 2001).

Questions two and three of this study asked students to identify their gender and year of study (i.e. first year student, sophomore, junior, senior). In order to avoid confusion, students were asked to check their year of study as it would be at the end of the Spring 2003 semester. Information on the credits required to fulfill first year, sophomore, junior, or senior level status was also given.

Question number four of the survey asked students to check their top three favorite technical classes they have taken at the University of Wisconsin Stout. The students did not have to rank the classes, just check their favorite three. The comprehensive list of technical classes was compiled from the Technology Education Program Plan Sheet and University of Wisconsin Stout Program Guide. All students, sometime throughout their schooling at the university, would have the opportunity to take these courses as either a required or an elective course.

Question number five asks students to circle, from a list, any courses in which they had during their high school technology education experience. They were also asked to circle the number (1-3) of experiences they had with each course (i.e. one semester of Woods I and one semester of Wood II). In order to keep some consistency, the same list of course titles from Sander's study, used in question number one was used. Students also had the opportunity to add an additional course title if one of their experiences did not appear on the list.

PROCEDURE

Upon completion of the Protection of Human Subjects training, the first draft of the research questionnaire was completed and reviewed in April of 2003 by a panel of experts consisting of two professors and a research technician at the University of Wisconsin Stout. Revisions were made and the Instructional Research Board reviewed the survey, along with the required paperwork. During the first week of May, the questionnaire was administered to ten different classes. The classes consisted of mostly technology education majors. The researcher administered the questionnaire.

The subjects were introduced to the study and then asked to read the consent form, which described the participants right to decline or withdraw from the survey and their confidentiality with participating. Only technology education majors were allowed to take the survey. If students were in multiple participating classes, they were asked to only compete the survey once. After announcing the consent form, the researcher gave a brief overview, with directions, on how to complete the survey instrument along with directions on the procedures to follow when finished. Students were reminded multiple times, both verbally and on the consent form and actual survey, not to record their names on the survey. The students were then given approximately fifteen minutes to complete the survey. Upon completion, the students were directed to put the questionnaire in a confidential envelope. The questionnaires were then taken to the Office of Information and Operations Systems were the researcher entered the raw data into the computer to be analyzed by the SPSS statistical analysis program.

DATA ANALYSIS

Responses from the questionnaire will be analyzed using descriptive statistics to summarize the results. The following references were used to form a basic understanding of the statistical procedures of this study: Basics of Qualitative Research by Strauss and Corbin, Developing a Questionnaire by Gillham, Survey Design and Analysis Current Issues by Alwin, How to Analyze Survey Data by Fink, Elementary Survey Analysis by Davis, A Guide to Simplified Statistics for Psychology and Education by Smith, and Statistics for People Who (Think They) Hate Statistics by Salkind.

Statistical analysis of the data will consist of a one-way analysis of variables with the data being displayed in multiple cross tabulation tables. Question 1, dealing with the participants top five favorite classes to teach upon becoming a teacher, will be analyzed with a percentage and frequency distribution. Demographic data from questions 2 and 3 will be used to further cross-compare data received from questions 1, 4, and 5. Question 4, dealing with the students' top three favorite technical classes taken, will be analyzed with percentages and frequency distributions. An informal observation will be written on the cross-comparison of the data from question number 1 and the data received from question number 4. Question 5, dealing with the participants high school technology education experience, will be analyzed using percentages and frequency of responses. A cross-comparison will be done between the data received in question number 5 and the responses from question number 1. Upon completion and review of the data analysis, the following objectives will be discussed and evaluated in chapter 4 of the study:

1. What are the choices of classes that the University of Wisconsin Stout technology education majors would want to teach related to the most popular classes currently taught throughout the country?
2. Are the technology education majors' choices of classes to teach different with respect to the their different levels of education (i.e. first year student, sophomore, junior, senior)?
3. Do the technology education majors' choices on classes to teach reflect their high school technology education experience?
4. Do the technology education majors' choices of classes to teach reflect their favorite technical classes in which they took at Stout?

CHAPTER 4
Results and Discussion

The results from this study were collected through the use of a questionnaire developed by the researcher. The questionnaire for this study consisted of five questions. The first question required the participants to choose the top five classes they would like to teach when they become a technology education instructor. Question two and three asked the participants to record their gander and grade level status. Question 4 asked the participants to check their three favorite technical classes they have taken at the University of Wisconsin Stout. In question five, participants were asked to identify any technology education classes they had during their high school experience. Evaluation of the data received was done using the criteria discussed in Chapter III. The results to each question, including some cross comparison tables will be covered in the following paragraphs. The objectives of the study will be discussed in detail in Chapter V of this study.

RESULTS FROM QUESTIONS 2 AND 3: DEMOGAPHIC INFORMATION

The questionnaire for the study was administered to 143 technology education students. Males represented 137 or 95.8 percent of the cases, while females represented 6 or 4.2 percent of the cases.

Table 1: Gender of Respondents

Gender	Frequency	Percent
Males	137	95.8
Females	6	4.2

First year students represented 8 or 5.6 percent of the population. Sophomore students represented 23 or 16.1 percent of the population. Juniors represented 39 or 27.3 percent of the population. Seniors represented 73 or 51.0 percent of the population.

Table 2: Grade Level Status of the Respondents

Status	Frequency	Percent
First Year (0-32 credits)	8	5.6
Sophomore (33-64 credits)	23	16.1
Junior (62-96 credits)	39	27.3
Senior (97-128 credits)	73	51.0

RESULTS FROM QUESTION NUMBER 1

The following are the results to question number one, which asked students to record the five classes they would most like to teach upon becoming a high school technology education instructor. The following table shows the frequency of responses in which each class was selected in the top five. This table does not show the actual rank (1-5) of the class, only whether it appeared in the top 5. The table is in descending order in regards to frequency chosen in the top five.

Table 3: Frequency Top Five Most Like to Teach

Course Title	Frequency chosen in the top 5	Percentage of participants who chose class in top 5
Wood Technology	80	55.9
Drafting/CAD	60	42.0
Construction	60	42.0
Metal Technology	45	31.5
Exploring Technology	44	30.8
Transportation	42	29.4
Welding	41	28.7
Photography	40	30.0
Automotive	33	23.1
Power and Energy	28	19.6
Architectural Drafting	26	18.2
Manufacturing	25	17.5
Graphic Communications	24	16.8
Communications	22	15.4
Electricity and Electronics	19	13.3
Computers	18	12.6
Materials and Processes	17	11.9
Principles of Technology (Engineering)	17	11.9
Architecture	16	11.2
Modular Technology Education	8	5.6

RESULTS FROM QUESTION NUMBER 4

The table on the following page shows the results of question number 4: What are the students' top three favorite technical courses they have taken at the University of Wisconsin Stout. The table does not rank the individuals choices of first through third, but rather the number of times the course was chosen as one of the top three favorite technical classes. The table is in descending order in regards to frequency of times class was chosen in the top three.

Table 4: Favorite Technical Classes

Course Title	Frequency Chosen in Top 3	Percentage of Students Who Chose as Top 3 Favorite Class
Construction Technology	43	30.1
Welding and Casting	43	30.1
Polymer Processes	33	23.1
Transportation (Lecture and Lab)	31	21.7
Machining Metal and Forming Processes	29	19.6
Graphic Comm./Electronic Publishing	28	19.6
Communication and Information Systems	26	18.2
Computer Assisted Design and Drafting	18	12.6
Engineering Drawing I	16	11.2
Materials and Manufacturing Processes	14	9.8
Energy Technology (Lecture and Lab)	13	9.1
Design for Industry	11	7.7
Power Mechanics	11	7.7
Research and Development	9	6.3
Industrial Enterprise Practicum	7	4.9
Communication Information Technology	7	4.9
Prototype Development and Model Making	6	4.2
Architectural Graphics	6	4.2
Intro to Fluid Power	5	3.5
Engineering Drawing II	5	3.5
Computer Aided Manufacturing	4	2.8
Manufacturing Systems	4	2.8
Electricity/Electronics Fundamentals	3	2.1
Electronic Prepress	3	2.1
Publication Production	2	.7
Graphic Communications Practicum	2	.7
Architectural Design I	2	.7
Construction Materials	2	.7
Robotics	2	.7
Protocols & Interfacing Lab	1	.7
Heavy Construction Methods and Equip.	1	.7
Mechanical Power Transmission	1	.7
Numerical Control	0	0
Digital Logic and Switching	0	0
Microprocessors Fundaments	0	0
Architectural Technology	0	0
Data Communications	0	0
Introduction to Telephony	0	0
Electrical Systems Application	0	0
Other	0	0

RESULTS FROM QUESTION NUMBER 5

The following table shows the results of question number 5: What classes did the students have the most experiences in during high school? The table shows the number of students who had at least one experience with the class. The table is in descending order in regards to the total number of participants whom have taken at least one class.

Table 5: Classes Taken Most Often in High School

Class Title	Number of participants whom have taken at least one class	Percentage of participants whom have taken at least one class
Wood Technology	72	64.9
Drafting/CAD	50	45.0
Metal Technology	45	40.5
Welding	42	37.8
Exploring Technology	39	35.1
Automotive	30	27.3
Construction	28	25.2
Photography	25	22.5
Architectural Drafting	22	19.8
Computers	22	19.8
Electricity and Electronics	19	17.1
Graphic Communications	17	15.3
Manufacturing	13	11.7
Materials and Processes	12	10.8
Power and Energy	11	9.9
Architecture	11	9.9
Transportation	9	8.1
Communications	8	7.2
Other	8	7.2
Principles of Technology (Engineering)	6	5.4
Modular Technology Education	5	4.5

CROSS COMPARISON TABLES

The following tables were developed in an attempt to develop conclusions for the four objectives of the study listed below.

1. What are the choices of classes that the University of Wisconsin Stout technology education majors would want to teach related to the most popular classes currently being taught throughout the country?
2. Are the technology education majors' choices of classes to teach different with respect to their different levels of education (i.e. first year students, sophomores, juniors, seniors)?
3. Do the technology education major's choices of classes to teach reflect their high school technology education experience?
4. Do the technology education majors' choices of classes to teach reflect their favorite technical classes in which they took at the University of Wisconsin Stout?

OBJECTIVE NUMBER 1

Table 6 below will be used in response to objective number 1 of the study: What are the choices of classes that the University of Wisconsin Stout technology education majors would want to teach related to the most popular classes currently being taught throughout the country? The column on the left represents University of Wisconsin Stout students. The column on the right is from the Sander's study discussed in Chapter III.

Table 6: Students Choices for Most Favorite Classes to Teach vs. Most Popular Classes Taught in the United States

Class Rank	Stout Students Choices for Most Favorite Classes to Teach	Most Popular Classes Taught in the United States (1999)
1	Wood Technology	Exploring Technology
2	Drafting/CAD	Drafting/CAD
3	Construction	Wood Technology
4	Metal Technology	Metal Technology
5	Exploring Technology	Architectural Drafting
6	Transportation	Electricity and Electronics
7	Welding	Manufacturing
8	Photography	Communications
9	Automotive	Automotive
10	Power and Energy	Graphic Communications
11	Architectural Drafting	Construction
12	Manufacturing	Transportation
13	Graphic Communications	Materials and Processes
14	Communications	Power and Energy
15	Electricity and Electronics	Welding
16	Computers	Photography
17	Materials and Processes	Modular Technology Education
18	Principles of Technology (Engineering)	Computers
19	Architecture	Principles of Technology (Engineering)
20	Modular Technology Education	Architecture

Results from the table above show that the University of Wisconsin Stout technology education majors' choices for favorite classes to teach are very close to the data obtained from the 1999 Sander's study on the most popular classes taught in the United States. Four out of the top five classes (Wood Technology, Drafting/CAD, Metal Technology, and Exploring Technology) are the same for each study. Construction is the other course in the top five as selected by Stout student.

OBJECTIVE NUMBER 2

Tables 7-10 below will be used in response to objective number 2: Are the technology education majors' choices to teach different with respect to their different grade levels of education (i.e. first year, sophomore, junior, senior)? Each level will be represented in a separate table. Only the top five choices in each level will be given. Due to ties in the frequency of responses, more than five classes may be listed. The percentage column represents the frequency of student choices in regards to their own grade level.

Table 7: Classes Most Wanted to Teach by First Year Students

<table>
<tr><td>Rank</td><td>Class</td><td>Frequency</td><td>Percentage</td></tr>
<tr><td>1</td><td>Drafting/Cad</td><td>5</td><td>62.5</td></tr>
<tr><td>2</td><td rowspan="2">Wood Technology, Power and Energy (tie)</td><td rowspan="2">4</td><td rowspan="2">50</td></tr>
<tr><td>3</td></tr>
<tr><td>4</td><td rowspan="2">Arch. Drafting, Construction, Computers (tie)</td><td rowspan="2">3</td><td rowspan="2">37.5</td></tr>
<tr><td>5</td></tr>
</table>

Table 8: Classes Most Wanted to Teach by Sophomores

Rank	Class	Frequency	Percentage
1	Wood Technology	13	56.5
2	Construction	12	52.2
3	Drafting/Cad	11	47.9
4	Welding	9	3.9
5	Automotive, Metal Technology (tie)	8	3.5

Table 9: Classes Most Wanted to Teach by Juniors

Rank	Class	Frequency	Percentage
1	Wood Technology	20	51.3
2	Construction	17	43.6
3	Photography	13	33.3
4 5	Exploring Tech., Drafting/Cad (tie)	12	30.8

Table 10: Classes Most Wanted to Teach by Seniors

Rank	Class	Frequency	Percentage
1	Wood Technology	43	58.9
2	Drafting/CAD	32	43.8
3	Construction	28	38.4
4	Transportation	27	37.0
5	Metal Technology	25	34.2

Results from tables 7-10 above show that the technology education majors' choices on classes to teach are not tremendously different at the different grade levels. Each level of education (first year, sophomore, junior, senior) chose Wood Technology, Construction, and Drafting/CAD as a top five class to teach. Three out of the four grade levels picked Wood Technology as their favorite class to teach.

OBJECTIVE NUMBER 3

The following table will be used in response to objective number 3: Do the technology education majors' choices of classes to teach reflect their high school technology education experience? The table is in descending order in regards to percentage of students who had a high school experience and chose the class as one of their top five favorite classes to teach.

Table 11: Choices of Classes to Teach vs. Class Experience in High School

Class Title	Had Experience in High School	Chose as Top Five Class to Teach	Percentage Who Had High School Experience and Chose as Top Five
Wood Technology	72	54	75.0
Principles of Technology (Engineering)	6	4	66.7
Photography	25	16	64.0
Graphic Communications	17	10	58.8
Transportation	9	5	55.6
Drafting/CAD	50	25	50.0
Exploring Technology	39	18	46.2
Metal Technology	45	20	44.4
Construction	28	12	42.9
Welding	42	17	40.5
Modular Technology Education	5	2	40.0
Power and Energy	11	4	36.4
Architectural Drafting	22	7	31.8
Manufacturing	13	4	30.7
Automotive	30	9	30.0
Computers	22	6	27.3
Electricity and Electronics	19	5	26.3
Communications	8	2	25.0
Materials and Processes	12	3	25.0
Architecture	11	2	18.2

Results from table 11 above show that 75% of the students that chose Wood Technology (highest rated class) had an experience with wood technology in high school.

Principles of Technology, Photography, Graphic Communications, Transportation, and Drafting/CAD all had a percentage of 50% or more. Computers, Electricity and Electronics, Communications, Materials and Processes, and Architecture had the lowest percentages. Overall, the distribution of percentages covers a very large range. Besides the classes with the top five percentages, experience in high school seems to influence only 50% or less of the students choices on favorite classes to teach.

OBJECTIVE NUMBER 4

A cross comparison table between the classes most wanted to teach and favorite classes at Stout will not be developed due to the differences in class names and the grouping of the curricular content. However, objective number 4: Do the technology education majors' choices of classes to teach reflect their favorite technical classes in which they took at the University of Wisconsin Stout, will be discussed informally and generalized in Chapter V of this study.

CHAPTER 5
Summary, Conclusions, and Recommendations

INTRODUCTION

This chapter is divided into three sections. The first section will summarize the investigation of the professional mission of the technology education majors at the University of Wisconsin Stout. The second section will outline the conclusions of the study related to the data obtained and the objectives of the study. The third section will address the researcher's recommendations for future studies and developments in regards to the study.

SUMMARY

The purpose of this descriptive study was to determine the professional mission of the technology education majors at the University of Wisconsin Stout in regards to the classes they want to teach when they become teachers. The data for the study was obtained using a questionnaire designed and implemented by the researcher. Over a span of two weeks, 143 students, consisting of first year, sophomore, junior, and senior level technology education majors completed the survey.

The study was designed to address the following objectives:

1. What are the choices of classes that the University of Wisconsin Stout technology education majors would want to teach related to the most popular classes currently being taught throughout the country?
2. Are the technology education majors' choices of classes to teach different with respect to their different levels of education (i.e. first year students, sophomores, juniors, seniors)?

3. Do the technology education majors' choices of classes to teach reflect their high school technology education experience?
4. Do the technology education majors' choices of classes to teach reflect their favorite technical classes in which they took at the University of Wisconsin Stout?

CONCLUSIONS

This section of the chapter will look at the conclusions drawn by the researcher in regards to the four objectives listed in the summary section of this chapter.

Objective Number 1

> What are the choices of classes that the University of Wisconsin Stout technology education majors would want to teach related to the most popular classes currently being taught throughout the country?

Results from the survey show that the top five classes the technology education majors want to teach upon graduation are Wood Technology, Drafting/CAD, Construction, Metal Technology, and Exploring Technology. The top five courses taught in the United States from Sander's 1999 study include Exploring Technology, Drafting/CAD, Wood Technology, Metal Technology, and Architectural Drafting. As the results show, four out of the top five classes are the same for each study showing that the choices of classes to teach for the University of Wisconsin Stout technology education majors are almost exactly the same as the results from Sander's study. Although curricular content could be different, the course names, especially Wood Technology, Drafting/CAD and Metal Technology, reflect traditional industrial arts classes.

Objective Number 2

Are the technology education majors' choices of classes to teach different with respect to their different levels of education (i.e. first year students, sophomores, juniors, seniors)?

Students from each level of education (first year, sophomore, junior, senior) chose Wood Technology, Construction, and Drafting/CAD as a top five class to teach. Three out of the four grade levels picked Wood Technology as their favorite class to teach. These results show that there is not a dramatic change in the choices of classes to teach with respect to the different grade levels of education.

Objective Number 3

Do the technology education majors' choices of classes to teach reflect their high school technology education experience?

Results from this section of the study show that 50% or more of the students that had experiences in Wood Technology, Principles of Technology, Photography, Graphic Communications, Transportation, and Drafting/CAD in high school, chose these classes as classes they would like to teach upon graduation from Stout. The top ranked class was once again Wood Technology with 75% of the students having experienced this class in high school wanting to teach it. With the rest of the classes on the list, less than half the students who had experiences with them in high school wanted to go on and teach them.

Objective Number 4

Do the technology education majors' choices of classes to teach reflect their favorite technical classes in which they took at the University of Wisconsin Stout?

The top five choices for the favorite technical class at Stout, chosen by the technology education majors include Construction Technology, Welding and Casting, Polymer Processes, Transportation (Lecture and Lab), and Machining Metal Forming and Processes. Due to the fact that the variable (class) names were different between the choices of classes to teach and the technical classes at Stout, a cross comparison table was not developed in chapter 4. However, it is apparent from the results that many students' favorite classes at Stout reflect some type of material processing content. Four out of the five top choices consist of some type of material processing curricular content. Three of the top five (Wood Technology, Metal Technology, Construction) classes, in which student want to teach upon graduation, are very material processing based. Thus, there may be a large connection between the students' favorite technical classes at Stout and their choices of classes to teach upon graduation. Further, more detailed research in this area is needed to determine all the variables involved in the students choices.

RECOMMENDATIONS

This section contains recommendations based on the findings of this research. With this being an initial investigation, further research into each of the objectives is needed to determine all the variables involved in the students' choices.

It is apparent that the choices of classes to teach upon graduation are based on traditional industrial arts classes. Wood Technology, Drafting/CAD, and Metal Technology have been the main courses for much of the 20th century. Without further investigation into the actual content and methods of teaching in which the technology education majors would use to present the content, it is difficult to determine if these classes would be taught with a "rote and repetition" mentality. However, if a class name represents the content involved, many technology education majors may be going through the program and then resorting back to tradition teaching content upon becoming a teacher.

With this in mind, there seems to be a problem with the multitude of class names and lack of structure in the field of technology education. Without a mandated technology education class at the high school level covering a variety of topics (i.e. manufacturing, transportation, communications, construction, biotechnology, etc) there is no consistency amongst what is being taught about technology. In a sense, teachers teach what they want to teach and students may be missing out on the "big picture" that is needed for everyone to be technologically literate. The data from this study suggests that the trend in teaching very specific, traditional industrial arts type classes is a cyclical process and will continue to happen. Recommendations one and two below are suggested to break through this cyclical trend.

Recommendation Number 1

> There needs to be a broad-based technology education class with a consistent curriculum required in the state of Wisconsin for all high school students. With this in place, all students would receive a similar experience in technology.

Recommendation Number 2

> There needs to be a broad-based technology requirement for all technology education majors at Stout. The course needs to cover many areas in technology (i.e. manufacturing, transportation, communications, construction, biotechnology, etc). This class should be taught by technology education, teacher educators rather than the specific technical instructors. Students should be required to complete this class before taking and curriculum classes, before taking any technical classes, and before choosing a technical emphasis.

It is apparent from the results of this study that the classes chosen seem to be very specific in content (i.e. Wood Technology, Metal Technology, Graphic Arts, etc). It is troubling that students did not pick class such as Materials and Processes as there favorite class to teach which may reflect a more broad-based, conceptual description of curricular content. Much of this problem may be due to the fact that there are just so many different names of classes that it is confusing for students to place content into any type of organized framework.

Recommendation Number 3

> The faculty in the technology education department and the technology department need to work together in creating a framework of classes in which the connections between the content in the classes is clearly represented. Students need to know how all these technologies are related and interdependent upon each other.

Recommendation Number 4

> All technical subjects need to be taught in a conceptual, process-orientated fashion, which uses the same terminology and is consistent across the board. For example, all material and processes classes need to base their content on big ideas such as separating, joining, finishing, etc. With this approach to teaching, students will be more apt to teach using conceptual methods rather than strictly teaching skill development. There would also be more consistency between technical classes. This does not mean, however, that there will be less “hands on” in the technical classes.

It is recommended by the researcher that further studies be done in the area of “technology teacher mission.” Recommendations for future studies are described below.

Recommendation Number 5

> If this study were to be replicated again, a more detailed description of the class choices should be used. The list of classes from the Sander’s study gives the name of the class, but does not go into detail about the actual content involved. Due to this problem, students may choose a class title, but teach it very differently than someone else. As mentioned earlier in the study, there seems to be a problem with multitude of class titles.

Recommendation Number 6

If this study were to be replicated again, data taken for objective number four: Do the technology education major's choices of classes to teach reflect their favorite technical classes in which they took at the University of Wisconsin Stout, should be broken down into grade-level choices. This study did not categorize the data this way. The problem with not breaking the data down into grade levels is that many underclassmen may not have had the opportunity to take many technical classes. Due to this, the data for objective number four may be interpreted differently.

CONCLUSION

Through the results of this study and the experiences of the researcher in the field of technology education, it is recommended that the state of Wisconsin should continue to develop the state's technology education initiatives. More emphasis needs to be placed on the development of broad-based technology classes at the secondary level. School districts need to implement a technology education graduation requirement for all students. In order to begin creating some consistency amongst classes, teachers need to align their curriculum with national standards. Teacher development workshops on implementing a broad, standards-based course need to be offered across the state. With these initiatives in place, it is ultimately up to the future technology education teachers to ensure that all students are technologically literate and prepared for our ever-changing technological society.

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APPENDIX A

A STUDY OF THE PROFFESSIONAL MISSION OF THE TECHNOLOGY EDUCATION MAJORS AT THE

UNIVERSITY OF WISCONSIN STOUT

Questionnaire Instructions

Prior to starting this survey, please read the consent form, which was given to you separately. In order to remain anonymous, please do not put your name on any of the materials in this packet. When completed, please put the questionnaire in the envelope located at the front of the classroom. Please read the instructions carefully. The accuracy of this data is an important part of this study. If you have any further questions about this study, please contact Steve Meyer, the primary researcher, at 715-232-5619.

The following three paragraphs place you in the shoes of a student teacher applying for your first teaching job. Please read the following scenario and answer the questions below.
You are in the last month of completing your student teaching experience and you have been religiously looking for teaching jobs. The date for retiring teachers to officially announce their retirement was last week. Due to a large number of technology education teachers retiring, there are numerous job listings on the Department of Public Instruction's (DPI) website.

Many of the jobs offered are in the geographical area where you want to move. The schools are all approximately the same size, pay approximately the same salary, and have very similar facilities. The only difference between the schools' technology education programs is the courses that they offer. In order to narrow down the schools that you are going to apply for, you decide to write down a list of criteria for your dream-teaching job.

You begin by writing down what your perfect class schedule would be. Each school you are applying to has a seven period class day. One of those periods is your preparation period. Since you are a new teacher you are assigned to supervise a study hall so you can have a little more time to correct papers, plan for class, etc. This leaves you with five class periods to teach. With this in mind, pick the **five** classes below that you would most like to teach. Circle the codes (A, B, C, etc.) of the 5 classes, and then circle the number, which coincides to your rank (most favorite = 1 to least favorite = 5) of those classes. **You will only circle five classes. Each rank will only be used once.**

Class Code	**Class Title**	Rank
A	Exploring Technology	1 2 3 4 5
B	Drafting/CAD	1 2 3 4 5
C	Wood Technology	1 2 3 4 5
D	Metal Technology	1 2 3 4 5
E	Architectural Drafting	1 2 3 4 5
F	Electricity and Electronics	1 2 3 4 5
G	Manufacturing	1 2 3 4 5
H	Communications	1 2 3 4 5
I	Automotive	1 2 3 4 5
J	Graphic Communications	1 2 3 4 5
K	Construction	1 2 3 4 5
L	Transportation	1 2 3 4 5
M	Materials and Processes	1 2 3 4 5
N	Power and Energy	1 2 3 4 5
O	Welding	1 2 3 4 5
P	Photography	1 2 3 4 5
Q	Modular Technology Education	1 2 3 4 5
R	Computers	1 2 3 4 5
S	Principles of Technology (Engineering)	1 2 3 4 5
T	Architecture	1 2 3 4 5

If there is another class, not listed in this table that you would like to teach, please give the course name and rank here. ________________ 1 2 3 4 5

Please check the appropriate blank below in respect to your gender.

________ male ________ female

What will be your status at the end of this semester? (check 1)

_____ freshman (0 – 32 credits)   _____ sophomore (33 - 64 credits)   _____ junior (65 – 96 credits)   _____ senior (97 – 128 credits)

Out of the choices provided below, what have been your top three favorite technical classes here at Stout? Please check only three.

- ☐ Construction Technology
- ☐ Energy Technology (Lecture and Lab)
- ☐ Industrial Enterprise Practicum
- ☐ Welding and Casting
- ☐ Polymer Processes
- ☐ Engineering Drawing I
- ☐ Computer Assisted Design and Drafting
- ☐ Research and Development
- ☐ Publication Production
- ☐ Graphic Communications Practicum
- ☐ Architectural Design I
- ☐ Construction Materials
- ☐ Electricity/Electronics Fundamentals
- ☐ Protocols & Interfacing Lab
- ☐ Communication Information Technology
- ☐ Intro to Fluid Power
- ☐ Computer Aided Manufacturing
- ☐ Numerical Control
- ☐ Digital Logic and Switching
- ☐ Microprocessors Fundamentals
- ☐ Transportation (Lecture and Lab)
- ☐ Communication and Information Systems
- ☐ Design for Industry
- ☐ Machining Metal and Forming Processes
- ☐ Materials and Manufacturing Processes
- ☐ Engineering Drawing II
- ☐ Prototype Development and Model Making
- ☐ Electronic Prepress
- ☐ Graphic Comm./Electronic Publishing
- ☐ Architectural Graphics
- ☐ Architectural Technology
- ☐ Heavy Construction Methods and Equipment
- ☐ Data Communications
- ☐ Introduction to Telephony
- ☐ Power Mechanics
- ☐ Mechanical Power Transmission
- ☐ Robotics
- ☐ Manufacturing Systems
- ☐ Electrical Systems Applications

The table below contains the general titles of today's most commonly taught high school technology education courses. Out of this list, please circle the class code for any classes that you had in high school. Also, circle the number of times (i.e. Wood Technology I, Wood Technology II) you experienced these classes. If there are any questions on where a class would fit, please ask the questionnaire implementer.

Class Code	Class Title	Number of Courses Taken
A	Exploring Technology	1 2 3
B	Drafting/CAD	1 2 3
C	Wood Technology	1 2 3
D	Metal Technology	1 2 3
E	Architectural Drafting	1 2 3
F	Electricity and Electronics	1 2 3
G	Manufacturing	1 2 3
H	Communications	1 2 3
I	Automotive	1 2 3
J	Graphic Communications	1 2 3
K	Construction	1 2 3
L	Transportation	1 2 3
M	Materials and Processes	1 2 3
N	Power and Energy	1 2 3
O	Welding	1 2 3
P	Photography	1 2 3
Q	Modular Technology Education	1 2 3
R	Computers	1 2 3
S	Principles of Technology (Engineering)	1 2 3
T	Architecture	1 2 3

Other Class ___________________________________ 1 2 3

APPENDIX B

Research Consent Form

Directions: *Please read the following paragraphs before completing the attached questionnaire.*

STUDY TITLE:
A Study of the Professional Mission of the Technology Education Majors at the University of Wisconsin Stout

DESCRIPTION OF THE STUDY:
The main intent of this study it to determine the choice of classes the University of Wisconsin Stout technology education majors would most like to teach when they graduate from Stout and become practicing teachers. This study will use a questionnaire/survey to determine the students' choices.

RISKS OF THE STUDY:
There is little or no risk to you in filling out this questionnaire. Methods have been taken to ensure that your responses are not identifiable. Completed questionnaires will only be used for their raw data by the researcher.

BENEFITS:
Although the results of this study may be beneficial in future studies, there is no direct benefit to you by participating in this study.

CONFIDENTIALITY OF RESPONSES:
Your answers are strictly confidential. There are no identifying marks or codes and only the researcher will have direct access to the raw data.

RIGHT TO WITHDRAW OR DECLINE TO PARTICIPATE:
Your participation in this study is entirely voluntary. You may choose not to participate without any adverse consequences to you. Should you choose to participate and later wish to withdraw from the study, you may discontinue at that time without incurring any adverse consequences.

I understand that by returning the questionnaire, I am giving my informed consent as a participating volunteer in this study. I understand the basic nature of the study and any potential risks and benefits that were described above. I am aware that the information is being sought in a specific manner so that only minimal identifiers are necessary and so that confidentiality is guaranteed. I realize that I have the right to refuse to participate and that my right to withdraw form participation at any time during the study will be respected with no coercion or prejudice.

Note: Questions or concerns about the research study should be addressed to Steve Meyer, researcher (email: meyerste@uwstout.edu, phone: 715-232-5619) or Dr. Steve Schlough, research advisor (email: schloughs@uwstout.edu, phone: 715-232-1484). Questions about the rights of research subjects can be addressed to Sue Foxwell, Human Protections Administrator, UW-Stout Institutional Review Board for the Protection of Human Subjects in Research, 11 Harvey Hall, Menomonie, WI, 54751, phone: 715-232-1126.