

WISCONSIN TECHNOLOGY EDUCATION ASSOCIATION TEACHERS'
PERCEPTIONS OF THE NEED FOR A STANDARDS-BASED INTRODUCTORY
TECHNOLOGY EDUCATION COURSE REQUIRED FOR ALL STUDENTS

by

Jonathan Lindee

A Research Paper

Submitted in Partial Fulfillment of the

Requirements for the

Master of Science Degree

in

Career and Technical Education

Approved: 2 Semester Credits



Research Advisor

The Graduate School

University of Wisconsin-Stout

October, 2004

The Graduate School
 University of Wisconsin Stout
 Menomonie, WI 54871

ABSTRACT

<u>Lindee</u>	<u>Jonathan</u>	<u>D.</u>
(Writer) (Last Name)	(First Name)	(Initial)

Wisconsin Technology Education Association Teachers' Perceptions of the Need for a
 Standards-based Technology Education Course Required for All Students
 (Title)

Career and Technical Education
 (Graduate Major)

<u>Dr. Howard Lee</u>	<u>10/18/2004</u>	<u>107</u>
(Research Advisor)	(Date)	(No. of Pages)

American Psychological Association, 5th Ed.
 (Manual Style)

The purpose of this study was to evaluate technology education teachers' perceptions of the need for a standards-based, introductory technology education course for all seventh, eighth, ninth, or tenth grade students in Wisconsin. Secondly, this research indicates the opinions of technology education teachers regarding the need for content in such a course.

The population surveyed was a clustered sample of the members of the Wisconsin Technology Education Association. Members of this organization are typically teachers, professors, administrators, business people and other individuals that are affiliated with the

field of technology education. The population for this sample who received a survey in July, 2004 needed to be members of WTEA, not college students, not retired or business members, and currently teaching technology education.

Many technology education programs are facing funding problems, lack of consistency implementing technology education content, and the lack of a place in the core requirements next to science, math and other disciplines.

The results of this study indicate that many technology education teachers in WTEA would support the implementation of an introductory technology course, designed as a requirement for all students. Many technology education teachers in this organization also indicated that they would not alter the content in any course developed and implemented as a requirement as long as the teachers had the facilities and equipment to implement such a course. If a standards-based, introductory technology education course is eventually implemented as requirement for all students, the developers of such a course must account for the variety of facilities and equipment available to deliver content that is consistently taught between school districts.

Acknowledgments

This study would not have been possible without the support of a variety of individuals throughout my stay at Stout. First, I would like to thank university personnel instrumental at various points in the process of completing my thesis including my professors and the campus student services personnel. Secondly, I would like to thank my research advisor, Dr. Howard Lee, for encouraging me throughout this process. This is a learning experience I will carry with me throughout my lifetime.

I would also like to thank my bride, Kari, for supporting me endlessly. You constantly show me how fun life can be, you are the light of my life! Thank you for marrying me, I love you more than words can say!

Finally, I would like to thank my family and friends for providing suggestions, encouragement, and sometimes just an ear to listen to. The relationships I have with each of you are precious, and I look forward to returning the favor whenever the time presents itself!

Table of Contents

	<u>Page</u>
Abstract	ii
List of Tables.....	vii
 Chapter I: Introduction	
Statement of Problem	5
Purpose of Study	7
Research Questions	7
Significance of the Problem	8
Limitations of the Study	9
Definition of the Terms	10
 Chapter II: Literature Review	
Introduction	11
What is Technology Education?.....	11
How are Technology Education and Its Standards Related to Curriculum?.....	16
Standards of Other Content Areas	21
The Need for a Standards-Based, Introductory Technology Education Course, Required for All Students	23
Support for a Standards-Based, Introductory Technology Education Course, Required for All Students	26
Summary	27

	<u>Page</u>
Chapter III: Methodology	
Introduction	29
Method of Study	29
Sample Selection	30
Instrumentation	32
Procedures for Data Collected	37
Method of Analysis	37
Limitations	38
Chapter IV: Results and Discussion	
Introduction	40
Data Results	41
Chapter V: Summary, Conclusions, and Recommendations	
Introduction	71
Summary	71
Conclusions	78
Recommendations	84
References	88
Appendices	
Appendix A – Survey Instrument	92
Appendix B – Authors Included in the Karnes (1999) Article	95

List of Tables

	<u>Page</u>
Table 1 – Changing Emphasis in Technology Education	12
Table 2 – Comparison of Research and Section One Survey Questions.....	34
Table 3 - Comparison of Research and Section Two Survey Questions	36
Table 4 – Question 1 - How Many Years of Teaching Experience do You Have?	43
Table 5 – Question 2 - Please Check the Level at Which You Will Teach Next Fall.	44
Table 6 – Question 3 - What College Did / Will You Receive Your Bachelors Degree From?	45
Table 7 – Question 4 - Please Check the Highest Degree You Have Attained Below: ..	46
Table 8 – Question 1 - Using the Broad Definition of Technology as "Modifying Our Natural World to Meet Human Needs" the Study of Technology Should be Included in the school curriculum.	47
Table 9 – Question 2 - The Study of Technology Should be Made a Part of Other Subjects Like Science, Math, and Social Studies.	48
Table 10 – Question 3 - The Study of Technology Should be Taught as a Separate Subject.	50
Table 11 – Question 4 - If Technology is Taught as a Separate Subject it Should be a Required Class for All Students.	51
Table 12 – Question 5 - Technology Education Needs to Specifically Define What Content it Should Teach, at Least at the Introductory Level.	52

	<u>Page</u>
Table 13 – Question 6 - Provided the Funding Was Available, I Would Be Interested in Implementing This Course in My Program Offering.	53
Table 14 – Question 7 - I Would Teach the Course as it Was Developed, Without Altering the content in any way.	54
Table 15 – Question 8 - I Would Alter the Content of the Course To Fit the Facilities and Equipment I Have at My School.	56
Table 16 – Question 9 - I Believe It Is Important for Students Taking an Introductory Technology Education Course to Be Exposed to the Same Content Regardless of the School They Attend.	57
Table 17 – Question 10 - If Some of the Content Developed by This Panel of Experts Was Similar or Identical to the Content I Currently Deliver in Other Classes I Teach, I Would Be Willing to Change the Content in My Other Classes.	59
Table 18 – Question 11 - The District I Teach in Has the Facilities and Equipment to Accommodate an Introductory Class for All Students at the Middle/Junior High Level.	60
Table 19 – Question 12 - I Would Recommend an Introductory Course as a Requirement for All Students at the 7 th or 8 th Grade Level.	61
Table 20 – Question 13 - The District I Teach in Has the Facilities and Equipment to Accommodate an Introductory Class for All students at the High School Level.	62
Table 21 – Question 14 - I Would Recommend an Introductory Course as a Requirement for All Students at the 9 th or 10 th Grade Level.	63

	<u>Page</u>
Table 22 – Comparison by Teaching Level	65
Table 23 – Comparison by College Where Bachelors Degree Was Attained	67
Table 24 – Comparison by Highest Level of Degree Attained	69

Chapter I

Introduction

Do Wisconsin's schools need a required technology education course? Well, what is technology education? The answer to these questions is likely based on the school district. Many of Wisconsin's technology education teachers would hopefully give a definition that's generalized enough to include the areas of manufacturing, construction, communication, and transportation. The International Technology Education Association (ITEA) defines technology education as "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" (2004a, n.p.).

A technology education program for grades 7 - 12 in Wisconsin should be based either on the Standards for Technological Literacy or Wisconsin's Model Academic Standards for Technology Education (ITEA, 2004b; Wisconsin Department of Public Instruction, 2004). According to ITEA, the typical technology education curriculum might look like the following: Starting with exploratory areas in the middle school curriculum, courses should have specific names such as Exploring Technology and Innovation, Engineering Design, and Technological Systems. Exploring Technology should be 6 or 9 weeks in length and should include group and individual activities in design making and constructing solutions to technological problems. Innovation and Engineering Design should be 18 weeks in length and should include engineering design activities, brainstorming, visualizing, modeling, constructing, testing, and refining designs.

Students should understand the uses and impacts of innovations and develop skills in communicating design information and reporting results. Technological Systems should be 18 to 36 weeks in length and should include the exploration of design, development, and relationships of different systems. Systems concepts are applied to design and problem-solving activities in relation to transportation, information, energy, power, biotechnology, and other technological systems. Students should be engaged in laboratory activities constructing, using, and assessing technological systems. In high school, courses also have specific names such as Foundations of Technology, Technology Assessment, Issues in Technology, and Engineering Design Fundamentals. Foundations of Technology should be 18 or 36 weeks in length and include engaging group and individual activities, encouraging students to create ideas, develop innovations, and engineer practical solutions. During these activities students would apply science, math, and other school subjects. Technology Assessment should be 18 or 36 weeks in length and include students evaluating the appropriateness and effectiveness of various technologies. Students should determine and assess the effectiveness of new ideas, innovations, and technological systems while practicing analytical thinking, decision-making, and performing continuous design improvements. Issues in Technology and Engineering Design Fundamentals are advanced courses, which should be 18 to 36 weeks in length. In these two courses, students are eligible for advanced placement status applicable towards post-secondary education (ITEA, 1999). While the course offerings are beneficial, there are potential problems in the future for technology education because the existence of the

standards are not enough to ensure the continued funding of technology education programs.

Steve Johnston, president of the Wisconsin Technology Education Association from 2002-2004, offered the following insight: “As many of you are aware, the President’s [United States President George W. Bush] budget for fiscal year 2004 contains a proposal that could shift Perkins funds away from career and technical education entirely and use funds to alleviate costs and pressures associated with No Child Left Behind” (2003, p. 4). Johnston indicated the existence of pressure, disguised as a funding threat, from the federal and state government towards technology education. The shift in funding would jeopardize the future of the profession of technology education. The need for technology education teachers to take an active role establishing and following, among other things, introductory curriculum is imperative.

Based on Johnston’s previously quoted statement, the following questions should be addressed regarding the best of what technology education represents: What exactly does this profession teach that is common to all technology programs in the state of Wisconsin? How are the competencies that technology education teachers deliver connected to ITEA’s *Standards for Technological Literacy*? ITEA’s 20 content standards, published in 2000, were developed by leading professionals in the area of technology education. The five general areas that encompass the 20 content standards are summarized as follows:

1. The Nature of Technology – To make sense of the changing world, a basic understanding of technology is required.

2. Technology and Society – Society determines the wants and needs technology will attempt to address. This then determines the paths that technological development will take.
3. Design – This is as fundamental to technology as inquiry is to science. Technological design is different than designing art. Technological designers adhere to constraints to satisfy human needs and wants, while artists have few constraints.
4. Abilities for a Technological World – More powerful and useful technologies usually mean they are more complex. It's important to have a broad understanding of technology so that intelligent decisions may be made regarding it.
5. The Designed World – It is made up of modifications people have made to the natural world to satisfy their needs and wants. It provides ways to turn resources into products and systems. (ITEA, 2000; p. 22-140)

Professor Theodore Lewis made the following statement regarding the technology education profession, “To have any voice at all – to be taken seriously by states as they consider high school graduation requirements – contested subjects such as technology education can ill afford not to adopt standards” (Lewis, 2000, p. 2).

The federal government funds technology education programs in the form of a grant system, which is based on the alignment of various standards. One of the leading grant programs funding technology education in the state of Wisconsin is the Carl D. Perkins Grant signed into law by President George H. Bush in 1990. The following

question arises: Why should the federal government continue to give grants funding technology education programs if the members of this profession are not able to consistently deliver the same educational content to its clients? Steve Johnston, president of the Wisconsin Technology Education Association from 2002-2004, stated the following in the spring 2003 edition of the journal *Interface*:

What we are really doing is treating a symptom of a larger problem. Is there a way to deal with this issue and other related issues systemically as opposed to fighting every “fire” that comes up? I think it is important to understand that the Perkins threat stems from a larger concern, which is the perceived value, or lack thereof, for the technological literacy (not just computer instruction) of our children. We have to get to the “root” of the problem, and convince our decision-makers that Technology Education is a valued and integral part of the curriculum. Until that happens, we will constantly be battling challenges to Perkin’s and other sources of funding. (Johnston, 2003, p. 4)

It should be noted that Johnston was calling for technology education to become a core part of the curriculum so that funding technology education programs would not be such a challenge.

Statement of the Problem

It is unclear whether a standards-based introductory technology education curriculum has been consistently supported in Wisconsin. Currently, the Wisconsin Department of Public Instruction (WDPI) does not require school districts or technology education teachers to adopt standards for technology education (Wisconsin Department of

Public Instruction, 1998). In contrast, reading, writing, geography, history, math, and science are required to have an established set of standards. If an introductory technology education course was to be implemented, common goals must be in place for those creating the curriculum. In addition, the goals of those creating the curriculum must be aligned with the standards and the views of technology education teachers delivering the course content to the students. If the curriculum developed for the course is not delineated from the standards and technology education continues to face cuts in funding, this may result in the deterioration and elimination of technology education programs across the state. If teachers delivering the introductory technology education content do not support the course, they will not adopt it, and technology education will continue to flounder in the attempt to rally around a theme defining what educational content the profession represents. This study will identify the degree of support WTEA technology education teachers have for implementing a standards-based, introductory technology education course required for all students.

There are many internal factors to consider by introducing a required technology education course into the general curriculum, some of which cannot be addressed by this study. One of these factors is academic support from other elective areas such as business, agriculture, and art education. There may be some small school districts where these elective areas are in competition with each other in attracting students so that classes have enough students to warrant being offered. It seems that elective areas might be reluctant to support the integration of technology education into the core requirements if it would jeopardize student enrollment in their own area of instruction.

Purpose of the Study

The purpose of this study is to identify technology education teachers' perceptions of the need for a standards-based, introductory technology education course required for all students. The survey (see Appendix A) was distributed in July of 2004 and delineated based a number of factors including:

1. Graduation location – UW-Stout, UW-Platteville, other.
2. Teaching level – High school, middle school, other.
3. Years of teaching service – New teacher, tenure achieved, veteran teacher.
4. Level of education – Bachelor's or master's degree.

Once the researcher has analyzed the perception of technology teachers, it can be determined if a new course developed will be supported by technology education teachers and whether the development of introductory curriculum will be implemented consistently in technology education classrooms across the state of Wisconsin.

Research Questions

The following questions have been addressed by this study:

1. What are the perceptions of technology education teachers in Wisconsin regarding the need for a standards-based, introductory course required for all students?
2. What is the level of support for altering a required, standards-based, introductory technology education course by technology education teachers?

3. What is the difference in the perception of technology education teachers toward a standards-based, introductory course required for all students based on the following demographics:
 - A. Teaching experience
 - B. Teaching level
 - C. Level of education
 - D. Location of B.S. training

Significance of the Problem

The following statements indicate why this study is important:

1. A gauge for successful implementation - The results of the study will serve as a gauge to measure the likelihood of successful implementation of a standards-based, introductory technology education course that would become a core requirement for all students.
2. A clear meaning for what technology education means - Technology education underwent a name change in the 1980's, but the intended content change never developed in many school districts with the change from industrial arts to technology education. Wisconsin's schools were left with a mixture of technology content varying from industrial arts to technology education. The end result is a variety of technology programs that have few common themes between school districts.

3. Recognition of technology education as a component of general education - If technology education teachers can rally around a common introductory technology education course, that could serve as a very important stepping stone in unifying technology education as a field of study, solidifying funding, and securing a future for the profession as well.

Limitations of the Study

The limitations of this study are as follows:

1. The sample size of the study is limited to a clustered random sample of the members of the Wisconsin Technology Education Association (WTEA) and is not divided by age or sex.
2. Only specified WTEA members were surveyed, which does not account for technology education teachers who are not in WTEA. The members of the WTEA represent a population of technology education teachers who are likely to stay current with issues surrounding the profession as compared to technology education teachers who are not members of WTEA.
3. The sampled population's responses to survey questions may vary depending on individual circumstances such as varied technology education programs.
4. The survey is researcher-developed and not tested to be free from defects that may alter the responses.

Definition of Terms

The following terms have been defined for this study:

Standards for Technological Literacy – “Spell out what students should know to be technologically literate” (Lewis, 2000, p. 3)

Technology – “Human innovation in action” (ITEA, 2004c, p. 1).

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. A program of study that leads to technological literacy” (ITEA, 2004a, p. 1).

Technological Literacy – “The ability to use, manage, understand, and assess technology” (ITEA, 2004a, p. 1).

WTEA Member – A teacher, professor, administrator, or other professional who pays membership dues to WTEA and is involved in the field of technology education.

Chapter II

Literature Review

This chapter begins with a discussion of the significant research documented in the literature dealing with the definition of technology education. The International Technology Education Association's (ITEA) *Standards for Technological Literacy* are also discussed starting with the history of technology education's standards and then followed by a description of the foundations and framework for the standards in a model technology education program. Technology education's standards are then related to curriculum and synthesized with the areas of science and math. Finally, the need for a standards-based technology education course is discussed.

What is Technology Education?

Many could argue the profession of technology education has suffered from a lack of identity since its name change from manual or industrial arts to finally what it is called today, technology education. In some school districts, the name change was a formality with no change in pedagogical methods (Lewis, 2000; Hendricks, 2003). As stated earlier, technology education is "problem-based learning utilizing math, science and technology principles" (ITEA, 2004c, n.p.).

An addendum to *Standards for Technological Literacy: Content for the Study of Technology*, was released in 2000 called *Teaching Technology: Middle School Strategies for Standards-Based Instruction*. This release contained teaching strategies, standards-

based activities for students at the middle school level and information regarding the shift in emphasis in the study of technology education. The following chart was taken from that addendum and explains the shift in emphasis:

Table 1

Changing Emphasis in Technology Education

Less emphasis on:	More emphasis on:
- Knowing technical details and parts of tools	- Understanding systems and their interrelated parts
- Activities that are fun	- Selecting fun activities that reinforce and teach content
- Processes and skills to complete a project	- Designing and planning before making
- Working alone	- Working in groups or teams
- Teacher as information expert	- Teacher as facilitator of student learning
- Management of materials and equipment	- Management of ideas and information
- Student communicates to teacher	- Student presents information to classes
- Tests as the only assessment	- Self and team evaluation and reflection
- Right or wrong solutions	- Open-ended, innovative, creative solutions that allow for opportunities to take risks and discover what works

(ITEA, 2000b, p. 5)

The left column represents the kind of program more closely identified with industrial arts or industrial technology. The column on the right represents the kind of program more closely identified with technology education. The progression from left to right on the table shows how industrial arts has changed to technology education. Even though ITEA represents technology education as it should be, the following information indicates that not all technology teachers are following the model technology education program provided by ITEA.

Dr. Robert Hendricks, UW-Stout professor, conducted a presentation at the Wisconsin Technology Education Association's conference in 2003. During his presentation, Dr. Hendricks focused on the confusion of professionals within the field of technology education regarding the definition of technology education. Dr. Hendricks characterized technology education as "meaningless," and stated that the "inability to define ourselves clearly is leading to the demise of the profession and will continue to do so" (Hendricks, 2003, p. 1). Dr. Hendricks further stated that if current conditions continue, other subjects such as science and math will eventually adopt technology education's *Standards for Technological Literacy*. Each of the following three lists characterizes the criteria Dr. Hendricks believes the technology education profession is delivering to students:

Industrial Arts

- Materials based courses, i.e. woods, metals or specific device based i.e. auto or small engines
- Individual tool skill development based

- Content focused on crafts and hobbies or skills for personal interest
- Intended to serve a small subset of the school population - primarily non-academic students with no post high school educational plans and special education students
- Pretends to be vocational or occupationally focused but has little real connection to entry level technical skill development
- Little evidence of a clear connection of content to academic disciplines
- Content very stable
- Less academically challenging with greater focus on personal development relative to an individual work ethic
- Never truly considered general education
- Heritage in the 1950's, 60's and 70's (Hendricks, 2003, p. 2)

Technology Education

- Standards based as 70-90% of course content connects to state or national standards for technology education
- Focused on conceptual understandings, higher order thinking skills and “big ideas”
- Lab oriented but not skill development oriented
- Problem solving and system thinking focused
- Intended to serve the entire school population
- While large numbers of “Technology Education” teachers purport to teach this, the reality is that precious few really do

- Integrates and reinforces content from other academic disciplines
- Academically challenging
- Content is rapidly changing but clarity is retained through conceptual models
- Content is being absorbed into other disciplines most notably science
- Growing movement from within and outside the profession to establish as a general education discipline
- Heritage in the 1980's and 90's (Hendricks, 2003, p. 1)

Career and Technical Education

- Courses focused on entry level technical positions i.e. building construction, or courses focused on attracting students to a specific career requiring some sort of post high school education i.e. Cisco training for telecommunication or project Lead the Way for Engineers
- Content validated by state or national professional group with active local or regional advisory committee
- Course offered as a result of local and regional research on labor market dynamics
- Course carefully articulated with local technical college or university
- Typically offered for juniors or seniors
- Content relatively stable
- Moderately academically challenging with focus on personal development and skill development relative to entry-level position or further education
- Not intended to be general education

- Heritage in the 1940's (Hendricks, 2003, p.2)

At the end of the presentation, Dr. Hendricks offered a three-step solution to the problem of inconsistency in technology education. Dr. Hendricks stated that technology education professionals:

...must use a variety of forums to discuss our content base, identify different components, and present this to the public in a coherent fashion. Secondly, I would propose that UW-Stout, the WTEA and DPI secure funding to develop a one-semester course for the high school level that is a standards based, general education, technology course. ... Third...we must propose that we as a profession would reallocate existing resources in terms of teachers, labs and courses to facilitate this new required course. (2003, p. 4)

It should be noted that Dr. Hendricks called for a single standards-based technology education course for all students.

How are Technology Education and Its Standards Related to Curriculum?

Curriculum and carefully designed evaluations are the documented proof that standards are being delivered effectively and concurrently with other technology education professionals. An article written by William Dugger, entitled *Roots of Technology: Standards Projects* described three release dates for standards in technology education. The article began with a description of the Standards for Industrial Arts Education Programs created between 1978 and 1981. The standards were comparative statements surrounding ten major topic headings. "A total of 235 specific quality measures are listed

under each major topic heading. These quality measures were used to determine if an industrial arts program met, exceeded, or did not meet a standard” (2002, p. 96). Dugger went on to explain in 1985 the American Industrial Arts Association (AIAA) changed its name to the International Technology Education Association (ITEA) and the standards were changed as well to reflect technology rather than industry. The standards were then changed to Standards for Technology Education Programs (Dugger, 2002).

In 1994, ITEA formed the Technology for All Americans project to give formal structure to all technology education programs (Dugger, 2002). The project involved creating a set of standards for technology education in grades K-12 and was completed in 2000. According to ITEA, technology education curriculum worthy of being modeled after, exhibits the following criteria:

1. Focuses on students and their learning
2. Reflects exemplary practices for teaching and learning
3. Emphasizes design and problem-solving activities
4. Contributes to standards attainment
5. Develops technological literacy
6. Integrates math, science, and other subjects
7. Promotes careers in professional and technical fields (ITEA, 1999, p. 1)

Clearly, the criteria listed above are comprehensive, yet they are generalized enough to allow individual technology education teachers to tailor their own curriculum to either Wisconsin’s Model Academic Standards for Technology Education or the Standards for Technological Literacy. ITEA described a framework for a technology education

program in their 1999 release of *A Guide to Develop Standards-Based Curriculum for K-12 Technology Education*. It included descriptions of suggested course titles such as “Exploring Technology,” “Innovation and Engineering Design,” and “Technological Systems” at the middle school level (p. 3-4). At the high school level, “Foundations of Technology,” “Technology Assessment,” “Issues in Technology,” and “Engineering Design Fundamentals” were also described (p. 4). Further, the guide explained methodologies such as project-based learning, group learning, modular instruction, engineering design and development, simulation, and design portfolios for implementing the curriculum. As defined by the ITEA, these course titles and delivery strategies are fundamental in their relationship to a genuine technology education program to provide a framework for ITEA’s *Standards for Technological Literacy*.

As stated previously, ITEA (2000a) has developed 20 content standards stratified into 5 general categories. Each content standard has a set of benchmark standards based on the grade level at which the content standard is taught. The following content standards have been included in this review for clarity of what a technology education program should be based upon.

The Nature of Technology

Standard 1: Students will develop an understanding of the characteristics and scope of technology.

Standard 2: Students will develop an understanding of the core concepts of technology.

Standard 20: Students will develop an understanding of and be able to select and use construction technologies. (ITEA, 2000a, p. 210)

Clearly, these standards are comprehensive in nature and leave specific curriculum delivery up to individual technology education teachers. The authors of the standards for technological literacy claimed that the standards were not intended for delivery in one course or in a sequential manner. The authors stated that the standards could be interdisciplinary in practice. This indicates that technology education teachers would not be solely responsible for the delivery of every technology standard. There is also an indication that technology standards should be included in other subject areas. Since the standards for technological literacy are so generalized, the door is left open for a great deal of interpretation and variation of activities. In addition, the number and frequency of standards addressed in an activity, course, or program is left up to the instructor, creating a situation where inconsistency could be common.

Standards of Other Content Areas

Technology education is not the only subject area singled out in the struggle for a coherent curriculum. As indicated by the following study, other content areas such as math and science have, to varying degrees, suffered from a lack of focus. Schmidt, McKnight, and Raizen (1997), conducted a study called *A Splintered Vision*, which describes the curricular areas of math and science as being incoherent. Among other faults, the authors pointed to textbooks as part of the problem of incoherence. They stated, “without restricting what teachers may choose to do, they [textbooks] drastically

affect what teachers are likely to do under the pressure of daily instruction”(p. 53).

Additionally, Schmidt, McKnight, and Raizen (1997) pointed to textbooks as being self-contained organizations for instruction that may or may not be targeting appropriate standards in the context of the school district and student.

Technology education in comparison has relatively few textbooks because it is considered to be a relatively hands-on area of instruction (Lewis, 2000). In support, Lewis (2000) stated that technology education has traditionally been viewed as a non-academic area. Additionally, Cole (cited in Pearson & Young, 2002) indicated that standards have been developed by other agencies, however, “the technology components of those standards have not been translated into curricula or instructional materials. An analysis of some highly rated high school American history textbooks, for example, found almost no mention of technology” (p. 56). It seems that technology in other curricular areas has not been addressed fully in textbooks of other subjects. Science and math areas have had national standards implemented and have recently begun to reform their standards. A study conducted by the Council of Chief State School Officers (cited in Lewis, 2000), found that 46 states have implemented math and science standards.

The Center for Science Education is currently testing a new curriculum called "Foundation Science" designed for grades nine through eleven (Center for Science Education, 2004; p.1). The Foundation Science curriculum is divided into four, nine week long areas of chemistry, biology, physics and earth science and is designed to work closely with math concepts and hands-on learning experiences and scenarios designed to pique students' interests. Although the Foundation Science curriculum is not scheduled to be

released until 2010, components of the curriculum are being released earlier, such as the chemistry section in 2005 (Center for Science Education, 2004; p.1). As stated in Lewis (2000), “technology education has been embraced by important [stake holders] in the scientific community such as the National Science Foundation, and the American Association for the Advancement of Science” (p.2). Lewis stated that these and other organizations “provided important scaffolding...for the new technology standards” (2000, p.2). The science community appears to be advocating technology education as a required subject of study to compliment its own goal of science literacy for all students (Lewis, 2000).

The Need for a Standards-Based, Introductory Technology Education Course, Required for All Students

On March 31, 1994, President Clinton signed *Goals 2000: Educate America Act* into law. This law justifies the creation of standards in all subjects of study in public schools so that goals are established and met. Under *Goals 2000*, the federal government funded “systemic reform at the state and local levels and...provide(d) a framework within which to organize all state and federally funded education programs” (North Central Regional Educational Laboratory, 2004; p.1). Although *Goals 2000* has been replaced by *No Child Left Behind Act*, the development of standards for all subjects stems from the requirements of *Goals 2000*. *Goals 2000* has provided the reasoning for each state to develop their own form of standards for elective content areas such as technology education, as the following paragraph explains.

In 1998, Wisconsin adopted standards for technology education. These standards are similar to ITEA's standards in that they overview what students should know to be literate in technology subject areas by the time they graduate from high school. The following citation was taken from an article written by Fernando Cajas in *The Journal of Technology Education* (2000):

...I think there is an essential prior question to be answered: What knowledge and skills should everybody know? Why is this an important question? Because contemporary society, as well as the society of the next century, depends heavily on technology. It is our responsibility to present a common argument to bring technology to the classroom. Such an argument demands that we clarify what we are trying to achieve. That is, what ideas and skills all people need to understand about technology to be able to participate in a technological world in a thoughtful and informed manner. This common ground should drive the need for and direction of research in the movement toward providing technology education for all. Without such a consensus, research in technology education and the efforts to bring technology into the school curriculum will remain an incoherent, fragmented, and ultimately ineffective endeavor. (p. 67-68)

Several leading individuals in the field of technology education echo Cajas (2000) in recent articles, presentations, and published reports. Past president of the Wisconsin Technology Education Association (WTEA), Steve Johnston (2002 - 2004), University of Wisconsin - Stout Professor Dr. Robert Hendricks (2003), and editors Greg Pearson and Thomas

Standard 3: Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.

Technology and Society

Standard 4: Students will develop an understanding of the cultural, social, economic, and political effects of technology.

Standard 5: Students will develop an understanding of the effects of technology on the environment.

Standard 6: Students will develop an understanding of the role of society in the development and use of technology.

Standard 7: Students will develop an understanding of the influence of technology on history.

Design

Standard 8: Students will develop an understanding of the attributes of design.

Standard 9: Students will develop an understanding of engineering design.

Standard 10: Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.

Abilities for a Technological World

Standard 11: Students will develop abilities to apply the design process.

Standard 12: Students will develop abilities to use and maintain technological products and systems.

Standard 13: Students will develop abilities to assess the impact of products and systems.

The Designed World

Standard 14: Students will develop an understanding of and be able to select and use medical technologies.

Standard 15: Students will develop an understanding of and be able to select and use agricultural and related biotechnologies.

Standard 16: Students will develop an understanding of and be able to select and use energy and power technologies.

Standard 17: Students will develop an understanding of and be able to select and use information and communication technologies.

Standard 18: Students will develop an understanding of and be able to select and use transportation technologies.

Standard 19: Students will develop an understanding of and be able to select and use manufacturing technologies.

Young (2002), have indicated that there is a need to develop a consensus for the content that technology education represents.

The inclusion of technology education in the general curriculum is not taking place in a widespread fashion, as indicated by the following study. In the study conducted by Mark Sanders (2001), 58.6% of the population surveyed identified their programs as “technology education” programs. The survey did not inquire about the content of the programs labeled “technology education,” so the number of technology education programs actually practicing technology education could be lower than 58.6%. Pearson and Young (2002), stated “only a small group of technology educators is involved in setting standards and developing curricula to promote technological literacy. In general, with the exception of the use of computers and the Internet, which has been strongly promoted by the federal and state governments, technology is not treated seriously as a subject in grades K-12” (p. 5-6).

Past president of WTEA Steve Johnston (2002-2004) stated in the spring 2003 issue of WTEA’s journal *Interface* that “it is time to come together and focus our efforts on a common, unified, technology education course that would be implemented as a core requirement” (2003, p. 4). Johnston was suggesting that the technology education profession should unite around a single course, which would help unify the profession, and “create a foothold for [the] discipline to progress out of electives and into core requirements” (2003a, p. 4). Previously, Lewis (2000) accented Johnston’s message by stating that “there is little tradition in technology education of coherent course sequences for grades K through 12 that are premised upon inquiry, or that are agreed upon by

communities of practitioners” (p. 4). Lewis (2000) felt that the standards will give professionals in the field of technology education the chance to assess the curriculum in the early and late grades. He explained that technology education has not been represented well at these grade levels (2000). Additionally, Lewis argued that “standards have become a rallying point for arts, science, and mathematics education, and are viewed as an important basis of reform” in technology education, possibly leading to an improved status for the profession in society (2000, p. 9).

Since the release of the *Standards for Technological Literacy: Content for the Study of Technology* (ITEA) in 2000, additional guides have been released to assist teachers, schools, and states in implementing technology standards in the following courses. The following guides include *Exploring Technology: A Standards-Based Middle School Model Course Guide* (ITEA, 2001) and *Foundations of Technology: A Standards-Based High School Model Course Guide* (Gomez et al, 2003). As mentioned previously, both *Exploring Technology* and *Foundations of Technology* are suggestions for course titles in ITEA’s, *A Guide to Develop Standards-Based K-12 Technology Education* (1999) explaining a model technology education program (ITEA, 1999). Both resources contain contemporary, standards-based activities, goals, and objectives.

Support for a Standards-Based, Introductory Technology Education Course, Required for All Students

The review of literature in this chapter has provided evidence of the need for an introductory, required technology education course that is delineated from either

Wisconsin's *Model Academic Standards for Technology Education* or ITEA's *Standards for Technological Literacy*. Based on Hendricks (2003), Johnston (2003), and Lewis (2000), there is an indication that technology education teachers are not embracing and incorporating standards for technology education at the local district level.

An article from *The Journal of Technology Studies* indicated that many prominent leaders in the field of technology education share the view that technology education should be part of the general curriculum and that all students should at least take a standards-based, introductory technology education course before graduating from high school (Karnes, 1999). This article entitled "Technology Education in Prospect: Perceptions, Change, and the Survival of the Profession," was assembled by Dr. Karnes and includes a compilation of thoughts by leading professionals in the field of technology education. The leading professionals and the topics of their thoughts have been included in Appendix B and reflect the state of confusion in technology education prevalent today. Each of the 35 articles included in Karnes' pseudo-synopsis offered compelling arguments that are unique to the individual author, yet ultimately, they also shared comprehensive similarities regarding the changes needed in technology education (Karnes, 1999).

Summary

As pointed out previously, there are many leading professionals advocating the implementation of standards in technology education. There seems to be some uncertainty regarding the extent that some technology education teachers would support and implement standards in their programs. The main focus of this study was to identify

Wisconsin Technology Education Association teachers' perceptions of the need for a standards-based, introductory curriculum required for all students. The following chapter will explain the procedures used to collect the data.

Chapter III

Methodology

The methods and procedures used in this study describing Wisconsin Technology Education Association (WTEA) teacher's perceptions of the need for a standards-based, introductory course required for all students are explained in this chapter. The following headings in this chapter are as follows:

- A) Method of Study
- B) Sample Selection
- C) Instrumentation
- D) Procedures for Data Collection
- E) Method of Analysis
- F) Limitations

Method of Study

The following paragraphs briefly overview this study, giving the steps necessary to arrive at the final conclusions. The main goal of this study was to determine the perceptions of technology education teachers regarding the need for a standards-based, introductory technology education course required for all students. This idea was the result of the need for clarification of the content that represents technology education. This lead to the research problem and research objectives involved with determining

WTEA teacher's perceptions of the need for a course that could help demystify the core introductory content that represents technology education.

The next step in the process of this study was the review of literature. The review of literature helped clarify that standards and standards-based courses exist for technology education, providing much of the framework for implementing such a course in Wisconsin. The result of the literature review was a limited historical perspective of technology education's roots and a thorough explanation of technology education's current status.

The next step was the collection of data. Since this study dealt only with technology education teachers currently teaching and members of WTEA, a representative sample of the population was chosen from a list of WTEA members currently teaching technology education. The "Sample Selection" section of this chapter gives more information about the selection process.

A written survey was used to collect data. The survey questions directly related to the purpose of the study explained in Chapter 1. The data was used only to determine the perceptions of technology education teachers and all survey information was anonymously reported.

Sample Selection

The population for this sample who received a survey in July, 2004 needed to be members of WTEA, not college students, not retired or business members, and currently teaching technology education. There were exactly 153 members of WTEA who met those criteria and 594 members that did not meet the criteria. A third party was used

because they had readily available access to the names and summer addresses of the survey participants for this study. Additionally, the addresses could not be sent to the researcher due to confidentiality laws from the organization which provided the summer addresses that the third party applied to the outside of the sealed survey envelopes. The third party has asked to not be identified in this study.

The estimate provided by the third party totaled 200 qualifying teachers. The researcher sent 150 surveys to the third party to avoid a low sampling error based on the estimate of 200 qualifying teachers from the third party. The researcher was not able to wait for the third party to provide an exact estimate because the third party had to access a computer database containing the addresses for the qualifying participants. An exact number of qualifying participants was requested from the third party but due to reasons beyond the researcher's control, the exact number of qualifying participants was not provided to the researcher until the addresses were applied to the sealed survey envelopes by the third party. After the third party sent the surveys to the participants, the third party then notified the researcher that there were 153 qualifying members of WTEA for this study. The third party informed the researcher that three names had been randomly omitted, and an address was applied to each of the 150 surveys and then sent to the participants by the third party. The researcher had no knowledge of which technology education teachers would be sent a survey.

The return rate for this study was 50 percent, or 75 surveys. A recent study on return rates for mailed surveys, conducted by a reputable organization, reported that many valid studies have been conducted and published by organizations that had return rates

equal to or lower than the 50% return rate in this study (Hagar, Wilson, Pollok and Rooney, 2002). Consequently, the return rate for this study appears to be acceptable.

Instrumentation

The survey consisted of a section including demographic information (section one) and a section including information regarding the opinions of the participant (section two). The demographic information included four questions consisting of the participant's years of teaching experience, the grade level the participant is currently teaching at, the institution the participant's bachelor's degree was attained from, and the highest degree attained. The purpose of these questions was to indicate if there was statistical significance between the demographic information in section one and the opinions of the respondent in survey section two.

The second section of the survey dealt with the opinions of the participants regarding two areas. The first dealt with technology education teacher's perceptions for the need of a standards-based, introductory technology education curriculum required for all students. The second area dealt with technology education teacher's willingness to continue using the same content after the course was developed. The questions were designed to fulfill the objectives as they were stated in the purpose of the study in Chapter I.

Questions one through 10 in the second section of the survey used a four point Likert scale with the participants responding strongly agree (4), agree (3), disagree (2), or strongly disagree (1). The higher the mean response score, the stronger the statement was

generally agreed upon. The lower the mean response score, the stronger the statement was generally disagreed with. If a respondent selected both agree and disagree, it was considered a neutral response and recorded as a 2.5. The remainder of the survey required the respondents to answer with a yes or no.

The final survey and cover sheet was reviewed by the Research and Statistical Consultant, from the University of Wisconsin – Stout to check the face validity of the survey. Suggestions for improvements were made to the survey and the researcher completed those changes. The changes consisted of making questions 11 through 14 yes or no answers instead of using a four point Likert scale, changing wording in some questions so that it would be more reader friendly, and changing the format and font of the survey so that it would fit onto one, two-sided piece of paper. The survey was then sent to the University of Wisconsin - Stout Internal Review Board to be checked so that no harm would come to the respondents completing the survey. The final survey was agreed upon by the Research and Statistical Consultant from the University of Wisconsin – Stout, the researcher, and the Internal Review Board from the University of Wisconsin - Stout before it was sent out to the participants. Additionally, a 2 x 2 matrix was completed to make sure the survey questions fulfilled the objectives of the research. Each research question was matched to a survey question in the following tables two and three.

Table 2

Comparison of Research and Section Two Survey Questions

Research question	Section two survey questions
1. Determine WTEA teacher's perceptions of the need for a standards-based, introductory technology education curriculum, required for all students.	<p>1. Using the broad definition of technology as "modifying our natural world to meet human needs" the study of technology should be included in the school curriculum.</p> <p>2. The study of technology should be made a part of other subjects like science, math, and social studies.</p> <p>3. The study of technology should be taught as a separate subject.</p> <p>4. If technology is taught as a separate subject it should be a required class</p> <p>6. Provided the funding was available, I would be interested in implementing this course in my program offerings.</p> <p>11. The district I teach in has the facilities and equipment to accommodate an introductory class for all students at the middle/junior high school level.</p> <p>12. I would recommend an introductory course as a requirement for all students at the 7th or 8th grade level.</p> <p>13. The district I teach in has the facilities and equipment to accommodate an introductory class for all students at the high school level.</p> <p>14. I would recommend an introductory course as a requirement for all students at the 9th or 10th grade level.</p>

Table 2

(Continued)

Research question	Section two survey questions
<p>2. Determine if technology education teachers would implement the course consistently across the state of Wisconsin without changing the content.</p>	<p>5. Technology education needs to specifically define what content it should teach, at least at the introductory level.</p> <p>7. I would teach the course as it was developed, without altering the content in any way.</p> <p>8. I would alter the content of the course to fit the facilities and equipment I have at my school.</p> <p>9. I believe it is important for students taking an introductory technology education course to be exposed to the same content regardless of the school they attend.</p> <p>10. If some of the content developed by this panel of experts was similar or identical to the content I currently deliver in other classes I teach, I would be willing to change the content in my other classes.</p>

Table 3

Comparison of Research and Section One Survey Questions

Research question	Section one survey questions
<p>3. What is the difference in the perception of technology education teachers toward a standards-based, introductory course required for all students based on the following demographics:</p> <p>A. Teaching experience</p> <p>B. Teaching level</p> <p>C. Level of education</p> <p>D. Location of B.S. training</p>	<p>1. How many years of teaching experience do you have?</p> <p>2. Please check the level at which you will teach next fall.</p> <p>3. What college did / will you receive your bachelors degree from?</p> <p>4. Please check the highest degree you have attained below.</p>

The cover sheet included a brief explanation of the study, statement of anonymity, and survey directions so the participants could initially read through the cover sheet before answering the survey questions. To ensure a consistent presentation, the entire contents of the mailings sent to the participants were identical in every way. The cover sheet and survey are included in Appendix A of this study.

Procedures for Data Collection

The surveys were mailed to a third party in a sealed envelope. The sealed envelope contained a cover sheet, survey, and self-addressed, stamped envelope for the respondents to return the completed surveys in. The third party put the addresses of the respondents on the outside of each of the 150 sealed envelopes and put them in the mail on July 13, 2004. The completed surveys were mailed to the researcher from 75 technology education teachers between July 16 and July 22, 2004. All 75 surveys were turned into and recorded by the Research and Statistical Consultant, from the University of Wisconsin – Stout. After the data was tallied and grouped together, the results were analyzed, printed out, and explained to the researcher by the Research and Statistical Consultant, from the University of Wisconsin – Stout. Because the survey was anonymous, there was no way of knowing which technology education teachers returned a survey and which technology education teachers did not return a survey. Hence, there was no follow-up letter for any participants that were sent a survey.

Method of Analysis

This was a descriptive study, therefore, the data collected was analyzed and written descriptions of the results were given. A t-test was completed using each of the questions in section one of the survey as the independent variables and the questions in section two as the dependant variables. The questions in section one were compared to the questions in section two to indicate statistical significance between the independent and dependant variables. The scores for the t-test were reported in the tables and include

the mean, standard deviation and number of respondents for each independent variable in section one of the survey. In addition, each question was analyzed and a table created identifying the mean, standard deviation and the percentage indicating the most common responses to show WTEA technology education teachers' perceptions of the need, and the willingness to consistently deliver a standards-based, introductory technology education course required for all students. The results of the data collection were identified and described in the final chapters of this study.

Limitations

Every effort was made to limit the amount of error in this study, however certain circumstances remained that could affect the results of the study. The following are limitations to this study: timing, money, lack of a pilot study for the survey, truthful responses of the participants, response rate, time frame, and the survey instrument. Due to the only available time the researcher had to complete this study, the researcher administered the survey during the summer of 2004, when most technology education teachers have a break from school. Even though an acceptable return rate could be a problem at any time of the year due to busy schedules, administering the survey during this time frame could limit the number of returned surveys due to family vacations or other commitments. More money for purchasing postage and printing supplies would allow the entire population of technology education teachers in Wisconsin to be surveyed. The entire population includes members and non-members of WTEA. Additional money would also allow compensation for a team of people to first analyze and consult on the

survey and then pilot test the survey, which would make the results of the survey more valid and reliable. No pilot study was conducted to test the survey for validity and reliability. The absence of a pilot study for the survey could be a limiting factor in the results. Although the participants may feel apprehensive about expressing their true feelings because they fear harm may come to them by answering controversial questions related to their career, this survey is anonymous, which should minimize this factor. The response rate for this survey was 50% or 75 respondents. Although this appears to be an acceptable return rate for this study, more completed surveys could have been returned if a follow up letter had been sent to all participants thanking those that had already filled out the survey and reminding others who had not filled out the survey to respond. The time frame of approximately eight days from the time the participants received this survey to the last day this survey was collected was a limiting factor in the results. More surveys could have been collected if the return due date could have been extended longer. Finally, the last limiting factor is the survey, as this was researcher developed and may include unforeseen errors. However, the effects of this should be minimized due to the experience and advice of the Research and Statistical Consultant, from the University of Wisconsin – Stout before the survey was sent to the participants.

The results of this survey apply only to technology education teachers who are members of WTEA, as defined by the criteria earlier in this chapter. The results of this survey are discussed in the following chapters of this study.

Chapter IV

Results and Discussion

Prior to the discussion of the results in this study, it is necessary to briefly reflect on the purpose of the study and the method for collecting data. The overview will provide a background and help focus meaning from the survey results. The results of this study were intended for people interested in the profession of technology education in Wisconsin.

The purpose of this study was to identify Wisconsin Technology Education Association (WTEA) teachers' perceptions of the need for a standards-based introductory technology education curriculum required for all students. This problem statement stemmed from the issue of the lack of consistency in the delivery of technology education content delivered to students. Standards and subsequent guides have been developed recently to aid teachers in their consistency, however it is up to the individual teacher to comprehend, and implement standards-based courses in the state. The result of the survey will shed light on the attitudes of technology education teachers and the possible success of creating a course for all technology teachers to deliver to students. Next, three research questions were developed to create a focus and direction for this study.

A review of literature was conducted to gain perspective on the recent changes in the field and how those changes relate to standards and the recognition from science and math. After this was completed, an 18-question survey was developed to fulfill the

research questions for this study. Additionally, a 2x2 matrix was completed to ensure the research questions were addressed by the survey.

The participants were randomly selected from a clustered group of WTEA teachers with the restriction that they had to be members, not retired, and not students. Those teachers selected were sent a survey, along with a cover sheet that explained the research being performed, the assurance of anonymity, and the due date by which to reply. The surveys were sent out by a third party on July 13, 2004 and then sent to the researcher in the included postage-paid envelopes. The envelopes were collected by the researcher until July 23, 2004. The researcher had no knowledge of which technology education teachers received a survey.

The rate of return from possible subjects is important to point out before the results are discussed. There were 150 technology education teachers that were sent a survey. The number of returned surveys that were useable was 75, or 50%. This is above the minimum return rate in order to have an acceptable representation of the population identified (Hagar, Wilson, Pollok and Rooney, 2002). Many of the returned surveys were filled out completely, however some answers were not provided, or some questions included two answers. Those cases were included in the appropriate tables in the following section of this chapter.

Data Results

The following information in this section is broken into two parts. The tables in part one summarize the results of the data collected from the surveys. The tables in part

two compare the results of the questions in section one to the results of the questions in section two using a t-test to identify any statistically significant differences between the mean scores.

Part 1: Descriptive information

The following information summarizes the results of the data collected from the surveys. Each of the following 18 tables corresponds to one of the 18 questions in the survey. Each question is listed in the heading of the table while the tables' content includes the category, the number of teachers responding to the category, the valid percent, and the number of teachers that did not respond. While there was no space for participants to enter a neutral response, some indicated that they both agreed and disagreed with a particular question. These responses were assigned with a neutral label and included in the appropriate tables.

Survey Section 1: Demographic Information

Table 4

Question 1 - How Many Years of Teaching Experience Do You Have?

Category	Number responded	Valid percent	Mean	Standard deviation
0 – 3	15	20		
4 – 7	15	20		
8 – 12	6	8	18.75	14.15
13+	39	52		
No response	0	0		
Total	75	100		

For question one, the teachers had to answer one of four choices given. The purpose of question one in Table 4 was to find out how long the teachers had been teaching and if that has an effect on their opinions.

From the 75 technology education teachers that responded to this survey question, 52% indicated that they had taught 13 years or longer, 8% indicated that they had taught eight to 12 years, 15% indicated that they had taught four to seven years, and 15% indicated they had taught zero to three years. The average was 18.75 years of experience.

To summarize, it would be important to note that just under half (48%) of the respondents indicated they had taught between zero and 12 years while just over half (52%) indicated they had over 13 years of teaching experience. The t-test conducted in

part two of this chapter uses these groupings to identify any statistical significance between the respondents' answers in section two of the survey.

Table 5

Question 2 – Please Check the Level At Which You Will Teach Next Fall.

Category	Number responded	Valid percent	Mean	Standard deviation
Middle school	9	12.0		
High school	49	65.3	N/A	N/A
Middle & high school	17	22.7		
No response	0	0		
Total	75	100%		

For question two the teachers had to answer one of three choices given. Question two in Table 5 was written to provide an indication of whether teaching level was a factor in the respondents' opinions in section two of the survey.

From the 75 technology education teachers that responded to this survey question, nine indicated they taught at the middle school, 49 indicated they taught at the high school, and 17 indicated they taught at both the middle and high school.

To summarize, a little more than one third (34.7%) of the respondents taught at either the middle or a split between the middle and high school level while about two thirds (65.3%) indicated they taught at the high school level only. The t-test conducted in

part two of this chapter uses these groupings to identify any statistical significance between the respondents' answers in section two of the survey.

Table 6

Question 3 – What College Did / Will You Receive Your Bachelors Degree From?

Category	Number responded	Valid percent	Mean	Standard deviation
UW - Stout	62	82.7		
UW - Platteville	4	5.3	N/A	N/A
Other	9	12.0		
No response	0	0		
Total	75	100%		

For question three the teachers had to answer one of three choices given. The purpose of question three in Table 6 was to identify which participants graduated from UW-Stout, UW-Platteville, or another college. It was expected that most of the participants graduated from UW-Stout because it is one of the largest degree-granting institutions for technology education majors in this region. Since technology education programs are run by different instructors, it was of interest to identify any difference of opinion based on graduation location.

The results of the data collection indicate that 62 teachers received their bachelors degree from UW-Stout, four teachers received their bachelors degree from UW-Platteville, and nine teachers received their bachelors degree from another university.

To summarize, over three-fourths (82.7%) of the teachers received their bachelors degree from UW-Stout while less than one quarter (17.3%) of the teachers received their bachelors degree from another university. The t-test conducted in part two of this chapter uses these groupings to identify any statistical significance between the respondents' answers in section two of the survey.

Table 7

Question 4 – Please Check the Highest Degree You Have Attained Below.

Category	Number responded	Valid percent	Mean	Standard deviation
B.S. degree	34	45.3		
M.S. degree	40	53.3		
Ed. S. degree	1	1.3	N/A	N/A
Doctoral degree	0	0		
Other	0	0		
No response	0	0		
Total	75	100%		

The purpose of question four in Table 7 was to indicate the level of significance between the participants' opinions in section two and the level of education attained. Even though this question had four responses, two major categories emerged from the data received. Those two categories consist of those who have a B.S. degree and those who have attained a higher degree.

The results of question four indicate that 34 teachers have attained a B.S. degree, 40 teachers have attained an M.S. degree, and one teacher indicated they attained their Ed.S. degree.

To summarize, just under half (45.3%) of the teachers have a bachelors degree while just over half (54.6%) of the teachers have attained a masters degree and higher. The t-test conducted in part two of this chapter uses these groupings to identify any statistical significance between the respondents' answers in section two of the survey.

Survey Section 2:

The following tables explain questions one through ten using a Likert scale. The participants were given choices of strongly agree, agree, disagree, and strongly disagree for questions one through ten. This was done to encourage the participants to make a decision to either agree or disagree on each question. Even though a neutral response was not provided for the participants, many chose both agree and disagree on some questions. After receiving many surveys with both agree and disagree responses to questions the Research and Statistical Consultant, from the University of Wisconsin – Stout recommended including the agree and disagree responses as a neutral response. The researcher agreed to include the responses in the survey results. The Research and Statistical Consultant, from the University of Wisconsin – Stout recommended using a 4 point Likert scale. Since the results had already been processed using a 4 point Likert scale, the Research and Statistical Consultant, from the University of Wisconsin – Stout recorded the Agree (3) and Disagree (2) responses as a Neutral (2.5) response.

Table 8

Question 1 – Using the Broad Definition of Technology as “Modifying Our Natural World to Meet Human Needs” the Study of Technology Should Be Included In the School Curriculum.

Category	Number responded	Valid percent	Mean	Standard deviation
SA (4)	67	89.3		
A (3)	8	10.7		
N (2.5)	0	0	3.89	.31
D (2)	0	0		
SD (1)	0	0		
No response	0	0		
Total	75	100%		

The purpose of question one in Table 8 was to have the respondents indicate their opinion regarding the inclusion of technology into the school curriculum. This question was not specific and was intended to interpret the teachers generalized feelings toward including technology in the school curriculum.

It should be noted that 100% (75 teachers) of the teachers either strongly agreed or agreed with question one on the survey. The mean was 3.89 indicating a high average with the standard deviation of only .31 indicating high agreement. This indicates that

many technology education teachers support the inclusion of technology, as defined in question one, in the school curriculum.

Table 9

Question 2 – The Study of Technology Should Be Made a Part of Other Subjects Like Science, Math, and Social Studies.

Category	Number responded	Valid percent	Mean	Standard deviation
SA (4)	40	53.3		
A (3)	24	32.0		
N (2.5)	0	0	3.35	.83
D (2)	8	10.7		
SD (1)	3	4.0		
No response	0	0		
Total	75	100%		

The purpose of question two in Table 9 was to have the respondents indicate their opinion regarding the inclusion of technology in other subjects such as science, math and social studies. This question was more specific than question one in Table 8 and was intended to indicate the respondents' opinions of including technology in other subjects of study.

It should be noted that 64 (85.3%) of the teachers either agreed or strongly agreed with question two, while 11 (14.7%) of the teachers either disagreed or strongly disagreed

with question two on the survey. The mean was 3.35 indicating a high average with the standard deviation of .83 indicating somewhat high agreement. This indicates that the majority of technology education teachers support the inclusion of technology in other subjects of study.

Table 10

Question 3 – The Study of Technology Should Be Taught As a Separate Subject.

Category	Number responded	Valid percent	Mean	Standard deviation
SA (4)	48	64.0		
A (3)	23	30.7		
N (2.5)	1	1.3	3.58	.63
D (2)	2	2.7		
SD (1)	1	1.3		
No response	0	0		
Total	75	100%		

The purpose of question three in Table 10 was to have the respondents indicate their opinion regarding the teaching of technology as a separate subject. This question was designed to have the respondents consider the teaching of technology as a separate subject, similar to question one in Table 8, but more specific.

The results of this question parallel the results of question one in that 71 (94.7%) of the teachers either agree or strongly agree that technology should be taught as a

separate subject. The mean was 3.58 indicating a high average with the standard deviation of only .63 indicating high agreement. Additionally, three (4.0%) of the teachers either disagreed or strongly disagreed while one teacher provided a neutral response.

Table 11

Question 4 – If Technology Is Taught As a Separate Subject It Should Be a Required Class for All Students

Category	Number responded	Valid percent	Mean	Standard deviation
SA (4)	42	56.8		
A (3)	23	31.1		
N (2.5)	1	1.4	3.44	.73
D (2)	7	9.5		
SD (1)	1	1.4		
No response	0	1		
Total	74	100%		

The purpose of question four in Table 11 was to have the respondents indicate their opinion regarding the implementation of a requirement that all students should take a technology course as a separate subject. This question built upon question three in Table 10 and was designed to approach the topic of this study.

The results of the data indicate a similar response to questions one and three with 65 (87.9%) of the teachers responding that they either agree or strongly agree that

technology should be a separate subject, required for all students. The mean was 3.44 indicating a high average with the standard deviation of .73 indicating somewhat high agreement. Only eight (10.9%) teachers either disagreed or strongly disagreed that if technology was taught as a separate subject, it should be required for all students. Finally, there was one teacher who indicated a neutral response and one teacher who provided no response for question 4.

Table 12

Question 5 – Technology Education Needs To Specifically Define What Content It Should Teach, At Least At the Introductory Level.

Category	Number responded	Valid percent	Mean	Standard deviation
SA (4)	40	54.1		
A (3)	24	32.4		
N (2.5)	0	0	3.39	.76
D (2)	9	12.2		
SD (1)	1	1.4		
No response	0	1		
Total	74	100%		

The purpose of question five in Table 12 was to have the respondents indicate their opinion regarding the need for technology education to specifically define what content it should teach, at least at the introductory level. This question was designed to have

teachers consider the problem of inconsistency in the delivery of content in technology education.

The results of this question indicated that 64 (86.5%) of the respondents either agree or strongly agree that technology education needs to specifically define what content it should teach while 10 (13.6%) indicated that they disagree or strongly disagree. The mean was 3.39 indicating a high average with the standard deviation of .76 indicating somewhat high agreement. There was one respondent that provided no response to this question.

Table 13

Question 6 – Provided the Funding Was Available, I Would Be Interested In Implementing This Course In My Program Offerings.

Category	Number responded	Valid percent	Mean	Standard deviation
SA (4)	38	51.4		
A (3)	31	41.9		
N (2.5)	1	1.4	3.45	.61
D (2)	4	5.4		
SD (1)	0	0		
No response	0	1		
Total	74	100%		

The purpose of question six in Table 13 was to have the respondents indicate their support of the implementation of a standards-based, required, introductory course developed by leading technology teachers, industry professionals, and university professors. This question was designed to directly address the objective one of this study.

The results of this question indicate that 69 (93.3%) of the respondents who answered this question either agree or strongly agree that implementing such a course would be of interest. The mean was 3.45 indicating a high average with the standard deviation of only .61 indicating high agreement. In addition, four (5.4%) of the respondents indicated that they would not be interested in implementing the course while one respondent provided a neutral response and one respondent provided a neutral response.

Table 14

Question 7 – I Would Teach The Course As It Was Developed, Without Altering the Content In Any Way.

Category	Number responded	Valid percent	Mean	Standard deviation
SA (4)	3	4.0		
A (3)	25	33.3		
N (2.5)	4	5.3	2.36	.68
D (2)	37	49.3		
SD (1)	6	8.0		
No response	0	0		
Total	75	100%		

The purpose of question seven in Table 14 was to have the respondents indicate their intentions to teach the course identified in the previous table in a consistent manner, without changing the content of the course. This question was designed to directly address the second research question of this study.

The results of this question were somewhat split between agree and disagree. There were 28 (37.3%) teachers who either agreed or strongly agreed that they would not alter the content, while there also were 43 (57.3%) teachers who either disagreed or strongly disagreed that they would not alter the content. The mean was 2.36 indicating a

middle average with the standard deviation of .68 indicating somewhat high agreement.

In addition, there were four (5.3%) respondents who provided a neutral response.

Table 15

Question 8 – I Would Alter the Content of the Course To Fit the Facilities and Equipment I Have At My School.

Category	Number responded	Valid percent	Mean	Standard deviation
SA (4)	30	40.0		
A (3)	40	53.3		
N (2.5)	0	0	3.31	.68
D (2)	3	4.0		
SD (1)	2	2.7		
No response	0	0		
Total	75	100%		

The purpose of question eight in Table 15 was to have the respondents indicate their intentions of changing the course identified in question six due to the lack of proper facilities and equipment. This question was designed to have the respondents consider the possibility that if a standards-based introductory technology education course was developed, they might need to re-allocate funding to implement such a course.

The response to this question is initially confusing considering that question seven indicated that about half of the teachers said they would not alter the content of the

course. The results of question eight revealed there were 70 (93.3%) teachers that indicated they agreed or strongly agreed to change the course if they did not have the proper facilities or equipment to teach the course. The mean was 3.31 indicating a high average with the standard deviation of .68 indicating somewhat high agreement.

Conversely, there were only 6.7% (five responses) that indicated they disagreed or strongly disagreed to change the course if they did not have the proper facilities or equipment to teach the course.

Table 16

Question 9 – I Believe It Is Important for Students Taking an Introductory Technology Education Course To Be Exposed To the Same Content Regardless of the School They Attend.

Category	Number responded	Valid percent	Mean	Standard deviation
SA (4)	17	22.7		
A (3)	35	46.7		
N (2.5)	3	4.0	2.91	.76
D (2)	18	24.0		
SD (1)	2	2.7		
No response	0	0		
Total	75	100%		

The purpose of question nine in Table 16 was to have the respondents indicate the importance of exposing the same technology education content to students between school districts. This question, designed similar to question seven, is presented from the perspective of the students, rather than from the perspective of the teacher in question seven.

The results of this question reveal that the majority (69.4%) of teachers agree or strongly agree that it is important for students taking an introductory technology education course to be exposed to the same content. There were 52 teachers that fell into the previous category, however there was a sizable population of the respondents who either disagreed or strongly disagreed with exposing students to the same educational content between school districts. The mean was 2.91 indicating a middle average with the standard deviation of only .76 indicating somewhat high agreement. Over one fourth (26.7% or 20 respondents) of the population surveyed either disagreed or strongly disagreed while three (4.0%) teachers provided a neutral response.

Table 17

Question 10 – If Some of the Content Developed By This Panel of Experts Was Similar or Identical to the Content I Currently Deliver in Other Classes I Teach, I Would Be Willing To Change the Content In My Other Classes.

Category	Number responded	Valid percent	Mean	Standard deviation
SA (4)	4	5.3		
A (3)	60	80.0		
N (2.5)	3	4.0	2.91	.45
D (2)	7	9.3		
SD (1)	1	1.3		
No response	0	0		
Total	75	100%		

The purpose of question 10 in Table 17 was to have the respondents indicate their willingness to keep any course developed consistent, even if that meant the teacher would have to restructure or develop additional curriculum in other classes that might overlap content. This question is similar to question nine, because it specifies an example of where consistency might become more difficult to maintain.

The results of the data collection indicate that 64 (85.3%) of the teachers responded that they either agree or strongly agree with changing content in their other classes to keep any introductory course developed consistent. The mean was 2.91

indicating a high average with the standard deviation of only .45 indicating high agreement. There were eight (10.6%) teachers who indicated they disagree or strongly disagree with changing content in their other classes while three (4.0%) teachers provided a neutral response.

Table 18

Question 11 – The District I Teach In Has the Facilities and Equipment to Accommodate an Introductory Class for All Students at the Middle/Junior High Level.

Category	Number responded	Valid percent
Yes	64	86.5
No	9	12.2
Both yes and no	1	1.4
No response	0	1
Total	74	100%

The purpose of question 11 in Table 18 was to have respondents indicate if the middle or junior high school in their district had the proper facilities and equipment for accommodating an introductory class for all students. This relates to the size of the classroom and an estimation of the type and quantity of materials required for an introductory class.

The results for this question indicate that 64 (86.5%) teachers agree that their district has the proper facilities and equipment. There were nine (12.2%) teachers that

indicated that they did not have the proper facilities and equipment for a technology course required for all students.

Table 19

Question 12 – I Would Recommend an Introductory Course as a Requirement for All Students at the 7th or 8th Grade Level.

Category	Number responded	Valid percent
Yes	68	90.7
No	5	6.7
Both yes and no	2	2.7
No response	0	0
Total	75	100%

The purpose of question 12 in Table 19 was to have the respondents indicate their opinion regarding a recommendation to have an introductory course as a requirement for all students at the 7th or 8th grade level. Even though two respondents indicated both yes and no, this question was designed to make the respondents choose just one answer.

A little over 90% (90.7% or 68 respondents) support an introductory required course for all students at the 7th or 8th grade level.

Table 20

Question 13 – The District I Teach in Has the Facilities and Equipment to Accommodate an Introductory Class for All Students at the High School Level.

Category	Number responded	Valid percent
Yes	58	78.4
No	16	21.6
Both yes and no	0	0
No response	0	1
Total	74	100%

The purpose of question 13 in Table 20 was to have respondents indicate if the high school in their district had the proper facilities and equipment for accommodating an introductory class for all students. This question is very similar to question 11. This question also relates to the size of the classroom and an estimation of the type and quantity of materials required for an introductory class.

The results for this question indicate that 58 (78.4%) teachers agree that their district has the proper facilities and equipment at the high school. There were 16 (21.6%) teachers that indicated that they did not have the proper facilities and equipment for a technology course required for all students. More teachers recommended an introductory class at the middle or junior high school level than at the high school. It would be important to note that some teachers indicated their recommendation for an introductory technology education course for all students at both levels.

Table 21

Question 14 – I Would Recommend an Introductory Course as a Requirement for all Students at the 9th or 10th Grade Level.

Category	Number responded	Valid percent
Yes	54	72.0
No	20	26.7
Both yes and no	1	1.3
No response	0	0
Total	75	100%

The purpose of question 14 in Table 21 was to have the respondents indicate their opinion regarding a recommendation to have an introductory course as a requirement for all students at the 9th or 10th grade level. This question is very similar to question 12. Even though one respondent indicated both yes and no, this question was designed to make the respondents choose just one answer.

Nearly three-fourths (72.0% or 54 respondents) support an introductory required course for all students at the 9th or 10th grade level. It would be important to note that some teachers recommended an introductory course for all students for both “7th or 8th” and “9th or 10th” grades by circling “yes” for questions 12 and 14 on the survey.

Part 2: Statistical Analysis

The following information includes an analysis of the results of the data collected from the surveys. Only the questions that are statistically significant at or above the 0.050 level have been analyzed and included in the following tables. Each of the following three tables corresponds to one of the three demographic questions in section one of the survey. The first demographic question on the survey, regarding the comparison of years of teaching experience, revealed no statistical significance in relation to any of the survey questions. This means that there was no statistically significant difference between technology education teachers that have been teaching for less than 12 years or more than 13 years in relation to survey questions one through 14. Consequently, any analysis indicating the comparison by years of experience was not included in this study.

Table 22

Comparison by Teaching Level

Item Description	Group descriptor	M = Mean	T = Differences between means	Significance
		SD = Standard Deviation N = # Responded		
The study of technology should be made a part of other subjects like science, math, and social studies.	M/S	M = 3.65	T = 2.41	0.019*
	and	SD = 0.69		
	M/S & H/S	N = 26		
	H/S	M = 3.18		
Technology education needs to specifically define what content it should teach, at least at the introductory level.	M/S	M = 3.12	T = -2.39	0.019*
	and	SD = 0.82		
	M/S & H/S	N = 26		
	H/S	M = 3.54		
	(only)	SD = 0.68		
	(only)	N = 48		

Note. * Significant at or above the 0.050 level

Table 22 shows statistically significant differences between means above the 0.050 level between middle / middle and high school teachers and high school (only) technology education teachers when compared to question two on the survey. The researcher is 95% confident that the results did not occur by chance. Middle / middle and high school teachers had a higher mean score than high school (only) teachers. This indicates that they feel stronger than high school (only) teachers regarding the inclusion of technology in subjects such as math, science, or social studies. This reveals an answer to the research question in chapter one regarding the existence of a difference in opinion of the survey questions based on teaching level. It appears as though there are slightly more lower level teachers than upper level teachers that support the incorporation of technology into other curricular areas.

In addition, the researcher also found statistically significant differences between means above the 0.050 level between middle / middle and high school teachers and high school (only) technology education teachers when compared to question five on the survey. The researcher is 95% confident the results did not occur by chance. High school (only) teachers had a higher mean score than middle / middle and high school teachers. This indicates they feel stronger than middle / middle and high school teachers in specifically defining technology education content, at least at the introductory level. This reveals an answer to the first and third research question in chapter one regarding the support for a standard-based, introductory technology education course required for all students and the existence of a difference in opinion of the survey questions based on

teaching level. It appears as though there are slightly more upper level teachers than lower level teachers that believe in specifically defining content at the lower level.

Table 23

Comparison by College Where Bachelors Degree Was Attained

Item description	Group descriptor	M = Mean		T = Differences between means	Significance
		SD = Standard Deviation	N = # Responded		
I would teach the course as it was developed, without altering the content in any way.	UW-Stout	M = 2.26 SD = 0.64 N = 62		T = -2.98	0.004**
	Other	M = 2.85 SD = .69 N = 13			

Note. ** Significant at or above the 0.010 level

Table 23 shows statistically significant differences between means above the 0.010 level between those teachers who attained their bachelors degree from UW-Stout and

those teachers that attained their bachelors degree from somewhere else when compared to question seven on the survey. The researcher is 99% confident that the results did not occur by chance. Teachers that attained their bachelors degree from somewhere other than UW-Stout had a higher mean score than teachers who attained their bachelors degree from UW-Stout. This indicates that they feel stronger than UW-Stout graduates regarding the consistency of teaching the same content to all students. This reveals an answer to the second and third research questions in chapter one regarding support for delivering the contents of the course consistently and the existence of a difference in opinion of the survey questions based on the college where teachers attained their bachelors degree. The analysis of the data suggests that if a graduate attained their degree from a university other than UW-Stout, they would be slightly more willing to teach the same content as other teachers in the state than a UW-Stout graduate.

Table 24

Comparison by Highest Level of Degree Attained

Item description	Group descriptor	M = Mean		T = Differences between means	Significance
		SD = Standard Deviation	N = # Responded		
The study of technology should be made a part of other subjects like science, math, and social studies.	B.S. Degree M.S. degree and higher	M = 3.59 SD = 0.61 N = 34	M = 3.15 SD = 0.94 N = 41	T = 2.46	0.016*

Note. * Significant at or above the 0.050 level

Table 24 shows statistically significant differences between means above the 0.050 level between those teachers who attained their B.S. degree and those teachers that attained their M.S. degree and higher when compared to question two on the survey. The researcher is 95% confident that the results did not occur by chance. Teachers that attained their B.S. degree had a higher mean score than teachers who attained their M.S. degree and higher. This indicates that they feel stronger than those teachers who have

attained their M.S. degree and higher regarding the inclusion of technology in subjects such as math, science, or social studies. This reveals an answer to the third research question in chapter one regarding the existence of a difference in opinion of the survey questions based on the highest level of degree attained. The analysis of the data suggests that those teachers that had only attained a B.S. degree felt stronger about including technology in other curricular areas than those that had attained their M.S. degree or higher.

Chapter V

Summary, Conclusions, and Recommendations

Introduction

This chapter includes a summary of this study, conclusions that have been discovered, and recommendations that have been based on the sample group with possible considerations for related studies in the future.

Summary

The following summary describes the major ideas and procedures followed in this study. The summary includes a restatement of the problem, a brief overview of the methods and procedures used, and a discussion of the major findings in this study.

Restatement of the Problem

Before this study was conducted, it was unclear whether a standards-based introductory technology education curriculum would be consistently supported in Wisconsin. It was stated that if an introductory technology education course was to be implemented, common goals must be in place for those creating the curriculum. It was additionally stated that the goals of those creating the curriculum must be aligned with the standards and the views of technology education teachers delivering the course content to the students.

There were two contingencies offered in order for this process to be successful. First, if the curriculum developed for the course is not delineated from the standards and technology education continues to face cuts in funding, this may result in the deterioration and elimination of technology education programs across the state. Secondly, if teachers delivering the introductory technology education content do not support the course, they will not adopt it, and technology education will continue to flounder in the attempt to rally around a theme defining what educational content the profession represents.

This study has attempted to identify the degree of support WTEA technology education teachers have for implementing a standards-based, introductory technology education course required for all students. Identifying this will help determine if a new course developed will be supported by technology education teachers and whether the development of introductory curriculum will be implemented consistently in technology education classrooms across the state of Wisconsin.

Methods and Procedures

The methodology of this study was derived from a generalized lack of understanding of the content that represents technology education. To start, the main goal of this study was to determine the perceptions of technology education teachers regarding the need for a standards-based, introductory technology education course required for all students. This led to the research problem and research objectives involved with determining WTEA teacher's perceptions of the need for this type of course.

The next step in the process of this study was the review of literature. The review of literature helped clarify that standards and standards-based courses exist for technology education, providing much of the framework for implementing such a course in Wisconsin. The result of the literature review was a historical perspective of technology education's roots and a thorough explanation of technology education's current status.

After developing a foundation of research for this study, collecting data was the next task. Since this study dealt only with specific members of WTEA, a representative sample of the population was chosen from a list of WTEA members currently teaching technology education.

An 18 question written survey was used to collect data. The survey consisted of two sections including demographic and judgment type questions. The survey questions directly related to the purpose of the study and objectives explained in Chapter 1. The data was used only to determine the perceptions of technology education teachers and all survey information was anonymously reported. Finally, the surveys were collected, recorded, and analyzed to determine the perceptions of technology education teachers of the need for, and willingness to consistently deliver, a standards-based, introductory technology education course, required for all students.

Before reporting the major findings, it is important to note that of the 150 surveys sent out, 75 usable surveys were returned by the due date, which amounts to a 50% response rate. This response rate appears to be an acceptable representation of the sample group of WTEA technology education teachers. The responses for the survey questions

are shown in Table 5 through Table 22. A t-test was administered using demographic questions one through four in the first section of the survey as the independent variables. In order to administer a t-test, each demographic question was spit into two similar groups and then compared to each question in section two.

Major Findings

This section will briefly identify the major findings based on the survey results. There will be minimal conclusions made about the findings in this section. The conclusion section will contain a more thorough explanation of the findings.

Survey Section One

One result of this study to report on was that most, or 52% of the respondents, had taught for 13 years or longer while 48% had taught for 12 years or less. While the respondents had a choice between 0-3 years, 4-7 years, 8-12 years, or 13 years or longer, the results of the data were compiled into two similar groups so that a t-test could be administered. Of the 75 respondents, 15 indicated 0-3 years, 15 indicated 4-7 years, 6 indicated 8-12 years and 39 indicated teaching 13 years or longer. The average was nearly 19 responses per category.

Other findings showed that over half, or 65.3% of the respondents, taught only at the high school level while 34.7% either taught only at the middle school or both middle school and high school. Even though the respondents had a choice between middle school, high school, or both middle and high school, the results of the data were compiled into two similar groups for administering the t-test. Of the 75 respondents, 49 indicated

teaching at the middle school, 9 indicated teaching at the middle school, and 17 indicated teaching at both the middle and high school.

When asked select which college granted their bachelor's degree, over three fourths, or 82.7 % of the respondents, indicated UW-Stout as their degree granting institution while 17.3% indicated either UW-Platteville or they indicated "Other". In order to administer a t-test, the responses were split into either UW-Stout graduates or "other". Of the 75 respondents, 62 indicated receiving their bachelors degree from UW-Stout, four indicated receiving theirs from UW-Platteville, and nine indicated receiving theirs from another institution.

Other findings showed that over half, or 54.6% of the respondents, had attained an M.S. degree or higher while 45.3% had attained a B.S. degree. Parallel with demographic questions one through three, a t-test was administered so the results were combined into two similar groups. Of the 75 respondents, 40 indicated attaining an M.S. degree, one indicated attaining an Ed.S. degree, and 34 indicated attaining a B.S. degree.

Survey Section Two

Responses to section two of the survey made evident that many technology education teachers were in support of a standards-based, introductory technology education course required for all students. Most of the responses on survey questions one through six, eight, and ten indicated either agree or strongly agree. In survey question one, 100% of the respondents indicated they agree or strongly agreed that the study of technology should be included in the school curriculum. In survey question two, 85.3 % of the respondents indicated the study of technology should be made a part of other

subjects. Survey question three revealed that 94.7% of the teachers thought the study of technology should be taught as a separate subject, while in survey question four, 87.9% thought that it should be a required course. Survey question five indicated that 86.5% of the respondents thought that there was a need to identify introductory level technology education content. Survey question six revealed that 93.3% of the respondents would be interested in implementing a standards-based, required, introductory technology education course developed by leading technology teachers, industry professionals, and university professors. In survey question eight, 93.3% of the teachers would alter the content of the course if the facilities and equipment at their school. Finally, question 10 revealed that 85.3% of the teachers would change the content in their other classes if it were identical or similar to the content developed from the panel of experts. Questions seven and nine are separated from the rest of the results and explained in the following paragraph because the respondents answers are more evenly distributed.

The results for question seven indicate that 37.3% of the respondents either agree or strongly agree that they would not alter the content of a standards-based, required, introductory technology education course developed by leading technology teachers, industry professionals, and university professors. Conversely, over half, or 57.3% of the teachers, either disagreed or strongly disagreed that they would not alter the content. In addition, there were 4 (5.3 %) respondents who provided a neutral response. The results for question nine indicate that the majority, or 69.4% of teachers, agree or strongly agree that it is important for students taking an introductory technology education course to be exposed to the same content. Conversely, there was a sizable population of the

respondents who either disagreed or strongly disagreed with exposing students to the same educational content between school districts. Over one fourth, or 26.7% of the population surveyed, either disagreed or strongly disagreed while 4.0% of the teachers provided a neutral response. The results of questions seven and nine were more equally distributed between agree and disagree, than the rest of the questions on the survey.

There is a considerable population (57.3%) of technology education teachers that believe they should be able to alter content in the course, even though the intent of the course would be to promote content consistency between school districts. In addition, there is also a considerable population (26.7%) of technology education teachers that believe that it is not important for students to be exposed to the same content between school districts. Even though the results of this survey indicate support from technology education teachers, the results of these two questions indicate that there would be some teachers that would resist the consistent delivery of a standards-based, introductory technology education course required for all students.

Survey question 11 revealed that 86.5% of the respondents indicated they have the facilities and equipment to accommodate an introductory class for all students at the middle/junior high school level. Similarly, 90.7% of the respondents in survey question 12 indicated that they would recommend the course at the 7th or 8th grade level. Survey question 13 revealed that 78.4% of the respondents indicated they have the facilities and equipment to accommodate an introductory class for all students at the high school level. Additionally, 72.0% of the respondents in survey question 14 indicated that they would recommend the course at the 9th or 10th grade level. Although there are more teachers

supporting an introductory course at the middle/junior high school level, responses for survey questions 11 through 14 indicate that many respondents feel that there should be an introductory course at both the middle/junior high and high school levels.

Conclusions

Before explaining the major findings and conclusions of this study it is important to reiterate that of the 150 individuals that were sent a survey, 75 teachers, or 50%, returned a usable survey and make up the core from which any findings were determined.

Additionally, it should be noted that all respondents were technology education teachers employed in Wisconsin. The conclusions are based on the research questions in chapter one of this study. The following paragraphs include a restatement of each research question in this study along with an attempt to explain the findings of this study that fulfill these research questions.

Research Question 1

What are the perceptions of technology education teachers in Wisconsin regarding the need for a standards-based, introductory course required for all students?

As stated in chapter one, the profession of technology education is suffering from the lack of consistency between school districts, and no place in the required general curriculum. The research shows that there are many professionals related to the field of technology education that support the inclusion in the general curriculum of a standards-based, introductory technology education course, required for all students. The research also shows that there have been standards established for technology education and that example, standards-based introductory courses have been developed.

The results from the survey show that 93.3% of the respondents would be interested in implementing such a course in their program offerings. Conversely, 6.8% of the respondents would not support such a course in their program offerings. There were 90.7% of the respondents that recommended (6.7% would not recommend) such a course as a requirement at the 7th or 8th grade level. In addition, 72.0% of the respondents recommended (26.7% would not recommend) such a course at the 9th or 10th grade level.

Finally, 86.5% of the respondents support specifically defining what content technology education should teach and 87.9% of the respondents believe students should be required to take a technology education class prior to graduating. Conversely, 13.4% of the respondents do not support specifically defining what content technology education should teach and 10.9% do not believe students should be required to take a technology education class prior to graduating.

These results indicate that there is a high level of support for developing and implementing a standards-based, introductory technology education course required for all students in Wisconsin.

Research Question 2

What is the level of support for altering a required, standards-based, introductory technology education course by technology education teachers?

As stated in chapter one, technology education is an elective curriculum. Even though standards have been developed, it is voluntary for technology education teachers to base their curriculum on them. As a result, there seems to be a lack of consistency in the definition for technology education due to the variety of programs in districts throughout Wisconsin. The research shows that there is a need to define what content this profession represents in order to justify continued funding and possibly secure a place as a core requirement in the general curriculum.

The results from the survey show that 37.3% of the respondents would teach such a course as it was developed, without altering the content in any way and 69.4% of the respondents believe it is important for students taking an introductory technology education course to be exposed to the same content from district to district. Conversely, 57.3% of the respondents would alter the content of the course and 26.7% of the respondents do not believe it is important for students taking an introductory technology education course to be exposed to the same content from school district to school district.

Interestingly, 93.3% of the respondents stated that they would alter the content of a required technology education course (6.7% would not) if the facilities and equipment at the respondents' school were not appropriate. However, 85.3% of the respondents indicated that they would change the content in their other courses (10.6% would not) to keep the specified course consistent between school districts. This means that if a course was developed as a requirement, those creating the curriculum would need to make sure that either the content was generalized enough to ensure that all schools would have the proper facilities and equipment, or that the content was flexible enough to allow the teachers to make choices between several activities in the course, based on the facilities and equipment available at a given school.

The results indicate that the majority of teachers believe it is important for students to be exposed to the same content as long as each school district has the proper facilities and equipment to accommodate such a course. Stated simply, the size of the facility and the type of equipment necessary to teach the content in a required course must be available, as indicated by most teachers, in order for consistent delivery to take place.

Research Question 3

What is the difference in the perception of technology education teachers toward a standards-based, introductory course required for all students based on the following demographics:

A. Teaching experience

B. Teaching level

C. Level of education

D. Location of B.S. training

As stated in chapter one, the preceding independent variables were identified as possible factors in the opinions of technology education teachers regarding the topic of this study. Literature concerning these variables and the topic of this study was searched for, however, none pertained to this study. A t-test was administered to compare the means between two groupings of each of the independent variables in section one of the survey in relationship to each question in section two of the survey.

The results of the t-test for years of teacher experience yielded no statistically significant scores when compared to any of the dependant variables in section two of the survey. This means that the number of years a teacher had worked and their answers on the survey are not related.

The results of the t-test for teaching level indicated statistical significance above the 0.050 level in relation to the inclusion of technology into other subjects and specifically defining introductory technology education content. In question two, respondents who taught at the middle and middle and high school level ($M=3.65$) felt stronger than high school (only) teachers ($M=3.18$) regarding the inclusion of technology in subjects such as math, science, or social studies. This indicates that most respondents in both groups agree, but those that teach at the lower level agree more strongly.

In question five, respondents who taught at the high school level (only) (M=3.54) felt stronger than middle / middle and high school teachers (M=3.12) in specifically defining technology education content, at least at the introductory level. This indicates that most respondents in both groups agree, but those that teach at the higher level agree more strongly.

The results of the t-test for the college where the respondent attained their bachelors degree indicated statistical significance above the 0.010 level in relation to consistently teaching the same content to all students. Respondents who attained their bachelors degree from somewhere else (M=2.85) other than UW-Stout felt stronger than UW-Stout graduates (M=2.26) regarding the consistency of teaching the same content to all students. This indicates that more teachers who attained their bachelors degree from somewhere other than UW-Stout agreed than disagreed regarding the consistency of teaching the same content to all students. Conversely, since the mean for UW-Stout graduates was 2.26, this indicates that more teachers who attained their bachelors degree from UW-Stout disagreed than agreed regarding the consistency of teaching the same content to all students. The reason(s) for the difference could be varied and are a source for further study. Questions about what UW-Stout students are exposed to when they get their training or their experiences during student teaching are of interest to the researcher.

Finally, the results of the t-test for the highest level of degree attained yielded statistical significance above the 0.050 level when compared to question two. Respondents who attained their B.S. degree (M=3.59) felt stronger than those that attained their M.S. degree or higher regarding the inclusion of technology in other subjects

such as science, math and social studies. This indicates that most respondents in both groups agree, but those that have attained their B.S. degree feel more strongly. One could speculate why there is a difference between the two groups. One possibility is that those that have attained their M.S. degree have had more formal education and feel that they know how to teach technology best and therefore feel that they should be the ones teaching technology content. Another possibility is that those that have attained an M.S. degree could feel their job security is threatened by other teachers taking over content that technology education used to be responsible for covering. However, those with a B.S. degree could make the same arguments.

Recommendations

The following recommendations have been drawn from the findings of this study. The recommendations include those that have been created from the implications of the findings along with the recommendations for future research.

Recommendations related to this study

The recommendations listed below have been drawn from the findings and conclusions of this study.

1. The results of this study indicate that many technology education teachers would support the development of a standards-based, introductory technology education course required for all students by technology teachers, industry professionals and university professors. A recommendation would be for a panel such as the one previously

described to develop this course, conduct a comprehensive advertising campaign so that everyone knows what is happening and what technology education is, and finally for technology education teachers to deliver this course to students consistently between school districts.

2. The sample group in this study was somewhat small due to the number of restrictions placed on the population determined. The size of the qualifying sample could have been larger had student teachers been included in the mailings. A recommendation for further research would be to include students enrolled in a technology education program at a university and a member of WTEA in the population surveyed.

3. Many of the respondents were high school teachers that had been teaching for more than 13 years, at the high school level and graduated from UW-Stout. However, the response conclusions for teachers that are newer to the technology education profession, teach at the middle school level, and graduated from somewhere other than UW-Stout are less reliable due to the lower number of respondents which this study based some of its findings. Again, a recommendation would be to include more qualifying teachers in a sample for a future study.

4. Another recommendation would be to consider surveying teachers in the fall or spring, when more teachers would be not be on vacation and available to fill out the survey. However, one could argue that there would be less time for respondents to spend completing the survey due to the demands of teaching duties.

5. A final recommendation would be to spend more time and money revising the survey to eliminate any defects. Spending more time and money could increase the validity and reliability of the survey to increase.

Recommendations for further study

The recommendations that follow are about the possibility of further study, which might result in related or more thorough findings that compliment this study. These recommendations represent the thoughts contemplated while completing the research for this study.

1. As mentioned earlier, a repeat of this study at a later date would likely give a more thorough perspective of teacher perceptions of the need for a standards-based, introductory technology education curriculum required for all students. Though the general idea of this study was to provide an indication of technology education teachers' current perceptions regarding this topic, it would be very interesting to see how the results would compare to a similar study done in a couple years as more and more elective programs are facing budget cuts.

2. A final recommendation would be to approach technology education teachers with a fully developed course designed by a variety of recognized leaders and conduct a similar study to this one. Although there already have been courses developed by organizations that would address the problem of inconsistency in technology education programs, they have been recently developed and few teachers may have had the chance

to evaluate them. It would be interesting to see how technology education teachers would respond to concrete, content-defining activities.

References

- Bush, G. H. (1990). Statement on signing the Carl D. Perkins Vocational and Applied Technology Education Act Amendments of 1990. *Federal Register Division. National Archives and Records Service, Public Papers of the Presidents of the United States*. pp.1290-1291. Retrieved July 24, 2003, from: the MasterFILE Premier database.
- Cajas, F. (2000). Research in technology education: What are we researching? A response to Theodore Lewis. *Journal of Technology Education*, 11(2) 61. Retrieved June 21, 2004, from:
<http://scholar.lib.vt.edu/ejournals/JTE/v11n2/cajas.html>
- Center for Science Education (2004). Foundation Science. Retrieved July 12, 2004 from:
<http://cse.edc.org/work/foundationscience/default.asp>
- Dugger, W. E. (2002). Roots of technology education: Standards projects. *The Journal of Technology Studies*, 28(2), 96. Retrieved June 18, 2004, from: the Ebscohost database.
- Gomez, et al (2003). *Foundations of Technology: A Standards-Based High School Model Course Guide*. Reston, VA: International Technology Education Association.
- Hager, M.A., Wilson, S., Pollak, T.H. & Rooney, P.M. (2002). Response Rates for Mail Surveys of Nonprofit Organizations: A Review and Empirical Test. National Center for Charitable Statistics (NCCS). Retrieved July 20, 2004 from:
<http://nccs.urban.org/overhead/pretestpaper.pdf>

- Hendricks, R. (2003). *What do you teach? No really, what do you teach?* Paper presented at the Wisconsin Technology Education Association conference, Wisconsin Dells, WI, April 3, 2003.
- International Technology Education Association (ITEA). (1999). *A guide to develop standards-based curriculum for K-12 technology education*. Reston, VA: International Technology Education Association.
- ITEA. (2000a). *Standards for technological literacy: Content for the study of technology*. Reston, VA: International Technology Education Association.
- ITEA. (2000b). *Teaching technology: Middle school strategies for standards-based instruction*. Reston, VA: International Technology Education Association.
- ITEA. (2001). *Exploring technology: A standards-based middle school model course guide*. Reston, VA: International Technology Education Association.
- ITEA. (2004a). Frequently asked questions. Retrieved June 24, 2004, from: <http://www.iteawww.org/TAA/FAQsPage.htm>
- ITEA. (2004b). History of technology for all Americans project. Retrieved June 24, 2004, from: <http://www.iteawww.org/TAA/HistoryofTfAAPPPage.htm>
- ITEA. (2004c). What is technology? Retrieved June 24, 2004, from: <http://www.iteawww.org/A1.html>
- Johnston, S. (2003). WTEA President's message – Spring Edition. *Wisconsin Technology Education Association (WTEA)*. Retrieved June 24, 2004, from: <http://www.wtea-wis.org>

- Karnes, R. (1999). Technology education in prospect: Perceptions, change, and the survival of the profession. *Journal of Technology Studies*, 25(1), Winter-Spring. Retrieved July 7, 2004, from: <http://scholar.lib.vt.edu/ejournals/JOTS/Winter-Spring-1999/karnes.html>
- Lewis, T. (2000). Adopting standards for technology education. *Journal of Industrial Teacher Education*, 38(1), 71. Retrieved June 18, 2004, from: the WilsonWeb database.
- North Central Regional Educational Laboratory (2004). *Summary of Goals 2000: Educate America Act*. Retrieved July 12, 2004, from the World Wide Web: <http://www.ncrel.org/sdrs/areas/issues/envrnmnt/stw/sw0goals.htm>
- Pearson, G., & Young, T. A. (2002). *Technically speaking: Why all Americans need to know more about technology*. National Academy Press, Washington, DC: Committee on Technological Literacy.
- Sanders, M. (2001). New paradigm or old wine? The status of technology education practice in the United States. *Journal of Technology Education*, 12(2). Retrieved June 18, 2004, from: <http://scholar.lib.vt.edu/ejournals/JTE/v12n2/sanders.html>
- Schmidt, W., McKnight, C., & Raizen, S. (1997). *A splintered vision: An investigation of U.S. science and mathematics education*. Retrieved June 21, 2004, from: <http://scholar.lib.vt.edu>
- Wisconsin Department of Public Instruction (WDPI) (2003). Homepage. Retrieved June 24, 2004, from: <http://www.dpi.state.wi.us/>

Wisconsin Department of Public Instruction (WDPI). (1998). *Wisconsin's model*

academic standards. Retrieved June 18, 2004, from:

<http://www.dpi.state.wi.us/standards/pdf/teched.pdf>.

Appendix A

Survey

July 13 , 2004

Dear Technology Educator,

I am asking for your help with the following survey. I'm hoping to determine your perception of the need for a standardized, required, introductory technology education course in Wisconsin. I've included questions on this survey which will help me identify your thoughts on the need for this type of technology education course.

The survey should take about 10 minutes. You can be assured that your responses are anonymous and confidential. No attempt will be made to identify any respondents.

By filling out this survey, you are giving your consent to participate in this research. Your decision to participate in this survey is completely voluntary. You are not required to participate, and your decision to not participate will not provide any negative consequences. All of your responses will be anonymous, and confidential. To ensure your anonymity, you should not write your name or any identifying information on the questionnaire. When all surveys have been collected, averages and correlations will be computed. All results will be presented in a way that no individual can be identified.

I do not foresee any significant risks to you, although any research may involve unforeseeable risks to participants. If completing the survey makes you uncomfortable, you can withdraw from the study without any negative consequences. You may contact those listed below if you experience any negative reactions as a result of taking this survey, and they will assist you with your concerns.

If you have any questions about your participation in this research, please ask before completing the survey. By completing the questionnaire, you will have given your informed consent to participate in this research. This means that you understand the nature of the research, have had an opportunity to ask and obtain satisfactory answers to your questions, and have voluntarily agreed to participate in this research. The University of Wisconsin-Stout Institutional Review Board for the Protection of Human Subjects has approved this survey. If you have any questions or concerns about the nature of this study, contact me at 715-232-3237. Dr. Howard Lee, my research advisor is also available at (715)-232-1251. If you have questions regarding your treatment as a participant in this study contact Sue Foxwell, Human Protections Administrator, 11 HH, UW-Stout, Menomonie, WI 54751, (715)-232-1126.

Please return this survey in the enclosed, postage-paid envelope by July 22, 2004.

Thank you for your contribution to this research!

Jon Lindee

UW-Stout
115 North Hall
Menomonie, WI 54751

Technology Education Teacher Survey

Demographic Information

1. How many years of teaching experience do you have? (check one)

- 0-3 years
- 4-7 years
- 8-12 years
- 13 years or longer

2. Please check the level at which you will teach next fall.

- Middle School
- High School
- Both Middle and High school

3. What college did / will you receive your bachelors degree from?

- UW-Stout
- UW-Platteville
- Other _____

4. Please check the highest degree you have attained below:

- B.S. Degree
- M.S. Degree
- Ed.S. Degree
- Doctoral Degree
- Other _____

Directions: Listed below are a series of statements about teaching and learning. Read each of the following statements carefully. Indicate the extent to which you think these ideas reflect your opinion by **circling** the letters representing strongly agree, agree, disagree, or strongly disagree. All answers are anonymous.

	<i>Strongly Agree</i>	<i>Agree</i>	<i>Disagree</i>	<i>Strongly Disagree</i>
1. Using the broad definition of technology as "modifying our natural world to meet human needs" the study of technology should be included in the school curriculum.	SA	A	D	SD
2. The study of technology should be made a part of other subjects like science, math, and social studies.	SA	A	D	SD
3. The study of technology should be taught as a separate subject.	SA	A	D	SD
4. If technology is taught as a separate subject it should be a required class for all students.	SA	A	D	SD
5. Technology education needs to specifically define what content it should teach, at least at the introductory level.	SA	A	D	SD

- Please turn over and complete back side -

Assume a panel made up of leading technology teachers, industry professionals, and university professors developed a standards-based, required, introductory Technology Education course.

- | | | | | |
|---|-----|---|----|----|
| 6. Provided the funding was available, I would be interested in implementing this course in my program offerings. | SA | A | D | SD |
| 7. I would teach the course as it was developed, without altering the content in any way. | SA | A | D | SD |
| 8. I would alter the content of the course to fit the facilities and equipment I have at my school. | SA | A | D | SD |
| 9. I believe it is important for students taking an introductory technology education course to be exposed to the same content regardless of the school they attend. | SA | A | D | SD |
| 10. If some of the content developed by this panel of experts was similar or identical to the content I currently deliver in other classes I teach, I would be willing to change the content in my other classes. | SA | A | D | SD |
| 11. The district I teach in has the facilities and equipment to accommodate an introductory class for all students at the middle/junior high school level. | Yes | | No | |
| 12. I would recommend an introductory course as a requirement for all students at the 7 th or 8 th grade level. | Yes | | No | |
| 13. The district I teach in has the facilities and equipment to accommodate an introductory class for all students at the high school level. | Yes | | No | |
| 14. I would recommend an introductory course as a requirement for all students at the 9 th or 10 th grade level. | Yes | | No | |

Any additional comments:

Appendix B

Authors Included in the Karnes (1999) Article

1. Thomas R. Baldwin, Dean, College of Technology, Pittsburgh State University
The Challenging Road to Oblivion.
2. Elazer J. Barnett, Interim Dean, School of Technology, North Carolina Agricultural & Technical State University - *Critical Changes in Technology Education.*
3. M. James Bensen, President, Bemidji State University - *Invent the Future Rather Than Reinvent the Past!*
4. David Bjorkquist, Professor Emeritus, University of Minnesota - *Learner-Centered Education in Technology.*
5. Sharon A. Brusick, Assistant Professor, Technology Education, Virginia Polytechnic Institute & State University. *Commitment to a Cure.*
6. James J. Buffer, Jr., Professor and Associate Dean Emeritus, The Ohio State University, and Horace G. Fralin, Professor and Dean Emeritus, Virginia Polytechnic Institute & State University. *No title for article.*
7. Rodney L. Custer, Chairperson, Department of Industrial Technology, Illinois State University *Prospects for the Future: It's Our Call.*
8. Paul W. DeVore, Professor Emeritus, West Virginia University, *Resistance to Change.*
9. William E. Dugger, Jr., Director, Technology for All Americans Project, International Technology Education Association, *Technology Education in the Millennium.*

10. Michael Dyrenfurth, Professor & Graduate Coordinator, Department of Industrial Education & Technology, Iowa State University of Science & Technology, *Ensuring the Future of Technology Education.*
11. Thomas L. Erekson, Director, School of Technology, Brigham Young University, *No title for article.*
12. Rupert N. Evans, Dean Emeritus, College of Education, University of Illinois at Urbana-Champaign, *No title for article.*
13. Dennis R. Herschbach, Associate Professor, Department of Educational Policy Planning and Administration, University of Maryland, *Looking Past 2000.*
14. Daniel L. Householder, Professor, Department of Educational Human Resource Development, Texas A&M University, *No title for article.*
15. Everett N. Israel, Professor of Industrial Technology, Eastern Michigan University, *The Future of Technology Education: Meeting the Challenge.*
16. Scott D. Johnson, Associate Professor & Graduate Programs Coordinator, Department of Human Resource Education, University of Illinois, *No title for article.*
17. Theodore Lewis, Associate Professor, Department of Work, Community & Family Education, University of Minnesota, *From This Day Forward.*
18. Donald G. Lux, Professor Emeritus, Technology Education, The Ohio State University, *Change Imperatives.*
19. G. Eugene Martin, Professor and Dean, School of Applied Arts & Technology, Southwest Texas State University, *Where Are Our Leaders?*

20. Jerome Moss, Jr., Professor Emeritus, University of Minnesota, *Connections*.
21. Stephen Petrina, Assistant Professor, University of British Columbia, *It's 1999: Are We Part of the Problem or Part of the Solution?*
22. David J. Pucel, Professor, Department of Work, Community & Family Education, University of Minnesota, *Technological Literacy: An Essential Ingredient for Life and Careers*.
23. Willis E. Ray, Professor Emeritus, The Ohio State University, *No Title for article*.
24. Mark Sanders, Associate Professor, Virginia Polytechnical Institute and State University *Politics as Unusual*.
25. Ernest N. Savage, Interim Dean, College of Technology, Bowling Green State University, *No title for article*.
26. Michael Scott, Associate Professor, Technology Education, The Ohio State University, *Education: A Good Beat But Still Hard To Dance To*.
27. Kendall N. Starkweather, Executive Director, International Technology Education Association, *No title for article*.
28. Sam Stern, Professor of Technology Education, Oregon State University, *No title for article*.
29. Leonard F. Sterry, Professor, Graduate Program, Director for Technology and for Ph.D. Program in Technology Education, University of Wisconsin-Stout, *Viable Mission*.

30. Jerry Streichler, Trustee Professor and Dean Emeritus, College of Technology, Bowling Green State University, Executive Director, Epsilon Pi Tau, *No title for article.*
31. Richard A. Swanson, Professor and Director, Human Resource Development, Research Center, University of Minnesota, *It's the Theory, Stupid.*
32. Tim L. Wentling and Grayce Wicall Gauthier, Professor of Education & Head of Human Resource Education Department respectively, University of Illinois at Urbana-Champaign, *No title for article.*
33. Brenda L. Wey, Department of Technology, Appalachian State University, *No title for article.*
34. Tom Wright, George & Frances Ball, Distinguished Professor of Industry & Technology Ball State University, *Defining Technology: A Prerequisite to Acceptance.*
35. Karen Zuga, Associate Professor of Technology Education, The Ohio State University, *No title for article.*