

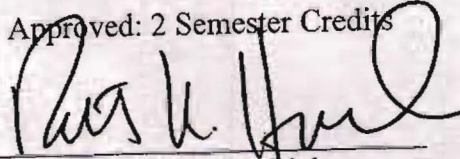
Have the Technology Education Standards Impacted  
the Classroom Curriculum in  
South-Central Wisconsin?

By

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ABSTRACT

The purpose of this study is to identify the effects the state and national Technology Education standards have had on the Technology Education curriculum in public schools in South-central Wisconsin, specifically those located in CESA 2, of which 49 schools have Technology Education programs. As all subjects taught in schools become standards based in their curriculum, it is important that we look at how this changes the quality of that curriculum. It is the goal of standards to improve education and thus improve student learning and future success. By looking carefully at how standards are actually impacting the classroom one can begin to draw conclusions if teachers are modifying curriculum to meet the standards or manipulating the system to make it look as if their curriculum is standards based, but really hasn't changed since before the standards push. This is especially evident in the area of Technology Education where both the state and national standards have called for curricular shift from more

traditional shop type classes to more analytical and engineering based classes. This shift is supported by respected national agencies such as the National Science Foundation and The National Academy of Engineering. It is imperative for the future success of students that Technology Education instructors look objectively at how well the standards are being implemented. This study is a step in that direction. A 29 question survey instrument will be given in an online web based format. The first part of the survey will be demographic information including the size of school and department to which they belong. Next, the types of courses offered in the departments including any courses that have been added or dropped in the last 10 years. The remainder of the survey will consist of yes / no responses and Likert Scale type questions about how they have used the Wisconsin and ITEA standards in their curriculum. Frequencies and percentages will be used to determine the degree to which the standards have impacted the Technology Education curriculum of the sample group.

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## CHAPTER 1

### Introduction

#### *Overview of Technology Education*

With little debate, one can say that technology is always changing. With this being said, it is of no surprise that the field of Technology Education sees its share of change also. One way to quickly look at the changes this profession has seen over the years is to analyze the different labels it has had. A quick glance into the past would reveal many labels, including Manual Training, Manual Arts, Industrial Arts, Technology Education, and, most recently at least in Wisconsin, Technology and Engineering Education. While a closer look will reveal some other labels that have been used throughout the years, these five lay a basic framework for where the profession started and where it is heading.

According to Snyder (2004), it is important to understand the subtly different emphasis each label placed upon the profession. In Manual Training the emphasis was placed on the manual part of the curriculum. In this instance, the curriculum reflected industrial work in a school setting by which students would learn how to perform specific jobs using tools and machines. As time passed, the profession realized that students need more than just job skills to be productive members of society, so Manual Arts emphasized the arts part of the curriculum. Students still learned specific job skills, but the curriculum also included other subjects that would help students to be more informed and productive members of society. As technology changed in the jobs these students were preparing for, the word manual became obsolete. Factories and machines were becoming more sophisticated and automated, producing more products faster and cheaper than ever before. Industry was becoming a vital part of America and also changing the country in many ways.

The next emphasis was on industry, and so the label "Industrial Arts" was adopted. This broadened the field to include the skills needed by industry but also industry itself and how it was shaping and changing the future of America. The profession had been very skill-based and vocational to this point, but a shift was about to happen. The driving force in the world of business and industry was technology. Technology was making the world a smaller, more competitive place. The launching of Sputnik by the Soviet Union and the ensuing space race made it clear to Americans that the education system needed to deal with the issues of technology and the changes it would bring.

It became apparent that students needed to know how to deal with these changes and become more aware of how these changes were affecting the world around them. In 1983, "Technology Education" began to replace the old "Industrial Arts" title. The emphasis was on the study of technology and improving the technological literacy of all Americans. This was a shift to a more cognitive approach to technology and not strictly a vocational and skills-based approach. Understanding what technology is, how it is changing the world, and analyzing the advantages and disadvantages of all that technology were key concepts for Technology Education. A big step forward came in 2000 when the International Technology Education Association (ITEA) published its Standards for Technological Literacy (STL). Here was a framework for what should be taught in a Technology Education curriculum outlining the most important concepts of technological literacy. As the profession strives to make all students technologically literate, it becomes apparent how closely related other school subject areas are to Technology Education, especially math and science. Technology is the practical application of knowledge, and most of the knowledge comes from the worlds of math and science. As educators began to look at the standards and see how they could meet them, it became obvious

that the field of engineering would offer excellent opportunities for students and teachers alike to meet the criteria set forth in Standards for Technological Literacy.

This emphasis on math and science leads to the current label of Technology and Engineering Education. This combines the best of all the labels while meeting current and future needs of students. Through engineering, students look at the design and implementation of systems, which offers them the opportunity for hands-on work while analyzing the benefits, risks, and ethical considerations that all Americans will need to know to be informed decision makers in the future.

### *Technology Education Standards Call for Change*

Wisconsin technology educators have two sets of standards that they can use to benchmark their curriculum. One set that has been mentioned earlier, was published by ITEA in 2000 and are called Standards for Technological Literacy. In 1998, the Wisconsin Department of Public Instruction (WDPI) published the Wisconsin Model Academic Standards for Technology Education. When compared to each other, the standards share much common ground. The standards present a unique challenge to the Technology Education community in that to fully implement the standards, significant changes to the curriculum are needed. As discussed earlier, Technology Education has its roots in a more vocational skill based setting. This has been where most of the time and money has been spent in curriculum development and physical facilities and equipment. This past curriculum has reflected the needs of the society at the time, and course titles such as Woods, Metals, Graphic Arts, and Automotive were common (Reeve, 2002). While these courses have been slowly changing, the introduction of state and national standards have quickened the pace, or at least increased the pressure, to change to a

more theory-based cognitive approach. While the changing of a name can be done very quickly with a vote and a stroke of a pen, changing what is actually taught in the classroom on a day-to-day basis will take time to evolve, especially when the changes are significant. In Standards for Technological Literacy (ITEA, 2000), teachers are urged in the Call to Action (p. 200) section to make changes to their curriculum, textbooks, and learning environments as they implement the standards and move away from a more traditional setting.

The Call to Action (ITEA, 2000) is not the only source of pressure. The National Academy of Sciences (2002) published a book entitled *Technically Speaking: Why all Americans need to know more about technology* that urges technology programs to focus on design, technical literacy, and engineering. In addition, the programs are targeting different students. Traditionally, students looking to enter the workforce or go on to a trade or technical school made up the main population of a Technology Education class. As stated in the preface of Standards for Technological Literacy (ITEA, 2000), "Technology Content Standards was created under the aegis of the ITEA and its Technology for All Americans Project and hundreds of educators and professionals have participated in its development and revision... Technology Content Standards will help ensure that all students receive effective instruction about technology (p. vii)." The significance of these two statements becomes very apparent when coupled with the title of the above mentioned book *Technically Speaking: Why all Americans need to know more about technology*. Technology Education is moving toward a more general education curriculum designed for *all* students. Understanding technology is something that all students and all Americans need to know. This is summed up by William Wulf, President of the National Academy of Engineering, in the foreword of Standards for Technological Literacy:

“We are a nation increasingly dependent on technology. Yet, in spite of this dependence, U.S. society is largely ignorant of the history and fundamental nature of the technology that sustains it. The result is a public that is disengaged from the decisions that are helping shape its technological future. In a country founded on democratic principles, this is a dangerous situation (ITEA, 2000, p.v).”

Clearly, there is a message of change coming from the leaders of the Technology Education field as well as leaders from the math, science and engineering areas. In order to serve the students and society of today, Technology Education needs to shift from vocational preparation to a more general education philosophy geared at making students technologically literate. Only then will students be able to intelligently navigate the maze of technological innovations they are sure to encounter in the future.

#### *Statement of the Problem*

Technology Education has progressed through many curricular philosophies through its history, the most recent change being driven by both the Wisconsin Model Academic Standards for Technology Education and the nationally accepted Standards for Technological Literacy. Because Technology Education is not a content area that is subject to state testing, there is little information about how these new standards are actually impacting or changing the old curriculum. To obtain this knowledge, data will be collected through an online survey during the fall semester of 2006 to Technology Education teachers in the south-central portion of Wisconsin.

### *Purpose of the Study*

The purpose of this study is to identify the effects the state and national Technology Education standards have had on the Technology Education curriculum in public schools in South-Central Wisconsin.

### *Research Questions*

1. Have technology educators made an effort to read and become familiar with the state and national Technology Education standards?
2. Have technology educators made an effort to revise their current curriculum and benchmark their class objectives to the state or national Technology Education standards?
3. Have any significant program changes (i.e. old courses discontinued, new courses added, old equipment sold or thrown out, new equipment purchased) happened as a result of aligning the curriculum with the state or national Technology Education standards?

### *Significance of the Study*

As technology becomes an increasingly important part of everyone's life, it is important that technology educators adequately prepare students to meet the technological problems they will face in their futures. One way of ensuring this is by changing and building the classroom curriculum around the state or national Technology Education standards. Since there is no mandated state test that checks to see if the standards are being taught, there is less pressure to change or adopt the standards. This study will begin to see what effects the standards are having on the Technology Education curriculum and to what extent technology educators are revising their curriculums.

### *Assumptions & Limitations*

This study has the following assumptions and limitations:

1. This study focuses on Technology Education teachers and is assuming that they will be honest and truthful in their responses about their programs.
2. Many of the questions asked will be subjective in nature, and much of the data collected will be limited to personal opinion.
3. The study only includes a small geographical area, South-central Wisconsin, so the results will be specific to this area and may not represent the same findings elsewhere in the state or country.
4. The survey developed for this study was used solely for this study and therefore has little measure of validity or reliability.

### *Definition of Terms*

The definitions of the following terms are crucial to the complete understanding of the standards movement and how it has impacted Technology Education.

**Benchmark** – A written statement that describes the specific developmental components by various grade levels that students should know or be able to do in order to achieve a standard (ITEA, 2000).

**Concepts** - Important ideas. Concepts have a lasting quality. Once learned, concepts have a usefulness that can be transferred and applied in new and different situations (WDPI, 1998).

**Curriculum** – The courses of study that teachers and students cover describing and specifying the methods, structure, organization, balance and presentation of the

content (ITEA, 2000).

**General Education-** General education is general in several clearly identifiable ways: it is not directly related to a student's formal technical, vocational, or professional preparation; it is part of every student's course of study, regardless of his or her area of emphasis; it is intended to impart common knowledge, intellectual concepts, and attitudes that every educated person should possess (WDPI, 1998).

**Technical Education** - A program of studies that leads to the preparation of a technician. This is usually a technical college function (WDPI, 1998).

**Technology Content Standard** - A written statement that specifies the knowledge (what students should know) and process (what students should be able to do) students should possess in order to be technologically literate (ITEA, 2000, p.242).

**Technology Education** – A study of technology, that 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 (ITEA, 2000).

**Technological Literacy** – The ability to use, manage, understand, and assess technology (ITEA, 2000).

**Vocational Education** - A program of studies that leads to the preparation of workers with skills for specific occupations. This is usually a post-secondary function (WDPI, 1998).

## CHAPTER 2

### Review of Literature

#### *Introduction*

The standards movement has been around for more than 20 years. Its popularity and continued momentum can be largely attributed to a study completed in 1983 by the National Commission on Excellence in Education. The study they completed was entitled *A Nation at Risk: The Imperative for Educational Reform*. This study would shed light on what American schools would need to do in order to keep pace with the ever changing world and competition from foreign countries.

This literature review will explain the historical perspective of the standards movement and how it has shaped all areas of education. In addition, a significant portion will analyze how the content of Technology Education has changed and the role standards have played in this transformation.

#### *A Historical Overview of the Standards Movement*

Education and educational reform are often tied to political winds. The evolution of the standards movement is no different. There have been many pieces of legislation that have helped to develop the current educational climate in our country. The following will discuss the key pieces that have direct ties to the standards movement.

In 1981, the United States Secretary of Education established the National Commission on Excellence in Education. Their mission was to complete a study on the quality of American education in the next 18 months. The result of this study was the report entitled *A Nation at*

*Risk*, which was released to the American people in April of 1983. This was a front page new event. Everyone from educational leaders to President Ronald Reagan was given a copy of the report, and much of the news coverage in both print and TV covered the findings (Bell, 1993).

The results of the study were disturbing but not surprising. This was more of public wake up call to people outside of education. The expectations at most schools were very low, and the schools had no pressure to change them. Many high schools required only one credit in math and science to graduate. Since there were few directions from governing agencies on acceptable expectations, some schools would lower their expectations to hide the failures of the education system. With this problem came another buzz word in the standards era: "accountability." Whose fault was this? Much of the blame fell on the classroom teachers, but everyone from administrators to the decline in family values were suggested as possible contributors to the overall failure (Bell, 1993).

To ensure that every student was given a quality education and that there would be more clear accountability in the future, clear and universal standards would have to be developed. From this the standards movement was formed. *A Nation at Risk* concluded with a list of recommendations that would help the educational community change and provide a better learning environment for American students. One of the recommendations was that schools, colleges, and universities adopt more rigorous and measurable standards for academic performance. This started laying the foundation for future academic standards and educational reform (Crosby, 1993).

To continue the reform of American schools, the National Governors Association and President George H. Bush adopted the *National Education Goals* in 1989 after meeting for an

Education Summit in Virginia. The six main goals that came from this meeting are described below, and all were expected to be implemented by the year 2000:

- Goal One: Readiness for School: All students will start ready to learn
- Goal Two: High School Completion: Graduation rate at least 90%
- Goal Three: Student Achievement: All students will have demonstrated competency in English, Math, Science, History & Geography
- Goal Four: Students will be first in the world in Math and Science
- Goal Five: Adult Literacy: All Americans will be literate and able to compete in a global economy
- Goal Six: Safe, Disciplined, & Drug Free Schools: All schools will offer this learning environment

George H. Bush never got to fully implement his plan because he was beaten by Bill Clinton in the 1992 Presidential Election. The new President Clinton was not new when it came to education reform. He played a key role in the Education Summit in 1989 as Governor of Arkansas. He continued where the previous president let off and passed the *Goals 2000: Educate America Act*. This law would allow states to get grants to develop and implement their own standards-based educational reforms. As states began to implement this plan the focus changed to making sure all students were meeting high academic standards and promoting professional development and accountability in schools (The National Education Goals, 1998).

One of the most recent acts passed by our government to continue educational reform and the standards movement is the *No Child Left Behind (NCLB) Act of 2001*. This act was officially signed into law on January 8, 2002 by President George W. Bush and has been a major concern for educators, administrators and school boards. This is justifiable since "The No Child Left

Behind Act is potentially the most significant educational initiative to have been enacted in decades (Simpson, LaCava, & Graner, p. 67, 2004).” Some of the concrete reasons for this are the standards associated with the NCLB Act. The stated goals of NCLB are to ensure that all children have a fair, equal, and significant opportunity to obtain a high quality education and to reach at a minimum proficiency on challenging state academic achievement standards and assessments.

The standards set forth by NCLB are a great challenge to our nation’s schools. The biggest challenge is meeting annual yearly progress (AYP). By mandating that all students demonstrate AYP, NCLB serves as the most rigorous and exacting of standards-based strategies yet enacted for reforming schools (Albrecht & Joles, 2003). With this program there are consequences for not meeting the standards. NCLB brings accountability to the forefront and gives it real meaning. What good are standards if no one follows them or only says they do with no real proof that change is taking place? Under NCLB, schools that perform well may receive public recognition and financial rewards, but those whose students perform poorly could receive sanctions and even be subject to state takeover.

Another area of accountability is through the hiring of Highly Qualified Teachers (HQT). According to the law all teachers in core areas should meet the state’s criteria of “highly qualified” by the end 2005-2006 school year. There are many problems with this standard; first, what constitutes a highly qualified teacher? Each state had to define this, using guidelines in NCLB. Some of the standards set forth are that highly qualified teachers must hold at least a Bachelor’s degree, demonstrate competencies in their respective content area, and pass a rigorous exam in each of the subject areas that they teach (Simpson, LaCava, & Graner, 2004).

NCLB is the standards movement in action. States must have academic standards for all content areas and prove through standardized tests that students are meeting the requirements set forth by those standards. Based on the results, rewards or consequences will be given as set forth in the standards of NCLB. As one can see, standards are playing a key role in educating the next generation who will ultimately decide the future of America.

### *Need for Academic Standards*

It is important to clarify that a real need for academic standards exists, and while the winds of education can change quickly, it is important to point out that standards are here to stay. When asked if standards are a fad that will soon be replaced with another fad, Christopher Cross, President of the Council for Basic Education, replies, "My answer remains firm and consistent: Standards are here to stay. The effort has survived almost a decade of attempts to sabotage it and, in fact, public support is stronger than ever (1998, p. 35)." Robert Marzano, a Senior Researcher for 20 years at Midcontinent Research for Education and Learning Institute in Aurora, Colorado, states directly that "Standards hold the greatest hope for significantly improving student achievement (2001, p.14)." This is true for all academic areas, not just Technology Education. The basis for a strong democracy is an educated public, and with the world shifting to a global economy, future generations will see higher competition in the job market. Education will be more important than ever to help Americans succeed in the fast changing world. With the limited amount of time teachers have with their students, what should be taught so that students can and will succeed? The answer to this question is very complex, but it shows the importance of having set standards so that all students start with a least a minimum knowledge base. Diversity plays a key role in developing the standards of what should

be taught. Each state or different areas within a state might have differing opinions of what is important to teach. This makes common assessment difficult because students are all exposed to different material. Standards help to level the playing field by setting minimums on student performance and focusing on specific content ideas.

According to the Wisconsin Department of Public Instruction (WDPI, 1998), standards serve as rigorous goals for teaching and learning that enable students, parents, educators, and citizens to know what students should have learned at a given point of time. "Without clear goals, students may be unmotivated and confused (p. viii)." The WDPI goes on to explain why state level standards are so important. Public education is a state responsibility, and thus the state must ensure that all students have access to a high quality education. To put this idea into action requires that the state set clear standards of what students should know and be able to do while providing evidence that shows the students' progress in meeting these expectations. Overall this helps to level the playing field for students who attend different schools throughout the state and eliminates the guessing game for teachers who aren't sure what ideas are the most important to teach in the small amount of time they have with their students.

#### *Wisconsin Model for Academic Standards for Technology Education*

The WDPI began to draft academic standards for all areas in 1996. The standards for Technology Education were completed in 1998 by a very diverse task force of people around the state. The task force was comprised of educators, parents, school board members, and business and industry leaders. Public involvement was an important part of the standards development. "It was absolutely essential that the final academic standards reflect the values of Wisconsin's citizens" (Wisconsin's Model Academic Standards, 1998, p. xi).

The Wisconsin Technology Education Standards are divided into four areas, each area having a content standard, a rationale, and a set of performance standards that indicates what students will be able to do by the end of the fourth, eighth, and twelfth grades. Listed below are the four general areas and the content standard that describes the premise of what students will be able to do after mastering that area. The following is taken from the Wisconsin Model for Academic Standards for Technology Education (1998):

A. Nature of Technology

Content Standard: Students in Wisconsin will understand that technology is an extension of human capability.

B. Systems

Content Standard: Students in Wisconsin will recognize that systems are made up of individual components and that each component affects the operation of the system and its relationship to other systems.

C. Human Ingenuity

Content Standard: Students in Wisconsin will be able to define problems, gather information, explore options, devise a solution, evaluate the outcome, and communicate the results.

D. Impact of Technology

Content Standard: Students in Wisconsin will understand that technology affects society and the environment in ways that are both planned and unplanned and desirable and undesirable.

### *ITEA Standards for Technological Literacy*

As discussed earlier, ITEA published a set of standards in 2000 that were developed to guide every student in the nation down the path of technological literacy. This was a complex undertaking involving many educational and governmental agencies such as the National Science Foundation, the National Research Council, the National Academy of Engineering, and the National Aeronautics and Space Administration. The goal of ITEA was to provide technology educators a document that would aid in the evolution of Technology Education as a content area that is respected by everyone in the academic arena. "As a field of study that has evolved over the past fifteen to twenty years from industrial arts programs, technology education is just beginning to establish a new identity that people outside of the field recognize and understand (ITEA, p.3, 2000)." The ITEA and WDPI standards for Technology Education are similar yet they have some differences. Standards for Technological Literacy is a very thorough document that is 248 pages long. It is not just a list of standards, but a rationale for the standards that provides implementation strategies to get the standards incorporated into a school's curriculum and begin to shape day to day lesson plans. The ITEA standards are broken up into five areas, with 20 content standards as a total for the five areas. Below is an overview of the five areas and content standards so the reader may get an idea of the scope and direction the standards are moving the field of Technology Education. The following is taken from Standards for Technological Literacy (ITEA, 2000):

#### 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 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 of 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.

Standard 20: Students will develop an understanding of and be able to select and use construction technologies.

One will notice that both the WDPI and the ITEA standards are broad based and fit into the general education description better than the technical or vocational education description. This is a key idea in this research, as will be discussed in detail in the next section. There is a content shift in the field of Technology Education, and it is clearly defined at both state and national levels through the standards.

### *A Call for Change*

Since this study is looking for effects or changes the standards have had on the Technology Education curriculum, it is important to understand that the standards did call for

change and that a curriculum that correlates to the standards will look different from a more traditional pre-standards curriculum. Dr. William Dugger (1999), the Director of the Technology for All Americans Project, explains that the power of standards lies in their capacity to change fundamental components of the educational system. By clarifying educational outcomes, which is what standards do, there is a shift in emphasis. "To be clear, standards imply change, not an affirmation of the status quo (Dugger, 1999)." The state of Wisconsin echoed this when it developed standards for Technology Education by stating, "Technology Education in the high school must go beyond constructing physical objects. Students must develop an understanding of the nature of technology, technological systems, design and ingenuity, and the impact of technology (WDPI, p. viii, 1998)." The field of Technology Education has gone through considerable revision in recent years. Over the last 20 years, the recommended curriculum for the study of technology has evolved in response to a new emphasis on teaching design and the development of standards (Welty, 2003). The next section will explain what a more traditional Technology Education curriculum looks like and also explain what a standards-based curriculum looks like. While there will be some similarities, there will need to be notable changes to truly achieve a curriculum that will address the issue of producing technologically literate citizens. This can be difficult because there is no clear line. The overlap of the two makes for a large grey area. This is partly due to the fact that true vocational education is looking to become more liberal or general, and many Technology Education programs are becoming more attuned to work so they qualify for vocational funding (Volk, 1995).

Pullias (1989) identified three implementation strategies found in Technology Education, two of which add to this grey area. One will keep part of the old and install part of the new and

overtime ease into a more complete implementation. The other “is to disguise what we have been doing for years and try to make it look like a new curriculum (p. 3).”

Pressures in education can come from all directions. Pressure comes from school administrators to maintain or reinstate traditional programs for students with limited abilities, from industry to focus on trade specific courses, from local technical colleges to prepare students for post-secondary technical programs, and from district curriculum directors and professional organizations to include courses related to the new standards and technological literacy (Daugherty, 2005). When trying to please everyone, clear focus on what should be taught becomes a confused mess that can be made to look like many different things depending on who the teacher is talking too. In the end very little gets done with any quality because of all the tugs in different directions.

#### *Industrial Arts: Roots of Technology Education*

While names change with ease, curriculum and day-to-day lessons change more slowly due to the time it takes to develop them. When the profession changed to Technology Education in 1983, it was seen by many as a paradigm shift from Industrial Arts. Technology was going to be a more intellectual discipline and focus on processes and outcomes of technology rather than industry (Sanders, 2001). This was a shift from a more vocational and skill-based education to a more general idea-centered education. Many feel the name has changed but the actual programs have stayed the same even with the Technology Education standards pointing in a new direction. Baybee and Loucks-Horsley (2000) point out that “practitioners may be bound by their current views of Technology Education programs and practices. These views are often contrary to the spirit of the standards and sustained by many commercial publishers, school boards,

administrators, and communities (p. 15-16).” Have the ideas of the forward thinkers in the profession been translated into a curriculum that is different from Industrial Arts or vocational education? There has been little research on the actual practice of technology at the local school-based level (Petrina, 1998).

One study that did look at this was done Mark Sanders in 1999 and published in 2001. He used two previous studies as benchmarks for his study. One of the earlier studies was done during the 1962-1963 school year by Schmitt and Pelley and was entitled Industrial Arts Education: A Survey of Programs, Teachers, Students, and Curriculum. The next study entitled the Standards for Industrial Arts Programs Project (SfIAP), was done during the 1978-1979 school year. Sanders’ (2001) study revealed many similarities between the programs now and the programs surveyed in 1979. One slight difference was the name of the programs. In the 1999, almost 60% of programs were named Technology Education but that still left 40% of programs called by other names, with Industrial Tech (20%) and Industrial Arts (9%) leading the way. In both studies, almost 40% of programs associated their program’s curriculum with vocational education. Even after two decades of Technology Education as the professional name, four out of ten programs still considered themselves vocational education, and three out of ten programs still used “industrial” as part of their name. Another clue that many teachers are sticking with tradition is in the names or types of classes offered. When the top classes of 1999 are compared to the top classes of 1963, many similarities can be found. Some modifications have to be made, such as comparing CAD in 1999 to Drafting in 1963 and substituting General Technology Education for General Industrial Arts. With these and a few other modifications “...the top six course categories in 1999 would be the same as the top six course categories taught in 1963 (Sanders, 2001 p. 50).” The top classes in both studies are, in no particular order,

“General Class”, Woods, Metals, Drafting/CAD, Electricity/Electronics, and Communications/Graphic Arts. The study concludes that there have been changes in Technology Education, but the divide between general education and vocational education is still unclear. One of the most taught Technology Education classes is CAD/Drafting which is vocational by nature. According to Lewis (1996), when CAD/Drafting is taught in sequence, students will view this as learning knowledge and skills that can be linked to the workplace. The intent of the teacher could be different, but the problem is the proximity of this knowledge to vocational skills.

#### *Technology Education as Defined by Standards*

Bybee and Loucks-Horsley (2000) sum up the importance of standards by saying “The power of standards lies in their capacity to catalyze change in fundamental components of the educational system. They do so by specifying what all students should know and be able to do (p.14).” The current movement in education to continually improve itself is the standards movement. This movement began back in 1983 when the National Commission on Excellence in Education published a report entitled *A Nation at Risk: The Imperative for Educational Reform*. The report contained a list of five recommendations related to content, standards, and expectations and a variety of other things. The commission recommended that schools and colleges adopt more rigorous standards that are measurable and hold higher expectations for academic performance. These recommendations lead to standard-based educational reform (Crosby, 1993).

Why is there a need for standards? According to Galluzzo (1996), the public views the need for standards from a variety of perspectives. One can be the lost faith people have in the

teachers' and schools' ability to adequately prepare students to succeed after graduation, whether it is in the workplace or in post secondary education. Another is the many international comparisons that show American children falling behind other nations. This promotes a fear that American children will not be able to compete in an increasingly complex global economy. Most importantly is the concern over equity and excellence. There needs to be some way of showing that the educational system is striving to have all students taught by highly qualified teachers and learning the vital information they need to succeed in the world. The standards movement holds a lot of promises. Such promises as students who do not master the material will not advance until they do so and curriculum across schools will be more consistent, will help ensure that all students are getting a quality education. Galluzzo writes that "the standards movement ensures the preservation of a free and public education in our democracy " and "standards, if educators implement them wisely and cautiously, can be the very principal element that brings all students closer to excellence in education (1996, p.17-18)."

The cliché "excellence in education" is what needs to be defined in order for Technology Education programs to evaluate themselves to see if they are meeting the old standards of industrial arts or the new standards of Technology Education. In *Technically Speaking* (NAS, 2002), The National Academy of Sciences implies that teachers of technology must approach the subject from an engineering perspective rather than an industrial arts perspective. "Teachers at all levels should be able to conduct design projects and use design-orientated teaching strategies to encourage learning (p.108)." This makes it very clear that people outside the Technology Education circle do view industrial arts and Technology Education as different and that to truly teach the concepts put forth by the new standards, there needs to be a change in the curriculum

taught, not just a change in the name or an alignment of the old curriculum to the new standards.

### *Summary*

The division between vocational and general education in Technology Education is the grey area where most of the debate tends to take place. This can be a very difficult border to draw a line through when factoring in political ideas, economic concerns, local decisions, and sources of program funding. While the realities of life keep the line blurred, in a purist sense the difference is easier to see. Lewis explained this by saying:

“I have, for example, been a critic of attempts to link Technology Education and tech-prep... when I interrogated my own stance with respect to crossing of curricular borders [general vs. vocational education], I found that it had been fashioned substantially from the perspective of a purist, from my ivory tower existence, and very little by my past experience as a metalworking teacher (1996, p. 25).” Pullias (1992) states it more clearly: “blindness is going to have to be removed and educators are going to have to accept the fact that Technology Education is something totally new. Technology Education is not a remake of industrial arts... (p. 4).”

There has been a push by the leaders of the Technology Education profession to move away from the vocational type of philosophy found in Industrial Arts to a more general education philosophy as defined in Technology Education. Many believe the *STL* will be the catalyst for this change. Bybee and Loucks-Horsley (2000) state, “We do think it is important to point out that Technology Education standards will initiate change... (p. 15).” This has been gradually happening for over 20 years, but some, like Foster (1994), will argue, “Unfortunately, there is little evidence that this philosophy [Technology Education] or these strategies have ever been seriously implemented on any large scale or for any perceptible length of time (p. 26-27).”

Change is usually a slow process, but this process has been brought to the public stage by the publishing of Standards for Technological Literacy and *Technically Speaking: Why all Americans need to know more about technology*. This has increased the pressure to look at one's program and to see how it fits with the new standards. According to a study by Meade and Dugger (2004), 41 of the 50 states have adopted and are using *STL*. This means that four out of five states are using *STL* to guide their Technology Education programs. Some states, including Wisconsin, have published their own Technology Education standards and are following the same principles and ideas set forth in *STL*. Because standards and accountability are the new ideals that quality education will be based, it becomes very important for Technology Education programs to follow the standards set forth by their state agency. As school districts begin to align their core curriculums with state standards, the elective areas will soon follow suit, and this increased pressure from administration will force programs to benchmark what they do to the standards. This type of local pressure has not been felt since the changing of the name to Technology Education. Maybe this is the spark that is needed to clear up some of the confusion between program's names, course titles, and the rift between vocational and general education. While the degree of difference can be debated, none will deny that there is a difference. Again, Pullias wrote, "Technology Education must be thought of as something new ... It has no place in an old industrial arts, or shop paradigm. To say Technology Education can exist in the old setting is totally inaccurate (1992, p. 3)."

## CHAPTER 3

### Methodology

#### *Introduction*

This chapter deals with the methodology of how the study was carried out, including the procedures used to gather the information on the problem. The subject sample will be identified and described, along with how the sample was selected. The chapter will then discuss the procedures for how the data will be collected and analyzed and conclude with the identifiable limitations of the sample and instrument.

#### *Subject Selection and Description*

Wisconsin is divided up into 12 Cooperative Educational Service Agencies (CESA). CESA Two is located in the south-central part of Wisconsin and includes the counties of Dane, Green, Jefferson, Kenosha, Racine, Rock, and Walworth. All of the school districts located in CESA Two who have a Technology Education program will be included in the survey. If there are multiple teachers in the Technology Education program at any of the schools, one member of the faculty will be randomly picked to receive the survey instrument and serve as spokesperson for their program. There are 77 schools listed in the CESA Two district directory, but not all of them have Technology Education programs. Approximately ten of the listed schools are K-5 elementary schools with another 13 listed as K-8 schools with no Technology Education program. There are also 5 high schools that have no identified Technology Education programs. This leaves 49 schools with Technology Education programs that will be included in the study. For this small population size at least 50% of the schools need to be accounted for in

the study to have valid results. Using this calculation, at least 25 schools need to respond. Since response to surveys can be low and some of the surveys that come back may be incomplete or unusable, the researcher will send surveys to all 49 schools in order to increase the validity and receive represented data.

### *Instrumentation*

A 29 question survey instrument was developed to address the objectives of this study. The survey instrument will be given in an online web based format. After Institutional Review Board (IRB) approval, the survey will be put on the web using UW-Stout's Survey Tool. This is a program open to faculty and student use for conducting research. The first part of the survey will be demographic to gain an insight into who was filling out the survey and the size of school and department to which they belong. Next, they will be asked to identify the types of courses offered in their department and indicate if any courses have been added or dropped to their course offerings in the last 10 years. The remainder of the survey will consist of yes / no responses and Likert Scale type questions about how they have used the state and national standards in their curriculum. Because that the survey will be designed specifically for this study, it will have little measure of validity or reliability.

### *Procedure for Data Collection*

After Institutional Review Board (IRB) approval, the survey will be put on the web using UW-Stout's Survey Tool. When this has been accomplished, an initial email will be sent to each of the participants introducing myself and explaining the study and how to access it online. After two weeks, a reminder email will be sent out to encourage those who have not yet

completed the survey to please do so. Then after four weeks a final email will be sent thanking those who participated and giving a final reminder to those who have not participated.

### *Data Analysis*

All completed survey results are automatically calculated by the survey program for frequency, percentage, and mean responses. These calculations will be used to determine the degree to which the standards have impacted the Technology Education curriculum of the sample group.

### *Limitations*

This study has the following limitations:

1. The instrument used in this study was developed specifically for this study and therefore has little measure of validity or reliability documented.
2. This study is restricted to the Technology Education programs in public schools in south-central Wisconsin; thus, it may not be generalizable to a larger population.
3. The information received from the participants is limited to their own biases, opinions, and insights.
4. Because the survey is online anyone, with an internet connection could find the link and complete the survey, or any invited individual could complete the survey multiple times, thus reducing the accuracy of the results.
5. A web-based survey is fairly new and might not be looked at as having the accuracy or credibility of a more traditional mailed survey by others reading this study.

## CHAPTER 4

## Findings &amp; Analysis of Results




*Introduction*

The survey was closed to responses in the beginning of March 2007 after having been open for approximately 4 weeks. There were a total of 33 respondents that voluntarily took the survey after receiving the initial invitation, the two week reminder, and finally the four week follow up and thank you email. With a total of 49 schools surveyed, 33 respondents represent a 67% response rate.

*Summary of Results*
























Question 1: What college did you receive your Technology Education degree from?

Table 1: Technology Education College Attended

		<b>Response Total</b>	<b>Response Percent</b>
UW-Stout		<b>24</b>	<b>73%</b>
UW-Platteville		<b>8</b>	<b>24%</b>
Viterbo		<b>0</b>	<b>0%</b>
Other, please specify: Galssboro State College (Now Rowan University), New Jersey		<b>1</b>	<b>3%</b>

Question 2: Put a check mark next to each category of Technology Education class that is offered at your school. The title does not have to match; the content taught is what is most important.

Table 2: Technology Education Class Categories

		<b>Response Total</b>	<b>Response Percent</b>
Automotive Repair		19	58%
Power Mechanics/Small Engine Repair		25	76%
Woodworking		33	100%
Engineering		19	58%
Communications		16	48%
Manufacturing		20	61%
Transportation		12	36%
Power/Energy		18	55%
Metalworking		26	79%
Welding		29	88%
Computer Networking		6	18%
Project Lead The Way		10	30%
Construction		31	94%
Drafting (mechanical)		22	67%
Drafting (computer)		28	85%
Electricity/Electronics		18	55%
Home Maintenance		23	70%
Webpage Design		6	18%
Robotics		7	21%
Photography (film)		11	33%
Photography (digital)		11	33%
Graphic Design		13	39%
Biotechnology		4	12%
		<b>Total Respondents</b>	<b>33</b>

Question two attempts to gauge how Technology Education has progressed since the standards have been put into place. Course titles, while not always a strict indicator of content, can give some insight into what is being taught in the class. Schmitt and Pelley (1966) put together a list of the most widely taught courses in Industrial Arts across the nation. The top 10 courses included:

1. General Industrial Arts
2. Woodworking
3. Drafting
4. Metalworking
5. Graphic Arts
6. Electricity/Electronics
7. Crafts
8. Power Mechanics
9. Home Mechanics
10. Photography

Rudiger (1961) also did a similar analysis of the Industrial Arts programs in Wisconsin around the same time. His results were very similar. The top 10 Industrial Arts courses in Wisconsin were:

1. General Woodworking
2. General Drawing
3. General Comprehensive Industrial Arts.
4. General Metals
5. General Electricity

6. Cabinet Making
7. Mechanical Drawing
8. Machine Shop
9. Architectural Drawing
10. Graphic Arts

Sanders (2001) did another check up on the national status of Technology Education in 1999. His results show some differences but most of the top class titles are close to the same as they were in the 1960's. His results are as follows:

1. General Technology Education
2. Drafting/CAD
3. Wood Technology
4. Metal Technology
5. Architectural Drawing/Drafting
6. Electricity/Electronics
7. Manufacturing
8. Communications
9. Automotives
10. Graphic Communications

The top 10 Technology Education classes in 2007 reported in this study for South Central Wisconsin include:

1. Woodworking
2. Construction

3. Welding
4. Drafting (computer)
5. Metalworking
6. Power Mechanics/Small Engine Repair
7. Home Maintenance
8. Drafting (mechanical)
9. Manufacturing
10. Automotive Repair (tie)
10. Engineering (tie)

The lists do share some striking similarities. Woodworking was, and still is, one of the most popular classes. Metalworking made the top 5 of all four lists. Drafting or Drawing has changed with technology over the last 40 years but has remained in the top 10 on all four lists. It is interesting to point out that while computer aided drafting has passed mechanical drafting in the 2007 list, mechanical drafting is still at number eight while back in the 1960's it was number seven in Wisconsin. In over 40 years it has only slipped one spot overall. One noticeable difference is that Engineering tied for the tenth spot in the 2007 list and with the fact that Project Lead the Way, an engineering based curriculum, was also reported by an additional 30% of the schools it seems that there may be a new trend starting to develop. Even in the 1999 study Engineering had not broken into the top ten.

Question 3: List the titles of the last four (4) classes that have been added to your course offerings within the last 10 years. (if no classes have been added write NONE).

There were 31 total respondents to this question, with two respondents skipping this question. The respondents were asked to enter "none" if no new classes had been added to the curriculum. Since we can not be sure if the respondents accidentally or purposely skipped this question, the statistics are calculated out of a total of 31 instead of 33. There were seven "none" responses so 22.5% of the reporting schools did not add any classes to their curriculum in the last 10 years. 74 classes total were listed in the response area so each class title has a calculated percentage out of this total depending on the frequency it was listed.

Table 3: Technology Education Classes Added

<b>Classes ADDED:</b>	<b>Total Respondents=</b>	<b>31</b>
<b>Course Title</b>	<b># of Responses</b>	<b>Percentage</b>
Automotive Electronics	1	1.35%
Automotive Brakes	1	1.35%
Photo	1	1.35%
Digital Photo	1	1.35%
Home Maintenance	5	6.76%
Consumer Auto	4	5.41%
Yearbook	1	1.35%
Small Engines	1	1.35%
PC Repair / Computer Maint.	4	5.41%
Architectural Drafting	3	4.05%
High Tech Applications CAD/CAM	1	1.35%
CADD Drafting	7	9.46%
Engineering Problem Solving	2	2.70%
Exploring Engineering	1	1.35%
Project Lead the Way	3	4.05%
IED	4	5.41%
POE	7	9.46%
DE	5	6.76%
CIM	1	1.35%
Technical Design	1	1.35%
Independent Woods / Cabinetry	3	4.05%
Independent / Adv. Metals	3	4.05%
Industrial Communications	1	1.35%
Machine Woods	1	1.35%
Video Production	1	1.35%
Plastics	1	1.35%
Communications	1	1.35%

Welding	2	2.70%
Machining & Fabrication	1	1.35%
Construction Academy	1	1.35%
Automotive Academy	1	1.35%
Webpage Design	1	1.35%
Modular Tech Lab	1	1.35%
Animation	1	1.35%
CISCO	1	1.35%
Total # of listed classes	74	100.00%
NONE	7	22.58%
Skipped	2	6.45%

The top two courses added to Technology Education programs are Computer Aided Drafting (CAD) and Principles of Engineering (POE). Both classes had a total of seven responses. The next two most popular classes added were Home Maintenance and Digital Electronics (DE). Both of these classes received five responses. There was a three way tie for the next most added classes. These classes included Consumer Automotive, PC Repair/Computer Maintenance, and Introduction to Engineering Design (IED). All of these classes received four responses each. Rounding out the rest of the most added classes include those with three responses each. These classes include Architectural Drafting, Project Lead the Way, Independent Woods/Cabinetry, and Independent / Adv Metals. One point of clarification that should be included deals with Project Lead the Way. This engineering based curriculum includes multiple classes some of which were listed individually and some respondents decided to list it as a whole. Project Lead the Way includes POE, DE, IED, and Computer Integrated Manufacturing (CIM). There are others but these were the ones listed in this study. By looking at the list of classes added and lumping together all of the Project Lead Classes and including Project Lead the Way as a whole; out of the 74 classes mentioned 20 are part of Project Lead the Way. This is approximately 27%. There were also another three classes added that had

Engineering in the class title. When looking at engineering as a whole, 31% or almost one out of three classes listed were based in some aspect of engineering.

Question 4: List the titles of the last four (4) classes that have been dropped from your course offerings in the last 10 years (if no classes have been dropped, write NONE)

There were 29 total respondents to this question, with four respondents skipping this question. The respondents were asked to enter “none” if no classes had been dropped from the curriculum. Since we can not be sure if the respondents accidentally or purposely skipped this question, the statistics are calculated out of a total of 29 instead of 33. There were 14 “none” responses so 48.2% of the reporting schools did not drop any classes from their curriculum in the last 10 years. Only 24 classes total were listed in the response area so each class title has a calculated percentage out of this total depending on the frequency it was listed.

Table 4: Technology Education Classes Dropped



<b>Classes DROPPED:</b>	<b>Total Respondents=</b>	<b>29</b>
<b>Course Title</b>	<b># of Responses</b>	<b>Percentage</b>
Modular Tech Lab	2	8.33%
Building Construction	3	12.50%
Power & Energy	1	4.17%
Transportation	1	4.17%
Metals/Casting	2	8.33%
Tech Drawing / Mech Drafting	3	12.50%
Enterprise	1	4.17%
Auto Body	1	4.17%
CAD II	1	4.17%
Graphic Communication	1	4.17%
Small Engines	2	8.33%
Home Maintenance	1	4.17%
Manufacturing	1	4.17%
Practical Mechanics	1	4.17%
Intro to Tech Ed	1	4.17%
Electronics	1	4.17%
Technology Engineering	1	4.17%

Total # of listed classes	24	100.00%
NONE	14	48.28%
Skipped	4	13.79%

When analyzing the classes that have been dropped in the last 10 years it is important to remember that just under half (48%) of the schools responding did not drop any classes at all. Of the classes listed Building Construction and Tech Drawing / Mechanical Drafting were the most dropped classes with each listed three times.

Question 5: Have you read the Wisconsin Model Academic Standards for Technology Education in its entirety?

Table 5: Have you read the Wisconsin Model Academic Standards for Technology Education in its entirety?

		Response Total	Response Percent
Yes		19	58%
No		14	42%
		<b>Total Respondents</b>	<b>33</b>

Question 6: Have you read the ITEA Standards for Technological Literacy in its entirety?

Table 6: Have you read the ITEA Standards for Technological Literacy in its entirety?

		Response Total	Response Percent
Yes		10	30%
No		23	70%
		<b>Total Respondents</b>	<b>33</b>

Question 7: Does your school/department own a copy of the Wisconsin Model Academic Standards for Technology Education?

Table 7: Does your school/department own a copy of the Wisconsin Model Academic Standards for Technology Education?

		<b>Response Total</b>	<b>Response Percent</b>
Yes		29	91%
No		3	9%
		<b>Total Respondents</b>	<b>32</b>
		(skipped this question)	1



Question 8: Does your school/department own a copy of the ITEA Standards for Technological Literacy?

Table 8: Does your school/department own a copy of the ITEA Standards for Technological Literacy?

		<b>Response Total</b>	<b>Response Percent</b>
Yes		19	58%
No		14	42%
		<b>Total Respondents</b>	<b>33</b>

Question 9: Do you personally, own a copy of the Wisconsin Model Academic Standards for Technology Education?

Table 9: Do you personally, own a copy of the Wisconsin Model Academic Standards for Technology Education?

		<b>Response Total</b>	<b>Response Percent</b>
Yes		13	39%
No		20	61%
		<b>Total Respondents</b>	<b>33</b>



Question 10: Do you personally, own a copy of the ITEA Standards for Technological Literacy?

Table 10: Do you personally, own a copy of the ITEA Standards for Technological Literacy?

		<b>Response Total</b>	<b>Response Percent</b>
Yes		6	18%
No		27	82%
<b>Total Respondents</b>		<b>33</b>	



Question 11: Do you have easy access to a copy of the Wisconsin Model Academic Standards for Technology Education?

Table 11: Do you have easy access to a copy of the Wisconsin Model Academic Standards for Technology Education?

		<b>Response Total</b>	<b>Response Percent</b>
Yes		28	88%
No		4	12%
<b>Total Respondents</b>		<b>32</b>	
(skipped this question)			1

Question 12: Do you have easy access to a copy of the ITEA Standards for Technological Literacy?

Table 12: Do you have easy access to a copy of the ITEA Standards for Technological Literacy?

		<b>Response Total</b>	<b>Response Percent</b>
Yes		18	56%
No		14	44%
<b>Total Respondents</b>		<b>32</b>	
(skipped this question)			1

Questions five through twelve were attempting to see how many Technology Education instructors have taken the time to review the standards and become familiar with what the standards are trying to accomplish. For the standards to impact the classroom curriculum it is

necessary for teachers to be familiar with them. According to Table 5, 58% of the respondents have read the Wisconsin Technology Education Standards in its entirety with 42% saying they have not. Fewer have read the ITEA standards with only 30% reporting they have read in its entirety. This difference between these two standards may be due to the availability of the documents. A vast majority, 91%, of respondents reported that their school or department owned a copy of the Wisconsin standards but only 58% had a copy of the ITEA standards. The survey also asked if the respondents personally owned a copy of the standards. A majority responded that they did not personally own a copy of either the Wisconsin or ITEA standards with 61% and 82% "no" responses respectively.

Use the following Likert scale to analyze the next statements.

1=Strongly Disagree 2=Disagree 3=Undecided 4=Agree 5=Strongly Agree

Question 13: It is important for me as a teacher to align my courses to the Wisconsin Model Academic Standards for Technology Education.

Table 13: It is important for me as a teacher to align my courses to the Wisconsin Model Academic Standards for Technology Education.

	1	2	3	4	5	Response Total	Response Average
Likert Scale	13% (4)	16% (5)	19% (6)	39% (12)	13% (4)	31	3.2
						<b>Total Respondents</b>	<b>31</b>
					(skipped this question)		2

Teachers in south-central Wisconsin are split on whether it is important to align their courses to the Wisconsin standards. Slightly over half, 52%, either agree or strongly agree that it

is important and 29% either disagree or strongly disagree with the same statement. This does leave 19% of the respondents unsure or undecided about the statement.

Question 14: It is important for me as a teacher to align my courses to the ITEA Standards for Technological Literacy.

Table 14: It is important for me as a teacher to align my courses to the ITEA Standards for Technological Literacy.

1	2	3	4	5	Response Total	Response Average
					(skipped this question) ;	2
<b>Total Respondents</b>						<b>31</b>

When asked about the importance of aligning their classes to the ITEA standards about one out of three, 32%, were undecided and 39% either agreed or strongly agreed. A smaller percentage, 29%, either disagreed or strongly disagreed. The high percentage of undecided teachers may be attributed to the lower amount of perceived access to the ITEA standards as compared to the Wisconsin standards as shown in Tables 5-12.

Question 15: It is important to my school administrators that I align my courses to the Wisconsin Model Academic Standards for Technology Education.

Table 15: It is important to my school administrators that I align my courses to the Wisconsin Standards for Technology Education.

	1	2	3	4	5	Response Total	Response Average
Likert Scale	10% (3)	6% (2)	19% (6)	42% (13)	23% (7)	31	3.6
<b>Total Respondents</b>						<b>31</b>	
(skipped this question)							2

When asked if it was important to their administrators that the Technology Education classes are aligned with the Wisconsin standards 65% of teachers agreed or strongly agreed it was important. Only 16% reported that they disagreed or strongly disagreed with the same statement. It is important to note that this agreement percentage is higher than the number of teachers who agreed with the same type of question as detailed in Table I3 in which 52% of teachers agreed or strongly agreed. The disagreement percentage is also lower so administration seems to be communicating with teachers a stronger push to align courses to state standards.

Question 16: It is important to my school administrators that I align my courses to the ITEA Standards for Technological Literacy.

Table 16: It is important to my school administrators that I align my courses to the ITEA Standards for Technological Literacy

	1	2	3	4	5	Response Total	Response Average
Likert Scale	10% (3)	16% (5)	39% (12)	29% (9)	6% (2)	31	3.1
						<b>Total Respondents</b>	<b>31</b>
					(skipped this question)		2

Thirty-five percent of teachers agree or strongly agree that it is important to administrators to align their Technology Education classes to the ITEA standards while 26% disagree or strongly disagree with the same statement. A fairly large number, 39%, are undecided on how important the ITEA standards are to their administration.

Question 17: I feel adequately trained and confident in using the Wisconsin Model Academic Standards for Technology Education in my courses.

Table 17: I feel adequately trained and confident in using the Wisconsin Standards for Technology Education in my courses.

	1	2	3	4	5	Response Total	Response Average
Likert Scale	13% (4)	10% (3)	33% (10)	33% (10)	10% (3)	30	3.2
						<b>Total Respondents</b>	<b>30</b>
					(skipped this question)		3

Less than half, 43% agree or strongly agree that they feel adequately trained in using the Wisconsin standards. Twenty-three percent disagree or strongly disagree that they feel adequately trained in using the state standards with 33% undecided.

Question 18: I feel adequately trained and confident in using the ITEA Standards for Technological Literacy in my courses.

Table 18: I feel adequately trained and confident in using the ITEA Standards for Technological Literacy in my courses.

	1	2	3	4	5	Response Total	Response Average
Likert Scale	19% (6)	16% (5)	32% (10)	19% (6)	13% (4)	31	2.9
						<b>Total Respondents</b>	<b>31</b>
					(skipped this question)		2

There is a very even split between the agrees, disagrees and undecided in this question. In feeling adequately trained in the ITEA standards 35% disagreed or strongly disagreed, 32% agreed or strongly agreed, and 32% were undecided. One should note that when comparing the level of training to the standards being discussed the average response for the Wisconsin standards in Table 17 was 3.2 where the average response for the ITEA standards in Table 18 was 2.9. Overall teachers tend to feel more trained and confident using the Wisconsin standards than the ITEA standards.

Question 19: Overall, what I teach has significantly changed because of the standards.

Table 19: Overall, what I teach has significantly changed because of the standards.

	1	2	3	4	5	Response Total	Response Average
Likert Scale	16% (5)	45% (14)	29% (9)	10% (3)	0% (0)	31	2.3
						<b>Total Respondents</b>	<b>31</b>
						(skipped this question)	2

A vast majority, 61%, of respondents either disagrees or strongly disagrees with this statement. Only 10% agree, with none strongly agreeing that what they teach has significantly changed because of the standards. Twenty-nine percent are undecided on whether the standards have changed what they teach.

Question 20: Overall, how I teach my curriculum has significantly changed because of the standards.


Table 20: Overall, how I teach my curriculum has significantly changed because of the standards.

	1	2	3	4	5	Response Total	Response Average
Likert Scale	26% (8)	39% (12)	26% (8)	10% (3)	0% (0)	31	2.2
						<b>Total Respondents</b>	<b>31</b>
						(skipped this question)	2

Again, a vast majority, 65%, of respondents either disagrees or strongly disagrees that how they teach has been significantly changed by the standards. Only 10% agree with the same statement and none strongly agree. Twenty-six percent are undecided on whether the standards have changed how they teach.

Question 21: Have you/your department formally (produced a document) aligned one or more courses to the Wisconsin Model Academic Standards for Technology Education?



Table 21: Have you/your department formally (produced a document) aligned one or more courses to the Wisconsin Standards for TE?

		<b>Response Total</b>	<b>Response Percent</b>
Yes		16	52%
No		15	48%
		<b>Total Respondents</b>	<b>31</b>
		(skipped this question)	2

There is a pretty even split between the respondents of this question. Sixteen respondents, 52%, have formally aligned one or more classes to the Wisconsin standards and 15 have not. This percentage correlates well with question 13. In that question 52% either agree or strongly agree that it is important to align their curriculum with the Wisconsin standards. It stands to reason that these two questions should have close to the same percentages because if it is viewed as important, the alignment to the standards would have been acted on especially since in question 15, 65% of the teachers responded that it was also important to their administrators that they align their classes to the Wisconsin standards.

Question 22: Have you/your department formally (produced a document) aligned one or more courses to the ITEA Standards for Technological Literacy?

Table 22: Have you/your department formally (produced a document) aligned one or more courses to the ITEA Standards?

		<b>Response Total</b>	<b>Response Percent</b>
Yes		7	23%
No		24	77%
		<b>Total Respondents</b>	<b>31</b>
		(skipped this question)	2

Only seven of the respondents have formally aligned one or more of their courses with the ITEA standards. This aligns closely to question 14 in which 12 respondents agreed or strongly agreed that it was important for them to align their courses with the ITEA standards. It is clear that when looking at standards an emphasis is placed on the Wisconsin Technology Education standards and not the ITEA. This may tie back to administration. When the teachers were asked in questions 15 and 16 about the importance of each set of standards to their administrators 52% agreed or strongly agreed that the Wisconsin standards were important compared to only 39% agreeing or strongly agreeing that the ITEA standards were important.

Only the respondents that answered “yes” to question 22 continued the survey. Anyone who answered “no” submitted the survey now.

Question 23: How many courses were formally aligned to the standards?



Table 23: Number of Courses Formally Aligned

		Response Total	Response Percent
1		1	6%
2		1	6%
3		3	18%
4		2	12%
5		0	0%
6+		10	59%
		<b>Total Respondents</b>	17
		(skipped this question)	16

A majority of respondents, 59%, formally aligned six or more classes to the standards.

Question 24: Was this standard alignment required by the district/school?




Table 24: Was this standard alignment required by the district/school?

		Response Total	Response Percent
Yes		9	50%
No		9	50%
		<b>Total Respondents</b>	<b>18</b>
		(skipped this question)	15

There was an even split between the respondents on whether the standard alignment was required by the district. With 33 total respondents and nine of them required by their district to align their courses to a set of standards that calculates to only 27% of Technology Education programs in CESA 2 that are required to teach to either state or national standards.

Question 25: What standards were used in the course alignment?

Table 25: Standards used in the alignment.

		Response Total	Response Percent
Wisconsin		13	76%
ITEA		1	6%
Both		3	18%
		<b>Total Respondents</b>	<b>17</b>
		(skipped this question)	16

With 76% of the respondents using only the Wisconsin standards and an additional 18% using both the Wisconsin and ITEA standards to align their courses, it again supports the data collected in questions 13-16 that the Wisconsin standards take precedent over the ITEA

standards in this survey group. Only one respondent used the ITEA standards alone to align the courses.

Question 26: I/We had to significantly change the content of the courses to align them to the standards.

Table 26: I/We had to significantly change the content of the courses to align them to the standards.

	1	2	3	4	5	Response Total	Response Average
Likert Scale	29% (5)	41% (7)	29% (5)	0% (0)	0% (0)	17	2.0
						<b>Total Respondents</b>	<b>17</b>
						(skipped this question)	16

A large majority of respondents, 70%, disagreed or strongly disagreed that any significant changes in course content had to be made to align the courses to the standards. It is also important to note that no one agreed or strongly agreed to the same statement. It is safe to say that course content has not significantly changed with the introduction of standards.

Question 27: I/We had to significantly change the objectives of the courses to align them to the standards.

Table 27: I/We had to significantly change the objectives of the courses to align them to the standards.

	1	2	3	4	5	Response Total	Response Average
Likert Scale	18% (3)	59% (10)	24% (4)	0% (0)	0% (0)	17	2.1
						<b>Total Respondents</b>	<b>17</b>
						(skipped this question)	16

Over three quarters, 77%, of the respondents either disagreed or strongly disagreed that any significant changes had to be made to their course objectives to align the courses to the standards. Again, it is also important to note that no one agreed or strongly agreed to the same statement.

Question 28: Overall, I/We had to significantly change the curriculum of the courses to align them with the standards.

Table 28: Overall, I/We had to significantly change the curriculum of the courses to align them with the standards.

	1	2	3	4	5	Response Total	Response Average
Likert Scale	18% (3)	59% (10)	24% (4)	0% (0)	0% (0)	17	2.1
						<b>Total Respondents</b>	17
						(skipped this question)	16

Again, over three quarters, 77%, of the respondents either disagreed or strongly disagreed that any significant changes had to be made to their course curriculum to align the courses to the standards. As with the past two questions no one agreed or strongly agreed to the same statement.

Question 29: Overall, I/We had to make significant changes to the physical classroom (i.e. materials, equipment, tools, etc.) to align the courses to the standards.

Table 29: Overall, I/We had to make significant changes to the physical classroom to align the courses to the standards.

	1	2	3	4	5	Response Total	Response Average
Likert Scale	38% (6)	38% (6)	12% (2)	6% (1)	6% (1)	16	2.1
						<b>Total Respondents</b>	16
						(skipped this question)	17

Once more over three quarters, 76%, disagreed or strongly disagreed that any significant changes had to be made to the physical classroom to align their courses to the standards. In this case 12% did agree or strongly agree to that same statement. While little, if any, changes have been made to the curriculum to align with the standards there has been some physical changes made to the classroom in order to accomplish the alignment.

## CHAPTER 5

## Summary, Conclusions, and Recommendations

*Summary*

In 1998 the Wisconsin Department of Public Instruction published the Wisconsin Technology Education Standards and shortly thereafter in 2000 the International Technology Education Association published the Standards for Technological Literacy. These standards were developed to move Technology Education curriculum forward and more clearly define the concepts students should be learning.

Since this study is looking for impacts or changes the standards have had on the Technology Education curriculum, it is important to understand that the standards did call for change and that a curriculum that correlates to the standards will look different from a more traditional pre-standards curriculum. Dr. William Dugger (1999), the Director of the Technology for All Americans Project, explains that the power of standards lies in their capacity to change fundamental components of the educational system. By clarifying educational outcomes, which is what standards do, there is a shift in emphasis. "To be clear, standards imply change, not an affirmation of the status quo (Dugger, 1999)." The state of Wisconsin echoed this when it developed standards for Technology Education by stating, "Technology Education in the high school must go beyond constructing physical objects. Students must develop an understanding of the nature of technology, technological systems, design and ingenuity, and the impact of technology (WDPI, p. viii, 1998)." Pullias (1992) states it very clearly: "blindness is going to have to be removed and educators are going to have to accept the fact that Technology Education is something totally new. Technology Education is not a remake of industrial arts... (p. 4)." In *Technically Speaking* (NAS, 2002), The National Academy of Sciences implies that

teachers of technology must approach the subject from an engineering perspective rather than an industrial arts perspective. "Teachers at all levels should be able to conduct design projects and use design-orientated teaching strategies to encourage learning (p.108)." Pullias also wrote, "Technology Education must be thought of as something new ... It has no place in an old industrial arts, or shop paradigm. To say Technology Education can exist in the old setting is totally inaccurate (1992, p. 3)."

The above remarks makes it very clear that people both inside and outside of the Technology Education circle do view Industrial Arts and Technology Education as different and that to truly teach the concepts put forth by the new standards, there needs to be a change in the curriculum taught, not just a change in the name or an alignment of the old curriculum to the new standards.

### *Conclusions*

The conclusions drawn from this research are based on the research questions stated in Chapter One.

Research Question One: Have technology educators made an effort to read and become familiar with the state and national Technology Education standards?

For the standards to impact the classroom curriculum it is necessary for the teachers to be familiar with them. According to Table 5, 58% of the respondents have read the Wisconsin Technology Education Standards in its entirety with 42% saying they have not. Fewer yet have read the ITEA standards with only 30% reporting they have read it in its entirety. The difference between these two standards may be due to the availability of the documents. A vast majority, 91%, of respondents reported that their school or department owned a copy of the Wisconsin standards but only 58% had a copy of the ITEA standards. The survey also asked if the

respondents personally owned a copy of the standards. A majority responded that they did not personally own a copy of either the Wisconsin or ITEA standards with 61% and 82% “no” responses respectively. It is clear that more teachers have made more of an effort to read the Wisconsin standards than the ITEA standards but only slightly over half have taken the time to read the Wisconsin standards. With the Wisconsin & ITEA Standards available free from their respective websites there is little reason not to have read the standards assuming one wanted to use or at least be familiar with them.

Research Question Two: Have technology educators made an effort to revise their current curriculum and benchmark their class objectives to the state or national Technology Education standards?

Approximately 34% of the respondents have formally aligned at least one course to either the Wisconsin or ITEA standards. With less than four out of ten schools aligning their program curriculum with established standards it is clear that overall little effort has been taken to benchmark class objectives. This combined with the fact that when asked if it is important to them to align their courses to the Wisconsin standards 48% of teachers were either unsure or disagreed to some extent. When asked the same question about the ITEA standards, 61% were either unsure or disagreed to some extent. Only nine, or 27%, were required to align their curriculum to the standards by the school district. There is little pressure from administration to align Technology Education courses to the new standards and only slightly over half, 52%, of teachers agree to some extent that it is important to align their courses to the Wisconsin standards. This percentage falls to 39% if referring to the ITEA standards.

When looking at the data to determine if any significant revisions have taken place in the curriculum one trend seems to be clear. Little revision or change has take place as teachers

aligned their courses to the standards. A large majority of respondents, 70%, disagreed or strongly disagreed that any significant changes in course content had to be made to align the courses to the standards. It is also important to note that no one agreed or strongly agreed to the same statement. It is safe to say that course content has not significantly changed with the introduction of standards. Likewise, when asked if any significant changes have been made to the course objectives and general curriculum the teachers responded overwhelming with a 77% majority that they disagreed or strongly disagreed. Again, no one agreed or strongly agreed to the same statements. The remainder of the teachers were unsure or undecided about any significant changes to content, objectives, or curriculum. Perhaps these classes were already teaching the objectives and goals of the new standards and all that was needed is to formally align them to the standards but keep in mind the quote from Dr. William Dugger (1999), "To be clear, standards imply change, not an affirmation of the status quo."

Research Question 3: Have any significant program changes (i.e. old courses discontinued, new courses added, old equipment sold or thrown out, new equipment purchased) happened as a result of aligning the curriculum with the state or national Technology Education standards?

Analyzing what classes have been added to Technology Education programs over the last 10 years might be a better way to analyze how programs are changing. As an elective, it can be hard to do away with the classes that have been the foundation of the department and a welcomed source of job security. By analyzing the classes that have been added, one can see if the discipline of Technology Education is cautiously moving in a different direction or just holding to what has been working in the past.

The top two courses added to Technology Education programs are Computer Aided Drafting (CAD) and Principles of Engineering (POE). Both classes had a total of seven responses. The next two most popular classes added were Home Maintenance and Digital Electronics (DE). Both of these classes received five responses. There was a three way tie for the next most added classes. These classes included Consumer Automotive, PC Repair/Computer Maintenance, and Introduction to Engineering Design (IED). One point of clarification that should be included deals with Project Lead the Way. This engineering based curriculum includes multiple classes some of which were listed individually and some respondents decided to list it as a whole. Project Lead the Way includes POE, DE, IED, and Computer Integrated Manufacturing (CIM). There are others but the ones listed were mentioned in this study. By looking at the list of classes added and lumping together all of the Project Lead Classes and including Project Lead the Way as a whole; that out of the 74 classes mentioned 20 are part of Project Lead the Way. This is approximately 27%. There were also another three classes listed that had Engineering in the class title. When looking at engineering as a whole, 31% or almost one out of three classes listed were based in some aspect of engineering.

When analyzing the classes that have been dropped in the last 10 years it is important to remember that just under half (48%) of the schools responding did not drop any classes at all. Of the classes listed Building Construction and Tech Drawing / Mechanical Drafting were the most dropped classes with each listed three times.

Overall there has not been a great change in the types or names of the classes that are being offered in Technology Education. Woodworking was and still is one of the most popular classes. Metalworking made the top 5 in all four lists between 1961 and 2007. Drafting or Drawing has changed with technology over the last 40 years but has remained in the top 10 on all

four lists. It is interesting to point out that while computer aided drafting has passed mechanical drafting in the 2007 list, mechanical drafting is still at number eight while back in the 1960's it was number seven in Wisconsin. In over 40 years it has only slipped one spot overall. One noticeable difference is that Engineering tied for the tenth spot in the 2007 list and with the fact that Project Lead the Way, an engineering based curriculum, was also reported by an additional 30% of the schools it seems that there may be a new trend starting to develop. Even in the 1999 list, the study of Engineering had not broken into the top ten.

With little change in the classes being taught it is logical that little would have to change in the physical classroom. This is what the data seems to indicate. Over three quarters, 76%, disagreed or strongly disagreed that any significant changes had to be made to the physical classroom to align their courses to the standards. In this case 12% did agree or strongly agree to that same statement. While few changes have been made to the curriculum to align with the standards there has been some physical changes made to the classroom in order to accomplish the alignment.

### *Recommendations*

In order for teachers to use the standards they first have to be familiar with the standards and that will only happen with easy access to them. The Wisconsin standards are already available free from the WDPI website but 12% of the respondents said they did not have easy access to them and this information is from an online survey so internet access is not the problem. One recommendation would be to better publicize that fact that the standards are on the WDPI website and if possible mass email a copy to all Technology Education teachers in the state. Include in this email as many Directors of Curriculum and Instruction as possible and ask them to forward it on to their Technology Education department.

The same recommendation would have to be made dealing with the ITEA standards.

Again all 258 pages of the ITEA standards are available free on the ITEA website but 44% of the respondents said they did not have easy access to these standards. A lot of time and money has gone into developing these documents but they do very little good if not placed in the hands of the everyday teachers who are in front of students. The Technology Education director at DPI should work to grow the number of teachers that are part of the Technology Education list serve and also establish a database of all email address for Technology Education teachers in the state that is only used when disseminating important information. This way teachers who do not want all of the continuous information from the list serve will still get pertinent information like an emailing of the standards or links to them.

If teachers are not comfortable using the standards then they will hesitate to use them at all. Only 33% agreed to feeling adequately trained in using the Wisconsin Standards with 10% more strongly agreeing. This is still under half of the responding teachers feeling comfortable using the Wisconsin standards. The percentages get lower when dealing with the ITEA standards. Only 19% agreed to feeling adequately trained in using the ITEA Standards with 13% more strongly agreeing. A vast majority is unsure or at least disagrees with feeling adequately trained in either of the standards. The recommendation is to continue and increase training at the university level for students going into the Technology Education field. As these students graduate and disseminate into the schools they will bring with them that knowledge and training. As part of a senior project at the university level these students could identify the most popular courses offered in the state by using this and other similar forms of research, and then design a complete a lesson, aligned to the standards, which would fit into one of those courses. Do this in a clear and concise way that can be copied or used as a pattern to align other lessons to the

standards and then bring all of these lessons together into one form that could be emailed as an attachment to the Technology Education teachers in the state. Assuming the lessons are pertaining to actual classes that are taught at a majority of schools it would be a way for veteran teachers to at least see how the standards can fit into what they are doing and give them an example to follow if they want to begin aligning some of their other lessons to the standards. Until concrete examples are given on how to implement the standards many teachers may view the standards as too abstract and confusing. This process will also help the senior students as they head out to do their student teaching. As a class, they will have developed a document filled with lessons that fit into the most likely classes they will be asked to teach.

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## Appendix A

## Technology Education Standards Survey Consent to Participate Letter

Dear #FirstName# #LastName#,

Investigator: My name is Matt Janisin and I am a Technology Education teacher at Elkhorn High School. To complete my Masters degree from UW-Stout I'm conducting a study on the impacts that the Technology Education standards have had on the classroom curriculum. I have a 29 question survey on the following link. If you would please take about 10 minutes to complete this survey I would greatly appreciate it. Your name will not be included on any documents and no response can be traced back to any school or individual. The survey will be active for 2 weeks and I will send a reminder in one week. If you have any questions or problems with the survey please reply to this email and I will respond ASAP. Thank you in advance for your participation and help with this project.

Consent to Participate in UW-Stout Approved Research

**This research has been approved by the UW-Stout IRB as required by the Code of Federal Regulations Title 45 Part 46.**

Title: HAVE THE TECHNOLOGY EDUCATION STANDARDS IMPACTED THE CLASSROOM CURRICULUM IN SOUTHCENTRAL WISCONSIN?

The link to the survey is:  
#SurveyLink#

If you do not wish to respond to this survey, please click on the link below to decline:  
#DeclineLink#

Description: The research is designed to analyze the impact the state and national Technology Education standards have had on classroom curriculum.

Risks and Benefits: The research will indicate if the standards have had an impact on the curriculum and to what extent that impact has had on what is taught in the classroom to see if students are benefiting from a standards based education. I cannot identify any possible risks from this research.

Confidentiality:

Your name will not be included on any documents. No response can be traced back to any school or individual. We do not believe that you can be identified from any of the information collected in the survey.

**Right to Withdraw:**

Your participation in this study is entirely voluntary. You may choose not to participate without any adverse consequences to you. However, should you choose to participate and later wish to withdraw from the study, there is no way to identify your anonymous document after it has been turned into the investigator."

**IRB Approval:**

This study has been reviewed and approved by The University of Wisconsin-Stout's Institutional Review Board (IRB). The IRB has determined that this study meets the ethical obligations required by federal law and University policies. If you have questions or concerns regarding this study please contact the Investigator or Advisor. If you have any questions, concerns, or reports regarding your rights as a research subject, please contact the IRB Administrator.

**Investigator:**

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**Statement of Consent:**

By completing the following survey you agree to participate in the project entitled "HAVE THE TECHNOLOGY EDUCATION STANDARDS IMPACTED THE CLASSROOM CURRICULUM IN SOUTHCENTRAL WISCONSIN?"

The link to the survey is:

#SurveyLink#

If you do not wish to respond to this survey, please click on the link below to decline:

#DeclineLink#

Many thanks for your help and cooperation on this project.

Matt



- Drafting (computer)
- Biotechnology
- Graphic Design
- Webpage Design
- Photography (film)
- Computer Networking
- Electricity/Electronics

3. List the titles of the last four (4) classes that have been added to your course offerings within the last 10 years. (if no classes have been added write NONE):

4. List the titles of the last four (4) classes that have been dropped from your course offerings in the last 10 years (if no classes have been dropped, write NONE):

5. Have you read the Wisconsin Model Academic Standards for Technology Education in its entirety?

Yes  No

6. Have you read the ITEA Standards for Technological Literacy in its entirety?

Yes  No

7. Does your school/department own a copy of the Wisconsin Model Academic Standards for Technology Education?

Yes  No

8. Does your school/department own a copy of the ITEA Standards for Technological Literacy?

Yes  No

9. Do you personally, own a copy of the Wisconsin Model Academic Standards for Technology Education?

Yes  No

10. Do you personally, own a copy of the ITEA Standards for Technological Literacy?

Yes  No

11. Do you have easy access to a copy of the Wisconsin Model Academic Standards for Technology Education?

Yes  No

12. Do you have easy access to a copy of the ITEA Standards for Technological Literacy?

Yes  No

Use the following Likert scale to analyze the next statements. 1=Strongly Disagree 2=Disagree 3=Undecided 4=Agree 5=Strongly Agree

13. It is important for me as a teacher to align my courses to the Wisconsin Model Academic Standards for Technology Education.

	1	2	3	4	5
Likert Scale	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

14. It is important for me as a teacher to align my courses to the ITEA Standards for Technological Literacy.

	1	2	3	4	5
Likert Scale	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

15. It is important to my school administrators that I align my courses to the Wisconsin Model Academic Standard for Technology Education.

	1	2	3	4	5
Likert Scale	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

16. It is important to my school administrators that I align my courses to the ITEA Standards for Technological Literacy.

	1	2	3	4	5
Likert Scale	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. I feel adequately trained and confident in using the Wisconsin Model Academic Standards for Technology Education in my courses.

	1	2	3	4	5
Likert Scale	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

18. I feel adequately trained and confident in using the ITEA Standards for Technological Literacy in my courses.

	1	2	3	4	5
Likert Scale	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

19. Overall, what I teach has significantly changed because of the standards.

	1	2	3	4	5
Likert Scale	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20. Overall, how I teach my curriculum has significantly changed because of the standards.

	1	2	3	4	5
Likert Scale	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

21. Have you/your department formally (produced a document) aligned one or more courses to the Wisconsin Model Academic Standards for Technology Education?

Yes  No

22. Have you/your department formally (produced a document) aligned one or more courses to the ITEA Standard for Technological Literacy?

Yes  No

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Cancel

If you answered YES to either question 21 or 22 please continue to the final 7 questions. If you answered NO to both questions 21 and 22 you are done with the survey. Please click "DONE" at the bottom of the page to submit your answers. Thank you for your participation.

23. How many courses were formally aligned to the standards?

- 1  
 2  
 3  
 4  
 5  
 6+

24. Was this standard alignment required by the district/school?

- Yes  No

25. What standards were used in the course alignment?

- Wisconsin  ITEA  Both

26. I/We had to significantly change the content of the courses to align them to the standards.

Use the previous Likert Scale: (1=Strongly Disagree ~ 5=Strongly Agree)

	1	2	3	4	5
Likert Scale	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

27. I/We had to significantly change the objectives of the courses to align them to the standards.

Use the previous Likert Scale: (1=Strongly Disagree ~ 5=Strongly Agree)

	1	2	3	4	5
Likert Scale	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

28. Overall, I/We had to significantly change the curriculum of the courses to align them with the standards.

Use the previous Likert Scale: (1=Strongly Disagree ~ 5=Strongly Agree)

	1	2	3	4	5
Likert Scale	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

29. Overall, I/We had to make significant changes to the physical classroom (i.e. materials, equipment, tools, etc.) align the courses to the standards.

Use the previous Likert Scale: (1=Strongly Disagree ~ 5=Strongly Agree)

	1	2	3	4	5
Likert Scale	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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Done

Cancel

## Appendix C

## Survey Follow Up Letter

Dear #FirstName# #LastName#,

I would like to thank those of you who have completed the survey. The number of responses has been very strong. If you haven't had time to take the survey I write you one last time asking for your help an input. A vast majority of the 29 questions are a simple click your response. Please click on the link below to take the survey, and if you chose not to participate, please click the "Decline" link. This just simply assures me you did get this message, and your choosing not to participate. Whether you take the survey or decline it, I have NO idea who the response comes from. This is a completely anonymous survey. The survey will be open until the end of next week. I wish you all a successful end to another school year and a quick spring.

Thanks again and I hope to see you in the Dells!

Matt

Consent to Participate in UW-Stout Approved Research

**This research has been approved by the UW-Stout IRB as required by the Code of Federal Regulations Title 45 Part 46.**

Title: HAVE THE TECHNOLOGY EDUCATION STANDARDS IMPACTED THE CLASSROOM CURRICULUM IN SOUTHCENTRAL WISCONSIN?

The link to the survey is:  
#SurveyLink#

If you do not wish to respond to this survey, please click on the link below to decline:  
#DeclineLink#

Description: The research is designed to analyze the impact the state and national Technology Education standards have had on classroom curriculum.

Risks and Benefits: The research will indicate if the standards have had an impact on the curriculum and to what extent that impact has had on what is taught in the classroom to see if students are benefiting from a standards based education. I cannot identify any possible risks from this research.

Confidentiality:

Your name will not be included on any documents. No response can be traced back to any school or individual. We do not believe that you can be identified from any of the information collected in the survey.

**Right to Withdraw:**

Your participation in this study is entirely voluntary. You may choose not to participate without any adverse consequences to you. However, should you choose to participate and later wish to withdraw from the study, there is no way to identify your anonymous document after it has been turned into the investigator."

**IRB Approval:**

This study has been reviewed and approved by The University of Wisconsin-Stout's Institutional Review Board (IRB). The IRB has determined that this study meets the ethical obligations required by federal law and University policies. If you have questions or concerns regarding this study please contact the Investigator or Advisor. If you have any questions, concerns, or reports regarding your rights as a research subject, please contact the IRB Administrator.

**Investigator:**

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**Statement of Consent:**

By completing the following survey you agree to participate in the project entitled "HAVE THE TECHNOLOGY EDUCATION STANDARDS IMPACTED THE CLASSROOM CURRICULUM IN SOUTHCENTRAL WISCONSIN?"

The link to the survey is:

#SurveyLink#

If you do not wish to respond to this survey, please click on the link below to decline:

#DeclineLink#

Many thanks for your help and cooperation on this project.

Matt