AN INVESTIGATION OF THE SAFETY EDUCATION CURRICULUM IN THE TECHNOLOGY EDUCATION TEACHERS' PROGRAM AT THE UNIVERSITY OF WISCONSIN IN MENOMONIE, WISCONSIN

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ABSTRACT

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ABSTRACT

Research indicates that effective and continuing efforts must be made by teachers to provide a safe environment and effective instructional practices to help guide our youth and adults through their school-related learning experiences.

Other literature appears to support the notion of the need for safety education to high school students as well as those who will be teaching such effective instructional practices. This need to provide a safe environment and effective instructional practices demonstrates a foundation for the investigation of methods and content that is presented to future educators. Specifically, this investigation focused on the review of the safety education curriculum that is standardized in the Technology Education Teachers program at the University of Wisconsin in Menomonie, Wisconsin.

An analysis between the Industrial Technology Education Program objectives as well as interviews with current technology education students/teachers indicates the possible existence of a problem. This problem lies in the fact that, there appears to be no representation of safety education that is either present within the objectives or is actually taking place within the programs' curriculum. It is therefore conceivable that the perceptions of received safety education and the overview of safety regulations together supply a foundation for an emphasis of a thorough safety education of Technology Education Teachers at UW-Stout.

The purpose of this study was to studey current UW-Stout Technology Education Teachers' program students and graduated UW-Stout Technology Education Teachers’ perceptions of the safety competencies that are either taught

or required in the UW-Stout Technology Education Teachers' program. Specific questions of the research project included:

1. What safety competencies are needed by technology education teachers?
2. What safety competencies are taught in the UW-Stout Technology Education Teachers' program?
3. What technology education courses teach the required competencies?
4. What safety competencies are deficient in the UW-Stout Technology Education Teachers' program?

A survey to measure safety competencies was designed and distributed to a reasonably representative group of subjects. The subjects in the study included current students in the Technology Education Teachers' program at UW-Stout as well as teachers in the technology education field that have graduated from the same program. Finally, the subjects of the study also included current teachers in the technology education field whom may also be students in the Technology Education Teachers' Masters Degree program at UW-Stout.

As a result of an analysis performed on the results given on the surveys, a majority of the participants felt that they were not taught important safety

regulations, guidelines, and standards in the curriculum during their instruction in the Technology Education Teachers' program at UW-Stout. The majority of the participants in the survey also felt that they did not receive instruction in legal liability issues and hazard recognition and control in the curriculum during their instruction in the Technology Education Teachers' program at UW-Stout. The data supports the claim that students in the Technology Education Teachers' Program at UW-Stout posses lower safety competencies than what the actual environment they are to teach in demands .

A conclusion may be made that the UW-Stout Technology Education Teachers' Program is not sufficiently preparing its students to deal with hazards that they may confront in the classroom/laboratory. Thus, the low safety competencies of students in the Technology Education Teachers' Program at UW-Stout indicates that there is a need for additional/higher level safety-related training/education amongst technology education students at UW-Stout.

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CHAPTER I

INTRODUCTION

Legal scholars estimate that 80% of all court cases involving alleged negligence for school-related injuries deal with some aspect of supervision. In addition to supervision-related forms of liability, another issue that has led to serious legal difficulties for school personnel involves a lack of proper instruction (Bever, 1996). The presence of many pieces of sharp, high-speed equipment, the school technology education classroom presents a variety of potential hazards for its students. Equipment commonly found in the technology education classroom such as power saws, drills, lathes, routers, and planing devices can be very destructive when used improperly. Given the presence as well as the hazardous nature of these forms of equipment, one could reason that the proper preparation of new technology education teachers as it pertains to hazard recognition and control is essential (Reich, 1995).

There are several standard objectives that have been developed for use in a high school-based technology education curriculum. One objective is to prepare students to understand the nature of technology and impact of technology on society. A second objective is to facilitate the students' ability to utilize learned skills as well as concepts and thus apply them to life situations (Hendricks and Sterry, 1999). At first blush, it seems reasonable that the application of these

objectives should serve as a foundation for fostering the development of student knowledge/skills and consequently ensure a safe classroom environment.

It is likely that various schools in the State of Wisconsin would recognize the above objectives in that they have developed direct responsibilities for certain individuals to be held accountable as it applies to providing safety programs which are integrated into operational as well as curriculum areas (Wisconsin School Safety Coordinators Association [WSSCA], 1998). There has also been federal and state safety laws that impose obligations of such magnitude that even the most idealistic teacher may find it difficult to maintain and know each code which contributes to providing students with a safe environment in which to work and learn. However, it is still the responsibility of the teacher to know and enforce each law and code to ensure the safety of the students (Fortier, 1998).

The teacher represents the front line of the school safety program in that he/she bears the responsibility for safety education and accident prevention within the classroom. If and when a student is injured in a school-related activity, a teacher is usually the first person at the scene of the accident and must be prepared to render the appropriate aid, and should also be responsible for preventing the recurrence of such accidents. From a prevention standpoint, teachers are expected to explain and demonstrate to students the safe performance of various skills and procedures in the classroom (Bever, 1996). Given the level

of responsibility as professional educators, there should be an emphasis on the instruction of safety and accident prevention in nearly all topics of the high school-level curriculum, including the technology education classroom. Each teaching-learning situation in the school technology education classroom has the potential for promoting safety consciousness; therefore, effective and continuing efforts must be made by teachers to provide a safe environment and effective instructional practices to guide our youth and adults safely through their school-related learning experiences (WSSCH, 1998). It is the goal of the educator that these acquired safety habits and concepts will remain standard to the students after they leave school (WSSCH, 1998).

Standards can serve as goals for teaching and learning good safety habits and practices. Setting reasonably high standards enables students and educators to know what the students should have learned in a given point in time (Fortier, 1998). The absence of standards has consequences similar to the lack of goals in any pursuit (WSSCA, 1998). The goal of safety and accident prevention must become a practiced activity of the teacher and may possibly involve a behavior change. In order to communicate the necessary behavior-change, there is a need for safety education (Bever, 1996).

The above as well as the other literature appears to support the notion of the need for safety education to high school students as well as those who will be

teaching such. This need demonstrates a foundation for the investigation of methods and content that is presented to future educators. Specifically, this investigation will focus on the review of the safety education curriculum that is standardized in the Technology Education Teachers program at the University of Wisconsin in Menomonie, Wisconsin. This teacher program prepares its students for productive careers in technological fields through a combination of course-work as well as work in career fields which play a key part of the educational plan that produces graduates who live, think and work creatively (UW-Stout, 2000).

An analysis between the Industrial Technology Education Program objectives as well as informal interviews with current technology education students/teachers indicates the possible existence of a problem. The nature of the problem may lie within the objectives of the technology education teacher program in that they may be deficient in the area of safety education. The assumption may be made that the students are receiving a standard knowledge base for safety competencies. However, there seems to be no representation of safety education that is either present within the objectives or is actually taking place within the programs' curriculum. It is therefore conceivable that the perceptions of received safety education and the overview of safety regulations together supply a foundation for an emphasis of a thorough safety education of Technology Education Teachers at UW-Stout.

Purpose

The purpose of this study is to describe current UW-Stout Technology Education Teachers' program students and graduated UW-Stout Technology Education Teachers' perceptions of the safety competencies that are either taught or required in the UW-Stout Technology Education Teachers' program. Specific questions of the research project included:

5. What are the safety competencies needed by technology education teachers?
6. What safety competencies are taught in the UW-Stout Technology Education Teachers' program?
7. What technology education courses teach the required competencies?
8. What safety competencies are deficient in the UW-Stout Technology Education Teachers' program?

Problem

Current research indicates that technology education teachers who have a thorough knowledge of safety education can practice and teach the proper safety competencies to high school level students. However, present graduated Technology Education Program teachers at UW-Stout may feel inadequately prepared to manage classroom safety issues based on the level of safety education

training that was received in the UW-Stout Technology Education Teachers' program.

Limitation

A limitation identified during the study was that current students in Technology Education Teachers' program at UW-Stout may also be graduates of the Technology Education Teachers' program at UW-Stout. Hence, the collected data may reflect students that are participating in courses that will count towards a masters' degree in the area.

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

The review of the literature served as a foundation of establishing three main purposes: (1) the need for safety competencies in the technology education classroom, (2) the extent that safety competencies are required in the UW-Stout Technology Education Teachers' program, (3) the safety competencies that are actually taught in the UW-Stout Technology Education Teachers' program.

The Need of Safety Competencies

One objective of education is to educate youth for life and not just for the acquisition of knowledge (Oberbillig, 1974). As technology education teachers develop programs, the development of objectives is an essential component in describing the ideas and concepts that are necessary for meeting the expectation of the program. As described by Kitzmann (1988, p. 2):

> The overriding objectives of technology education are technological literacy for all citizens. We all need to be technologically literate to some degree, although some of us will have different levels of need. The purpose of stating specific objectives is to focus the meaning of technological literacy. The objectives for technology education, therefore, are to provide students opportunities to better understand technology, develop an understanding of the relationships between individuals and society, explore interests and opportunities related to technology, prepare for entry into chosen technology-related occupations, and develop a technological base for continued learning.

In summary, Kitzmann emphasizes that technology education should provide technological literacy for all students and that the preferred means to ensure that such literacy is provided through the development of specific objectives. It is likely that the objectives developed by technology education teachers as based on Kitsmanns' ideas may serve as a role model for other programs. As objectives are developed, there soon follows a method to ensure that the objectives are being met and this can be accomplished through standards, codes, and rules. Given the presence of safety-related issues as identified by Reich (1995), it would seem prudent for a school/institution to recognize the need for safety objectives which would ultimately lead to the development of safety standards, codes, and rules.

The previous objective based concepts closely relate to the action that the Wisconsin School Safety Coordinators has developed in recent years. Through research and analysis processes, this organization has already developed a reasonably strong stance as it applies to safety in the technology education classroom. The Wisconsin School Safety Coordinators Handbook (1998) presents the rationale that:

> Safety standards, codes, and rules must be considered by instructors as important factors in the development of an accident prevention program. As the future workers of business and industry, shop and laboratory students should be thoroughly aware of safety standards. They should be acquainted with the codes and regulations. Standards of

> safety have a direct bearing on the development of safe work habits and attitudes, and when individuals do not act in accordance with safety standards, accidents are likely to occur. Hence, the consistent use of safety standards permits students to rely on their past experiences and habit content to work with hazards with a high degree of safety (WSSCH, 1998, [CD-Rom]).

The idea that is expressed by the Wisconsin School Safety Coordinators is that safety standards, codes, and rules must be taught to the future workers of business and industry. It is reasonable to conclude then that the instructors must not only know as well as teach information regarding accepted safety standards and codes, but they should also be able to maintain a classroom environment which is reasonably safe and thus reflect strict adherence to such safety based standards.

A particular aspect of safety standards, codes, and rules are how they are implemented into the school safety program. An important trait for technology education teachers is to be able to recognize the safety standards that apply to their area so that accident prevention programs can be developed. The development of a thorough accident prevention program is essential to reduce the number and frequency of accidents (Daugherty, 1998). A program essentially consists of a list of individuals and the actions that they must perform for the prevention of substandard conditions as well as prompt follow-up on the causes of accidents (Goetsch, 1999).

For various reasons, thorough accident prevention programs need to be developed and/or modified as the environment changes. In addition to protecting students as well as promoting the to practice safety in their future personal and professional lives, another reason would be related to dealing with legal issues. In this era of litigation consciousness, it is important for every school system to develop a detailed and thorough understanding of safety issues. Current written policy statements provide procedural guidelines for both faculty and staff and they also serve as a checkpoint whenever a conflict arises. Many million-dollar settlements have been awarded to students injured in school-related activities. The basis for these court proceedings is that of tort liability-the responsibility placed by the law on one who commits a wrong against another person. In the school setting, the tort or wrongful act may have resulted in injuries to students or their property. In today's complex legal system, the normal course of litigation is for the plaintiffs (usually the student and parents) to sue not only the teacher but also the school district. The courts go through the list of defendants and assess whether this or that individual is to be held liable for the injuries suffered by the student. One case in Minnesota has indicated that proper instruction is not just the responsibility of a teacher. School administrators and principles may also be held accountable for the development, planning, and administration of educational

programs in the school (Bever, 1996). Case No. 3-LACK OF PROPER INSTRUCTION provided in Beaver (1996, p. 440):

> In Minnesota a first-year physical education teacher was found 90% negligent and his principle was found 10% negligent after an eighth-grade student broke his neck doing a headspring over a rolled mat during a tumbling class. The sum awarded to the student and his family was in excess of $1 million.
>
> The court supported claims by the student and his family that class members were permitted to perform the headspring well before they had the opportunity to progress through a series of preliminary exercises. The court further concluded that the teacher was not spotting the exercise properly at the time the student was injured. Judgment against the principle was based on the conclusion that his failure to closely supervise an inexperienced instructor and administer the curriculum created the opportunity for the accident to occur.

As can be above, school administrators, such as principles, have become more vulnerable to litigation because of the close working relationship that is expected to exist between teachers and such administrative personnel (Appenzeller, H, and Ross, 1981). Given the outcome of the case presented by Bever (1996), it would not be surprising to see this liability-based trend continue in future years (Bever, 1996).

In school liability cases, the major consideration in court proceedings usually involves nonfeasance-failure to perform a legal act that one ought to do (e.g., failing to instruct students about the safe use of machinery and/or chemicals) (Bever, 1996). An all-encompassing term that is popularly used is negligence. Negligence has been defined as the failure to conduct oneself in

conformity with standards established by law for the protection of others against unreasonable risk of injury (Kaiser, 1986). Simply stated, it means that a teacher has failed to act as a reasonably prudent person would in the same situation. But, there is also the idea that court cases involving teachers could find that many of them are poorly prepared from a prior education standpoint for the responsibilities they must fulfill in the classroom (Bever, 1996). Given this premise, it is possible that a university could also find itself as a defendant in a case where a poorly prepared instructor was possibly negligent in his/her ability to protect a student.

Although the legal aspect of an accident prevention program is important, as future workers of business and industry, it would seem logical that technology education teachers should instruct students to ensure that they become acquainted with state and federal codes and regulations and thus promote better management of risk. Many state and federal codes and regulations affecting business and are developed specifically for employee protection. The employees must know the standards for their job and they must follow the regulations. While non-enforceable from a legal standpoint, following is an example of guidelines for business and industry as developed by the Wisconsin School Safety Coordinators Association (1998):

> S afety inspection - cooperate with committee.
> A lways handle equipment properly and follow safety recommendations.

F ollow all rules and regulations which are part of the regular operations.
E very unsafe act or hazardous condition must be reported to your supervisor.

E ach injury should be reported.
M ake sure you wear appropriate safety equipment.
P erform your job in a correct manner.
L earn to comply with DILHR codes supplied by employer.
O bey all established safety precautions in your work area.
Y ou should always be alert - accidents are due to human error.
E liminate dangerous waste from work area by placing in proper receptacles.
E njoy the benefits of a safe working environment.

As it would be highly preferred for Technology Education students to become acquainted with the above business and industry guidelines by WSSCH (1998), the students equally need to be aquainted with legally enforceable state and federal codes and regulations. Of equal if not greater importance, it would appear that high school aged technology education students would need to be instructed on the regulations that apply to them in the classroom. The State of Wisconsin has developed has developed a variety of regulations which must be adhered to within public schools. A portion of these regulations focus specifically on safety in public schools. However, the Department of Industry, Labor and Human Relations (DILHR) is responsible for monitoring school district compliance in providing safe and healthful facilities.

Within the Department of Labor lies the Occupational Health and Safety Administration (OSHA). As technology education students prepare to become the

future workers of business and industry, it is very important that they become acquainted with the purpose as well as regulations that are enforced by OSHA (WSSCH, 1998). The primary purpose of OSHA is to develop job safety and health standards (Reich, 1995) with the intent of enforcing such safety and health standards (Kaletsky, 1997). In a well-prepared CD-Rom, WSSCA describes methods to comply with OSHA standards. One method of creating a safe environment in the technology education classroom is by analyzing and identifying existing or potential hazards. If performed and followed through properly, the analysis can serve as an effective means to reduce the number and frequency of accidents (Daugherty , 1999). A well-documented analysis may also be used as an OSHA compliance record and documentation of a good faith attempt to identify hazards (WSSCH, 1998).

The agency that is primarily responsible for monitoring school districts compliance of safe and healthy facilities (i.e. DILHR) encourages that teachers be aware of the laws that directly apply to the classroom. It is the belief of the Wisconsin School Safety Coordinators Association that the teacher has the responsibility of knowing the laws pertaining to their environment (WSSCH, 1998). Figure 1 below, by WSSCA (1998), lists laws that typically apply to the Technology Education classroom which are frequently violated in Wisconsin schools:

Figure 1

(1) The most frequent violations found in Wisconsin schools as compiled from DILHR field inspections (WSSCH, 1998).

1. .22(a) 2 Walking Surfaces
2. .22(b) 1 Aisles and Passageways
3. .23(c) 1 Protection of Open Sided Floors, Platforms & Runways
4. .23(d) 1 Stairway Railings and Guards
5. .23(e) 4 Toeboard
6. .25(d) 1 Care of Portable Wood Ladders
7. .27(d) 3 Ladder to Extend 42" Above Landing Platform
8. .36(b) (4) & (d) (1) Obstructed Exits
9. .36(b) (5) Path to Exit Clearly Marked
10. .36(b) (6) Reliably Illuminated Exits
11. .36(d) (2) Fire Alarm and Sprinkler Systems
12. .37(a) Exit Components
13. .37(k) (1) & (2) Construction & Maintenance of Fire Doors, Fire Escapes, etc.
14. .37(o) Flame Retardant Curtains
15. .37(q) 2 Non-Exit Markings
16. .93(a) Asbestos

17. .106(b) (3) (iv) (a) Vent for Gasoline Storage Tank

18. .106(e) (2) (ii) Storage of Flammable Liquids

19. .106(g) (1) (v) Handling of Flammable Liquids

20. .106(g) (8) Sign on Gas Pump

21. .107(g) (3) Storage of Paint Rags

22. .133(a) (1) Eye and Face Protection Wherever There is Danger

23. .134(a) (1) Ventilation of Kilns

24. .134(a) (2) Respirators

25. .144(a) (1) (i) (e) Red Color for Fire Extinguishers

26. .151(c) Eye Wash and Showers Where Chemicals are Used or Mixed

27. .157(a) (2) Distance Between Fire Extinguishers

28. .157(a) (3) (5) Marking and Mounting of Fire Extinguishers

29. .157(d) 3-4 Maintenance and Testing of Portable Fire Extinguishers

30. .176(b) Storage of Materials

31. .178(g) (2) Ventilation in Battery Charging Areas

32. .212(a) (1-5) Machine Guarding

33. .212(b) Machine Anchoring

34. .212(a) (3) (ii) Guarding of Hand Operated Paper Cutters

35. .213(b) (3) Prevent Machines from Automatically Restarting Upon Restoration of Power

36. .213(h) (4) Radial Arm Saw, Automatic Return

37. .215(a) (2) (3) (4) & (b) (9) Grinding Wheel, i.e. Tongue Guard, Tool Rest

38. .219(d) (1)&(e) (3)(i) Guarding of Belts and Pulleys

39. .242(a) Condition of Hand Tools

40. .242(b) Compressed Air Used for Cleaning

41. .243(e) (1) (2) (3) Power Lawnmowers

42. .252(a) (2) (ii) (b) Secure Storage of Oxygen and Fuel Gases

43. .252(a) (2) (iv) (c) Separation of Oxygen and Fuel Gases When in Storage

44. .252(f) (1) (iv) Ventilation in Welding and Cutting Areas

45. .309 Refer to National Electrical Code

a. NEC 110-17 Exposed Live Parts

b. NEC 110-22 Identifying Disconnect Means

c. NEC 210-21(b) Grounding Type Receptacles Required

d. NEC 250-45(d) Grounding of Electrical Equipment

e. NEC 300-11 Secure Electrical Boxes

f. NEC 400-3,4,&5 Improper Use of Flexible Cords

g. NEC 511-6(c) Correct Type of Trouble Lights in Auto Repair Shop

h. NEC 680.31 Ground-fault Circuit-interrupters Required

The above list reveals evidence that there are numerous violations which are found within Wisconsin schools. It is reasonable to conclude that schools who avoid the use of formulized safety programs would be the ones who continue to add to the list of violations. One reason these schools that are found in violation of safety regulations may be that their teachers lack the adequate training to provide a safe teaching environment.

WSSCA (1998) holds to the belief that teacher training is an essential part of a successful safety program, which has a direct bearing on the development of safe work habits and attitudes by all individuals within the school environment. The teacher must adopt the ideas of safe work habits and attitudes. A mandatory method to achieve this idea is for top management/administration to recognize and demand that safety is everyone's responsibility (WSSCH, 1998). WSSCA (1998, [CD-Rom]) has developed a description of a teacher's responsibility that states:

> Teachers have a responsibility for safety education and accident prevention. The classroom teacher in many ways may implement safety education. This instruction should reflect the needs of safety education as indicated by local school and community conditions. The school's experience with accidents and injuries will suggest specific instructional needs. Teachers should familiarize themselves with policies and procedures. Because of teachers close relationship to pupils and their activities, they are most often named as defendants in pupil injury accidents alleging negligence. Taking all reasonable precautions against injury is a teacher's professional responsibility (WSSCH, 1998).

The above WSSCA stance emphasizes the need for effective safety competencies to be part of a technology education teacher's abilities. These abilities include a reasonable foundation of knowledge/application of standards, laws and regulations, objectives, legal aspects, violations within schools, and most importantly personal safety. The information confirms that there is great need for thorough safety competencies. Thus, given the environment as well as requirements of the profession, there is a great need for thorough safety competencies of technology education teachers

Safety Competencies Taught

This aspect of the literature review will focus on the safety competencies that are claimed to be taught in the UW-Stout Technology Education Teacher program. The foundation of the UW-Stout Technology Education curriculum comes from the description of the program. The description of the program states that its aims are:

> To prepare teachers for junior and senior high school teaching. Graduates help their students understand the technological nature of our world, by giving them the tools they need to cope with technology and make decisions about it. The program offers a background in training and technology that is applicable to careers in business and industry. The program combines general education with technical and professional studies. The courses seek to help you develop an appreciation for people and their interests. At the same time, courses will provide you with an understanding of the fields of technology that shape our world. Through study of broad areas such as communication, construction, manufacturing

and transportation, you'll learn about modern technologies and their application.

You'll have an opportunity to apply theory to real problems. Through labs, student teaching and optional work experiences, you will apply the principles of design, mathematics and science that you learn in the classroom. You'll work with computers, robots and lasers, and with more conventional equipment used in processing materials, energy and information.

The Technology Education program leads to junior and senior high teaching certification in all 50 states. With required work experience and a few additional classes, graduates may also become certified to teach in Wisconsin vocational and technical colleges.

In your first year as a Technology Education student, you receive a balance of general education, professional education and technical laboratory experience. General education courses include English composition, speech, psychology, sociology and math. An orientation course is taken in the professional studies sequence to help you plan your program. Several technical courses such as energy technology, transportation and communication technology will also help in the selection of an interest area. You will be assigned a faculty adviser for assistance with program planning. Additional help is available from the Advisement Assistance Center, the University Counseling Center, and Placement and Co-op Services.

Your schedule will continue to include liberal studies as you advance, but more emphasis is placed upon technical and professional courses. The program gives you the professional course work and experience you need. Students study areas such as teaching methods, educational psychology, curriculum development, reading methods, guidance and instructional evaluation. You also participate in a student teaching experience.

In addition to professional courses, you are exposed to a general background in the processes used in industry today. Through courses in energy technology, communication technology, transportation, building construction, drafting, microprocessing, and research and development, you gain the versatility you need to teach in public schools. With this general background, you develop expertise in communication, construction, manufacturing or transportation.

Communications students study image transfer, electronic communication, computer assisted design, office automation and

> telephony. Those interested in construction enroll in courses emphasizing architectural design, mechanical systems, heating and air conditioning, and construction materials. Computer aided manufacturing, robotics, industrial ceramics and maintenance of processing equipment top the list of courses for manufacturing students. The transportation curriculum includes introduction to fluid power, mechanical power transmission, vehicles, and propulsion and drives (UW-Stout, 2000, [On-line]).

The above program description covers a basis of the course-work that the future teachers will perform and accomplish. Even though the significant need for safety competencies to be held in the technology education classroom was highlighted in the earlier portions of this chapter, it is interesting to note that no mention of such is found in the above program description. As research was performed regarding specific technology education courses that addressed the aspect of safety, there was one course which is required by the students in the Technology Education Teachers' program that contains a direct and emphasized purpose of teaching classroom/laboratory safety in its objectives. The course is TECED-390 Lab/Class Management in Technology Education and its description is as follows:

> An overview of principles of facility planning and equipment selection for a variety of curriculum needs. Laboratory and classroom management techniques will be presented with an emphasis on safety requirements and managing various delivery systems used in contemporary programs (UW-Stout, 2000).

The course instructor, Dr. McAlister , describes in his syllabi the topics and objectives of the course as follows:

> Topics to be studied include technology facility planning, acquisition of equipment and materials, management of technology programs, and safety.
> Course Objective
>
> a. recognize and apply elements of facility planning, safety and health standards, space and design considerations, structural requirements and materials, and environmental considerations associated with technology education facilities.
> b. retrofit a laboratory to accommodate changes in technology education curriculum.
> c. requisition necessary tools, equipment and materials for a technology education program.
> d. recommend and implement measures that would improve the organization, efficiency and appearance of an existing technology education facility.
> e. identify sources of information about materials, equipment an facility planning for a technology education laboratory.
> f. perform administrative tasks associated with teaching technology education courses.
> g. construct and use a filing system to accommodate administrative records, instructional materials and resources.
> h. use a microcomputer to organize and manage activities associated with technology education.
> i. develop and implement a safety program, which incorporates safety instruction, record keeping, and safety inspection.
> j. describe what constitutes instructor liability, and what measures can prevent it.
> k. demonstrate an understanding of successful practices for motivating, disciplining and guiding students.
> l. develop and implement public relations strategies to promote technology education.
> m. describe activities necessary for successfully starting and ending a school year (McAlister, 2000, p.2).

A review of the above course objectives appears to present many content areas of technology education in the classroom as well as the aspect of safety into their overviews.

The recognition of the objectives and description of the course presents a step toward the needs of the students. A question that may be asked is, "does the course provide the adequate safety competencies needed by technology education teachers?" The following section will address this question.

Courses That Teach the Required Competencies

The third realm of the literature review represents courses, in technology education addressing safety, that are required in the UW-Stout Technology Education teachers program. As established in the previous section, the course TECED-390 Lab/Class Management in Technology Education is the only required course that identifies safety within its primary objectives. The required safety competencies of Technology Education teachers, presents a large area of content and learning. This area of content and learning is backed-up by the information described in the "needed safety competencies" section. The area of uncertainty is whether the required course presents the information that is needed to establish a thorough safety understanding for Technology Education teachers' within the classroom. This area will be addressed in the results of the questionnaire.

Conclusion

As the introduction indicated, this section of the research paper would review the literature to serve as a foundation of establishing three main purposes: (1) the need for safety competencies in the technology education classroom, (2) the extent that safety competencies are required in the UW-Stout Technology Education Teachers' program, (3) the safety competencies that are actually taught in the UW-Stout Technology Education Teachers' program.

This chapter has provided a reasonable explanation/follow-up on each of the above purposes. The review of each descriptive rationale for the purposes will aid in the subsequent development of ideas and conclusions. The ideas and conclusions will direct a view that is in alignment with the purpose of the paper. Until all aspects of information are presented, views are encouraged to remain open and unbiased.

CHAPTER III

METHODOLOGY

Introduction

The methods and procedures used in the development of this section of the research provide information in the following areas: the subjects, the instrumentation, and the procedure. Each of the areas are addressed to provide an overview of the key information included in the methodology section.

Subjects

The subjects in the study included current students in the Technology Education Teachers' undergraduate program at UW-Stout as well as teachers in the technology education field that have graduated from the same program. Finally, the subjects of the study also included current teachers in the technology education field whom may also be students in the Technology Education Teachers' graduate program at UW-Stout.

Instrumentation

A survey based instrument was used to asses the safety competencies of he subjects who either were enrolled in or had already graduated from the Technology Education Teachers' program at UW-Stout. The instrument also addressed the safety competencies that the subjects felt were taught as well as those that were deficient in the program. At the time of the survey, there was not

an instrument that was tailored to the questions that need to be addressed. Therefore, an instrument containing the desired questions needed to be developed by the researcher. Appendix A contains a sample of the consent form and Appendix B contains the survey that was used to determine the perceived level/desire for safety-related instruction as it relates to the UW-Stout Technology Education Program as well as the level of safety instruction that the program currently provides. Following is a synopsis of the survey questions:

The first question stated; "Are you currently a student in the Technology Education Teachers' program at UW-Stout?" This question helped to determine if the individual is a current student in the Technology Education Teachers' program at UW-Stout. The subject was asked to respond by marking yes or no.

The second question stated; "Are you a graduate of the Technology Education Teachers' program at UW-Stout?" This particular question established whether or not the subject was a graduate of the Technology Education Teachers' program at UW-Stout. The subject then was asked to respond by marking yes or no.

The third question stated; "Are you a current teacher in the technology education field that has graduated from the Technology Education Teachers' program at UW-Stout?" The question helped determined if the subject had graduated from the Technology Education Teachers' program at UW-Stout and

was a current teacher in the technology education field. The subject was asked to respond by marking the yes or no space.

The fourth question was stated; "As part of the Technology Education Teachers' program at UW-Stout, was there a course that was offered to you that focused on the identification and control of classroom/laboratory safety issues?" This question helped determined if information regarding the identification and control of classroom/laboratory safety issues was offered as a course at UW-Stout. The subject was then asked to respond by marking the yes or no space.

The fifth question asked; "Did the Technology Education Teachers' program at UW-Stout require you to take a classroom based safety/loss control course?" The question helped determined whether or not the individual was required to take a classroom based safety/loss control course. The individual was asked to respond by marking yes or no.

The sixth question was stated; "In the Technology Education Teachers' program at UW-Stout, were there any courses that you took that reviewed and taught state safety guidelines that should be adhered to in the technology education classroom/laboratory?" This question helped determine if the subject had taken any courses that reviewed and taught technology education classroom/laboratory-based state safety guidelines. The subject was asked to respond by marking yes or no.

The seventh question asked; "During your instruction of the curriculum in the Technology Education Teachers' Program at UW-Stout, were there any courses that you took that reviewed and taught state laws and regulations that must be followed in the technology education classroom/laboratory?" The question helped determine if the subject took any courses which reviewed and taught state laws and regulations. The subject was asked to respond by marking yes or no.

The eighth question was stated; "In the Technology Education Teachers' program at UW-Stout, were there any courses that you took that reviewed and taught federal laws and regulations that must be followed in the technology education classroom/laboratory?" This question determined if the subject took any courses which reviewed and taught federal laws and regulations. The subject was then asked to respond by marking yes or no.

The ninth question asked; "As part of the Technology Education Teachers' program at UW-Stout, were there any courses that you took that reviewed and taught OSHA standards and regulations that must be followed in private industry?" The question helped recognize if the subject took any courses that reviewed and taught OSHA standards and regulations that private industry is held accountable to. The subject was asked to respond by marking yes or no.

The tenth question stated; "During your instruction of the curriculum in the Technology Education Teachers' Program at UW-Stout, were there any courses that you took that reviewed and taught legal liability issues of the technology education classroom/laboratory?" This question helped to determine the extent that legal liability issues associated with the technology education classroom/laboratory were addressed in his/her coursework. The subject was asked to respond by marking yes or no.

The eleventh question was stated; "In the Technology Education Teachers' program at UW-Stout, were there any courses that you took which reviewed concepts of hazard recognition and control in the technology education classroom/laboratory?" The question helped to determine if the subject was ever presented with technical information pertaining to concepts of hazard recognition and control as part of his/her program of study. The subject was then asked to respond by marking either yes or no.

The twelfth question asked; "As part of the Technology Education Teachers' program at UW-Stout, do you feel that the program adequately prepared you to control the presence of hazards that may exist in the technology education classroom/laboratory?" This question helped to determine if the subject felt comfortable at being able to control the presence of hazards that may exist in the

technology education classroom/laboratory as a result of going through his/her program of study. The subject was asked to respond by marking yes or no.

The thirteenth and final question was stated; "The classroom/laboratory safety management training that is given to UW-Stout technology education students is either good or poor?" This question helped determine the subject's perception regarding the quality of the classroom/laboratory safety management training that is provided to UW-Stout technology education students. The subject was asked to respond by marking the good or poor space.

Procedure

The procedures for the data collection and analysis portion of this study included: (1) the development of a consent form and survey instrument that presented a series of questions to the selected subjects, (2) obtaining a list of subjects who may be willing to participate in the survey, (3) distributing and collecting the consent forms and corresponding surveys, and (4) analyzing the survey results.

Upon completing of the design of the survey, a list of subjects was obtained from UW-Stout. Included in the population were subjects that participated in summer courses on the UW-Stout campus. The survey instrument was distributed to all potential subjects during the UW-Stout summer session of 2000. The distribution of the surveys was done via three methods. The first

method of the distribution of the consent form and surveys was via the internet on e-mail. The second method of the distribution of the surveys and consent form was via US mail. The final method of the distribution of the surveys and consent from was through the method of direct person to person contact.

CHAPTER IV

PRESENTATION AND INTERPRETATION OF THE SURVEY RESULTS AND DISCUSION

The interpretation of the survey results includes a description of each question that was used in the survey and a summary of the answers to the questions given by the subjects. The data analysis includes the review and specific recording of the answers provided on the surveys.

PRESENTATION AND INTERPRETATION OF THE SURVEY RESULTS

The survey developed was specific in the issues that focused on the safety competencies of the subjects surveyed. Prior to the development of the survey, a certain goal was brought into light. This goal was to measure the overall idea of safety competencies that were taught to individuals that were either students in the UW-Stout Technology Education Program or else graduates of such program. The survey's goal was to measure the subjects' knowledge in the area of safety that is believed to be very beneficial to technology education teachers.

The surveys were distributed to 142 individuals which were described in the previous subjects section. Of the 142 surveys that were distributed via e-mail,

us mail, or hand delivered, 72 were returned. The completion and return of 72 surveys indicates a response rate of slightly greater than 50%.

The survey responses are provided in the section below.

The first question stated; "Are you currently a student in the Technology Education Teachers' program at UW-Stout", provided 35 yes responses and 37 no responses. The no responses indicate subjects that have graduated from the program. The responses indicate that about half of the returned surveys were from current students.

The second question stated; "Are you a graduate of the Technology Education Teachers' program at UW-Stout", provided 40 yes responses and 32 no responses. The no responses most likely indicated subjects that were current students. However, the number of responses given for question one lack a direct correlation to the number of responses given for question two. The exact reason for this difference is unknown. One possibility for this discrepancy between question one and two may be that several subjects misinterpreted them.

The third question that was asked stated; "Are you a current teacher in the technology education field that has graduated from the Technology Education Teachers' program at UW-Stout", provided 48 yes responses and 24 no responses. The responses to this question indicated that the majority of the returned surveys were from graduates of the program. Although, the number of responses to this

question may appear to be confusing when compared to the response for questions 1 and 2, it should be known that the individuals which responded to this question by marking yes may also be students in the Industrial Technology Education Masters' Program.

The fourth question was stated; "As part of the Technology Education Teachers' program at UW-Stout, was there a course that was offered to you that focused on the identification and control of classroom/laboratory safety issues", provided 4 yes responses and 66 no responses. For this question it should be noted that two subjects did not respond. The nature of the responses to this particular question indicate that the subjects were not offered a course that focused on identification and control of classroom/laboratory safety issues.

The fifth question which was stated asked; "Did the Technology Education Teachers' program at UW-Stout require you to take a classroom based safety/loss control course", provided 2 yes responses and 67 no responses. A total of three subjects did not respond to this question. Similar to the results of the previous question, a majority of responses indicate that the subjects were not required to enroll in a safety/loss control course.

The sixth question was stated; "In the Technology Education Teachers' program at UW-Stout, were there any courses that you took that reviewed and taught state safety guidelines that should be adhered to in the technology

education classroom/laboratory", provided 6 yes responses and 64 no responses with 2 subjects that did not provide a response.

The seventh question stated; "During your instruction of the curriculum in the Technology Education Teachers' Program at UW-Stout, were there any courses that you took that reviewed and taught state laws and regulations that must be followed in the technology education classroom/laboratory?" The returned surveys provided 1 yes response and 69 no responses with 2 subjects that did not respond. In relation to the responses given on the previous two questions, it is very obvious that the subjects did not feel that were taught state safety guidelines or laws/regulations.

The eighth question was stated; "In the Technology Education Teachers' program at UW-Stout, were there any courses that you took that reviewed and taught federal laws and regulations that must be followed in the technology education classroom/laboratory", provided 1 yes responses and 69 no responses with 2 subjects that did not provide a response. Based on the response to this question it is reasonably clear that federal laws and regulations are not being taught to the subjects in the program. The general drift of the responses to this question are similar to the responses given on the previous four questions.

The ninth question asked; "As part of the Technology Education Teachers' program at UW-Stout, were there any courses that you took that reviewed and

taught OSHA standards and regulations that must be followed in private industry", provided 4 yes responses and 66 no responses with 2 subjects not responding. The responses plainly indicates that OSHA standards and regulations were not taught to a majority of the individuals that participated in the survey.

The tenth question stated; "During your instruction of the curriculum in the Technology Education Teachers' Program at UW-Stout, were there any courses that you took that reviewed and taught legal liability issues of the technology education classroom/laboratory", provided 3 yes responses and 66 no responses. This issue provides a sizeable foundation in itself for the justification of adequate teacher preparation from safety instruction as well as a program development standpoint. From the shear number of responses, it is evident that the students are not exposed to the legal liability issues in the technology education classroom/laboratory that they should be.

The eleventh question was stated; "In the Technology Education Teachers' program at UW-Stout, were their any courses that you took which reviewed concepts of hazard recognition and control elimination in the technology education classroom/laboratory", provided 5 yes responses and 64 no responses with 3 subjects not responding. Based on the nature of the responses for this question, the Technology Education Teachers' program at UW-Stout does not include hazard recognition and control into their curriculum.

The twelfth question asked; "As part of the Technology Education Teachers' program at UW-Stout, do you feel that the program adequately prepared you to control the presence of hazards that may exist in the technology education classroom/laboratory", provided 3 yes responses and 67 no responses with 2 subjects not responding. The response to this question strongly correlates with the results of the previous one and thus indicates that the individuals which participated in the survey were not presented with hazard recognition and control-related information and consequently do not feel that they were prepared to control hazards which they may face in the technology education classroom.

The final question was stated; "The classroom/laboratory safety management training that is given to UW-Stout technology education students either is good or poor", provided 3 good responses and 66 poor responses, with 3 subjects not responding. The large number of “poor” responses strongly indicates that the subjects who participated in the survey are not pleased with the safety-related instruction received as part the Technology Education Program at UW-Stout.

DISCUSSION

The above data analysis provides a summary of the answers to the questions given by the subjects on the survey instrument. The survey results are completely the ideas of the subjects. Hence, the ideas of the subjects were

expressed by their responses to the questions specifically about safety issues in the program. The survey results overwhelmingly represent the notion that exposure to safety issues and concepts were deficient in Technology Education Teachers' program at UW-Stout. As recognized, the negative responses given to the questions repeated themselves again and again. Therefore, it is very clear that the subjects, which participated in the survey, recognized and felt that they were deficient in the knowledge of necessary safety concepts and issues needed to properly instruct those concepts and issues in the technology education classroom/laboratory.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The summary of the research includes a brief description of the purpose of the study. As well as a description of the instrument and subjects that provided data. The summary continues by providing a brief review of the results of the surveys. The conclusion section provides a brief interpretation of the data collected from the surveys. This section also integrates the data collected to the importance and necessary curriculum for the students. The recommendation section provides a discussion of possible ideas in which the results of the research may be utilized. The recommendation section also gives an overview of ideas that provide solutions to the problem.

SUMMARY

The purpose of this study was to provide current UW-Stout Technology Education Teachers' program students and graduated UW-Stout Technology Education Teachers' perceptions of the safety competencies that are either taught or required in the UW-Stout Technology Education Teachers' program. A review of current literature indicates a great need for technology education teachers to posses' significant safety competencies in order to properly instruct/follow codes and regulations. The review of literature also indicated that, based on the syllabus of a core education-based course, the present Technology Education Teachers'

program at UW-Stout provides safety instruction to the students in the program. In order to verify that the above program does what it claims, a survey to measure safety competencies was designed and distributed to a group of subjects.

The subjects in the study included current students in the Technology Education Teachers' program at UW-Stout as well as teachers in the technology education field that have graduated from the same program. Finally, the subjects of the study also included current teachers in the technology education field whom may also be students in the Technology Education Teachers' Masters Degree program at UW-Stout.

The instrument used in the study addressed safety competencies of the subjects in the Technology Education Teachers' program at UW-Stout. The instrument also addressed the safety competencies that the subjects felt were taught, including the safety competencies that were deficient, in the program. At the time of the survey, there was not an instrument that was tailored to the questions that need to be addressed. Therefore, an instrument containing the desired questions was developed.

CONCLUSIONS

The surveys indicate that approximately half of the participants in the survey were current students in the Technology Education Teachers' program at UW-Stout while the remaining participants in the survey were most likely

graduates of the Technology Education Teachers' program at UW-Stout. As an overview of the results given on the surveys, a majority of the survey participants felt that they were not taught important safety regulations, guidelines, and standards in the curriculum during their instruction in the Technology Education Teachers' program at UW-Stout. The majority of the participants in the survey also felt that they did not receive instruction in legal liability issues and hazard recognition and control in the curriculum during their instruction in the Technology Education Teachers' program at UW-Stout. As provided in the Wisconsin School Safety Coordinators Handbook (1998), schools and teachers have a direct responsibility for providing safety programs integrated into curriculum so that students can enjoy safe and healthful life-styles. Given this premise, it is reasonable to suggest that a technology education teacher cannot implement or develop a safety programs if they do not have a background in the safety and/or loss control/management. Therefore, it could be stated that a technology education teacher who has low safety competencies cannot provide a safety program that is integrated into curriculum and is consequently not providing the students with a safe and healthful life-style as stated in the Wisconsin School Safety Coordinators Handbook (1998).

It is very clear that the subjects, which participated in the survey, recognized and felt that they were deficient in the knowledge of necessary safety

concepts and issues needed for the proper instruction as well a control of hazards that may be present in the technology education classroom/laboratory. The low safety competencies of students in the Technology Education Teachers' Program at UW-Stout indicates that there is a high need for safety-related training/education amongst technology education students at UW-Stout. Hence, a conclusion may be made that the UW-Stout Technology Education Teachers' Program is not sufficiently preparing its students to deal with hazards that they may confront in the classroom/laboratory.

RECOMMENDATIONS

Assess Current Risk

As new technology is developed and implemented into technology education programs throughout schools, there is the potential for new risks to arise. It is likely that there may already be risk control programs that have been developed to control hazards found in traditional technology education classrooms and laboratories. But, with the current changes in technology education practices and procedures, there also comes the need to assess on more of a continuous basis. Therefore, one recommendation would be for undergraduate and graduate faculty in the Technology Education Teachers' program at UW-Stout to assess the current risks in technology education classroom and laboratories that span a wide range of activities/equipment (i.e.

computer, wook/metal working equipment). The assessment may be used as a foundation for the development of instructional materials/presentations which address the current risks in the technology education classroom and laboratory and means to effectively control such risks.

Tailor Coursework to Focus on Risks

Assuming that the current risks that are present in the technology education classroom and laboratory have been identified, the second recommendation would be for the faculty in the Technology Education Teachers' program at UW-Stout to tailor or modify current coursework. The modified coursework should integrate information pertaining to risks in the technology education classroom as well as effective risk control measures. One possible method which could help in the modification of the coursework would be to require associated faculty in the Technology Education Teachers' program at UW-Stout to enroll in some type of a college-level safety/loss control course.

Coursework Which Provides Insight on Risk Management

It is possible that the approach of modifying current coursework to include information pertaining to risks in the technology education classroom may be limited because of the other forms of teaching-related information that must be presented. If such a limitation exists, then a third recommendation would be to have students in the Technology Education Teachers' program at UW-Stout be

required to enroll in additional coursework which provides in-depth insight of the risk management process, including that of hazard recognition and control.

The above recommendations serve as stepping-stones to solving a problem that appears to exist within the UW-Stout Technology Education Teachers' Program. As was mentioned in the literature review, the potential for accidents does exits in the technology education classroom and associated with these accidents comes legal liability issues. One legal issue that should not be discounted in this day and age is the potential for a parent to bring suit upon a university because their child's teacher did not have the proper education as it pertains to hazard recognition and control in the technology education classroom. To adequately prepare the students in the Technology Education Teachers' program at UW-Stout, there must be an emphasis placed upon an equal spot in the curriculum for safety training.

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Appendix A

Consent Form for the Survey of the Technology Education Teachers' Program at UW-Stout

I *Francis H. Kratochvill III*, a graduate student at UW-Stout is conducting a research project to determine the *safety competencies* of: current students in the Technology Education Teachers' program at UW-Stout, and current teachers in the technology education field that have graduated from the Technology Education Teachers' program at UW-Stout. I would appreciate your participation in this study since it might provide very useful information about the safety training of UW-Stout Technology Education students and graduates. I do not anticipate that this study will present any medical or social risk to you. The information I gather will be kept strictly confidential and any report of the findings will *not* contain your name or any other identifying information.

Your participation in this project is completely voluntary. If at any time you wish to stop participation in this research, you may do so, without coercion of prejudice. Just tell me.
If you understand the above information and would like to continue with the survey, please sign and date the consent form.

Signature_____ Date_____

Once the study is completed, I would be glad to share the results with you.

NOTE: Questions or concerns about participation in the research or subsequent complaints should be addressed first to the Francis H. Kratochvill III or research advisor and second to Dr. Ted Knous, Chair of the UW-Stout Institutional Review Board for the Protection of Human Subjects in Research, 11 HH, UW-Stout, Menomonie, WI, 54751, phone (715) 232-1126.

Appendix B

Survey of the Technology Education Teachers' program at UW-Stout

This is a survey for *current students* in the Technology Education Teachers' program at UW-Stout and/or *teachers* in the technology education field that have graduated from the Technology Education Teachers' program at UW-Stout. The survey is designed to provide useful information concerning general safety issues.

Directions: Please complete the information by checking the appropriate response.

1. Are you currently a student in the Technology Education Teachers' program at UW-Stout?
   Yes ___ No ___

2. Are a graduate of the Technology Education Teachers' program at UW-Stout?
   Yes ___ No ___

3. Are you currently a teacher in the technology education field that has graduated from the Technology Education Teachers' program at UW-Stout?
   Yes ___ No ___

4. As part of the Technology Education Teachers' program at UW-Stout, was there a course that was offered to you that <u>focused</u> on the identification and control of classroom/laboratory safety issues?
   Yes ___ No ___

5. Did the Technology Education Teachers' program at UW-Stout <u>require</u> you to take a classroom based safety/loss control course?
   Yes ___ No ___

6. In the Technology Education Teachers' program at UW-Stout, were there any courses that you took that reviewed and taught <u>state safety guidelines</u> that should be adhered to in the technology education classroom/laboratory?
   Yes ___ No ___

7. During your instruction of the curriculum in the Technology Education Teachers' Program at UW-Stout, were there any courses that you took that

reviewed and taught state laws and regulations that must be followed in the technology education classroom/laboratory?
Yes ___ No ___

8. In the Technology Education Teachers' program at UW-Stout, were there any courses that you took that reviewed and taught federal laws and regulations that must be followed in the technology education classroom/laboratory?
Yes ___ No ___

9. As part of the Technology Education Teachers' program at UW-Stout, were there any courses that you took that reviewed and taught OSHA standards and regulations that must be followed in private industry?
Yes ___ No ___

10. During your instruction of the curriculum in the Technology Education Teachers' Program at UW-Stout, were there any courses that you took that reviewed and taught legal liability issues of the technology education classroom/laboratory?
Yes ___ No ___

11. In the Technology Education Teachers' program at UW-Stout, were there any courses that you took which reviewed concepts of hazard recognition and control elimination in the technology education classroom/laboratory?
Yes ___ No ___

12. As part of the Technology Education Teachers' program at UW-Stout, do you feel that the program adequately prepared you to control the presence of hazards that may exist in the technology education classroom/laboratory?
Yes ___ No ___

13. The classroom/laboratory safety management training that is given to UW-Stout technology education students is:
Good ___ Poor ___

NOTE: graduate student, Francis H. Kratochvill III, in the Industrial/Technology Education program at UW-Stout, designed this survey.