AN INVESTIGATION OF TEACHER SAFETY TRAINING WITHIN CURRENT TEACHING ASSIGNMENTS

By

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ABSTRACT

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The purpose of this study was to obtain perceptions of technology education teachers in the Minnesota Technology Education Association about health and safety training in their current employment. All teachers participating in this study had an active membership is the state association and are currently teaching in a public school.

The study explored what safety training programs are available in the public schools that would increase the health and safety competency level of the teacher in a

technology education laboratory as well as the students being taught within that curriculum.

A survey was used to gather information from the members of the MTEA. Data was collected, analyzed, and reported. The research data determined that technology education teachers received some safety training through their current employer, but more emphasis is needed to provide a safer and less hazardous environment within technology education laboratories. Further studies are recommended to determine the effectiveness of the training.

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CHAPTER 1

Introduction

In an attempt to redevelop an identity and standardize the discipline, technology education has undergone yet another reform movement. A national education reform movement that generated a change from Industrial Arts to Technology Education has created more division among professional personnel within the ranks of the education system. This reform has challenged the teaching profession with divided opinions on what the technical competencies the next generation of technology education teachers should possess (Rogers, 1996).

The national reform movement for technology education has developed a group of standards that has generated a change in curricula and instructional teacher preparation degrees (Volk, 1993). Teacher preparation programs have focused their efforts on the liberal studies element of the national standards in order to produce the greatest amount of change within the secondary level of an educational system. With the large amount of psychomotor skill development that was present in the industrial arts curriculum, the emphasis of cognitive skills were stressed with technology education reform. Technology education placed its focus on developing students' knowledge base that centered on the concept of technology and its impact on individuals and society (Brown, 1993). With the emphasis placed on cognitive skills within the curriculum, the skill development was reduced for fear of over burdening the teacher development program with additional credit hours for diplomacy. The technical content that survived the curriculum adjustment had a focus on

understanding the impacts, processes, and outputs of present-day technical subsystems used in contemporary industry (Rogers, 1996). In the attempt to develop a standardized discipline, teachers are entering classrooms inadequately prepared to teach the industrial processes of the schools curriculum (Lewis, 1993).

The field of technology teacher education lacks consistency in what technical courses are required for graduation, even though national standards have been developed. Technical content courses for technology education have been grouped into subject categories of biotechnology, communications, construction, manufacturing, and transportation (Rogers, 1996). These categories are broad based headings that try to incorporate existing and future technological subsystems. As a result of the change to technology education, teacher programs have been preparing graduates with their vision of technology education and have not been equipping graduates for the industry-related classroom they may be entering (Rogers, 1998). When a technology education teacher enters an industry-related classroom, the classroom environment could hinder the teachable curriculum. The structure of the industry-related classroom was developed during a time period when teacher preparation programs included technical content courses in woodworking, metalworking, electricity/electronics, automotive mechanics, graphics, and mechanical drafting. These laboratories were designed and constructed during a time period when teacher-training programs modeled the curriculum to be taught at the secondary education level. This lack of pedagogical consistency between teacher development programs and actual secondary educational institutions could have a

detrimental impact on the field when teachers do not possess a common base of technical competencies (Rogers, 1996).

Teachers possessing a technology education licensure can be placed in anyone of the different emphasis areas of technology and be expected to teach. At that time the instructor becomes the liable factor in anything that happens to students under their instruction. The teacher is responsible for safety education and accident prevention within the classroom. Experience in industry has shown that the laboratory can be a safe workplace, however, in an industrial-related classroom the classroom presents a variety of potential hazards for its students and professional staff (Oklahoma State University, 1999). From a prevention standpoint, teachers are expected to explain and demonstrate to students the safe performance of various skill and procedures in the classroom in order to reduce the potential hazards that can occur in that particular environment (Bever, 1996).

In order to assist in the hazard reduction process, a comprehensive safety program needs to be presented from the employer to the teacher. If teachers are to manage that responsibility and communicate safety information, supervised on-the-job training should be provided to any person who is impacted by that laboratory environment (Oklahoma State University, 1999). The intent of a laboratory safety program is to provide guidance and training to all laboratory workers who use hazardous substances or engage in potentially hazardous laboratory operations. Many injuries that occur result from employees failing to follow prescribed safe operational practices. These failures arise from workers attitudes, inadequate training, and

supervisory failure to enforce safe job procedures. The use of machine guards, environmental controls, good training, and maintenance programs can eliminate most mishap-producing factors (Department of Energy, 1990).

The goal for safety and accident prevention must become a practiced activity of the teacher and may possible involve training and a behavior change. In order to communicate the necessary behavior change, there is a need for safety education in educational institutions (Bever, 1996).

Statement of the Problem

A technology teaching licensure offers a great diversity of courses that an instructor is licensed to teach. The diversity of the teaching assignment demands that a teacher possess technical competencies in all subject areas within technology education. Safety practices within a classroom are part of the technical competencies that an instructor must obtain through training. The lack of safety practices creates liability issues for both technology educator and a school district. There has been limited research done to determine if technology educators are provided safety training, within their current teaching assignment, from their employer.

Purpose of the Study

The purpose of the study was to describe technology educators' safety training within their current teaching assignment. Through the use of a survey, data will be collected to provide an analysis of on-the-job safety training for technology education instructors. The results will provide current and relevant information on the presence of safety training for technology educators within Minnesota's public schools.

Research Questions

This study should answer the following questions:

1. Do Minnesota Public Schools have a safety and accident prevention program established for technology education teachers and students?

2. Are Minnesota Public Schools providing safety and accident prevention training for technology education teachers?

3. Are Minnesota Public Schools providing safety and accident prevention training opportunities through professional staff development?

4. Are technology education teachers instructing courses that they do not have the technical competencies in safety to teach the required curriculum?

Limitations of the Study

The foreseen limitations of the study are:

1. The sampling of people for the study will be limited to contracted teachers that are members of the Minnesota Technology Education Association. Generalizations can only be confined to teachers in that association.

2. Authenticity of the survey may be a limitation. The researcher developed the survey instrument.

Definition of Terms

For clarity of understanding, the following terms need to be defined for the study.

Technology Education – An educational discipline that involves knowledge and study of human endeavors in creating and using tools, techniques, resources, and

systems to manage the man-made and natural environments for the purpose of extending human potential and the relationship of these to individuals, society, and the civilization process (Sterry & Wright, 1987).

CHAPTER 2

Literature Review

Introduction

The literature review has served as a foundation for establishing two main purposes: (1) determining the technical competency requirements for licensure of technology education, and (2) selecting what training programs need to be provided in order to establish a safety competent technology education instructor.

Technology Education Competencies

A growing number of governmental leaders are addressing the issue of poor quality teachers in our schools. This criticism has made its way back to the perceived source, teacher education programs in college and universities. The extent to which teacher preparation programs are successfully shaping the teachers to cope with academic and nonacademic content is unclear. Research on critical issues and problems in technology education has identified teacher preparation as a significant concern for proponents of the profession (Hill & Wicklein, 2000).

Serious questions have been raised about the effectiveness of teacher preparation programs and their responsiveness to the changing needs of technology teachers. The challenge of functioning as a technology education teacher is only out done by the challenge of preparing new teachers in the technology education profession. The competencies of technology educators can be categorized into areas of personal, professional, and technical needs (Hill, 2000).

The technical content of technology teacher education programs need reorganization and adjustments to provide depth of technical content rather than a shallow exposure to the major processes of industry. Teacher development programs have been concerned with the increase of liberal studies in the professional development of teacher education. This concentrated effort on the study of technology has squeezed out the technical skill development programs that were once the foundation for industrial arts (Rogers, 1996). These problems are multiplied for most technology education teachers because of the additional challenge presented by their teaching environment.

Technology education teachers must manage laboratories with hundreds of pieces of equipment, materials and tools plus keep up with a complicated technical curriculum. The technical content area (e.g., operation of equipment, explanation of technical processes, maintenance of laboratory equipment) that was once viewed as the most prominent aspect of the technology education curriculum has dropped to a mid-range preparation element of teacher preparation institutions' curriculum (Hill, 2000). To further emphasize the problems within teacher preparation institutions beyond de-emphasizing technical content, findings from a study Rogers found there is not a single common required technical course within 133 responding degree programs. The responses on required courses included Electricity / Electronics, Mechanical Drafting, Manufacturing, Graphics/Desktop Publishing, Construction, Woodworking, Computer-Aided Drafting, Power/Energy, Material/Processes, and Industrial Safety. The study found that Electricity and Electronics was common in

about 75 percent of institutions across the United States, while Industrial Safety was only common in 23 percent of the institutions (Rogers, 1996).

To address the growing concern, the State of Minnesota's education profession has increased the number of performance competencies in which a teacher has to perform in order to gain an educational licensure. To be certified as a licensed teacher, a teacher candidate must pass a series of proficiency tests. The three-part proficiency test is divided into a section of basic skills, which includes reading comprehension, mathematical computation, and writing composition. A second section, general teaching knowledge, tests for knowledge of educational theory and practices. The final section is a licensure field-content specific test in which the candidate is tested on knowledge within their field of study. The proficiency testing has a focus on the professional skills and knowledge that a teacher must have to help ensure success in their teaching careers, but it does not include any demonstration of technical skills of safety and equipment operation (Minnesota Department of Children Families and Learning, 1999).

Minnesota Rule, Chapter 8710, states that a teacher of technology must have knowledge and skills to provide students with curriculum and instruction focused on the continually developing technological world. Understanding the definition, philosophy and rational of technology education, teachers use central concepts to enhance the teaching of decision-making, critical thinking, and problem solving. With the assistance of tools, materials and processes, teachers use technology-learning environments to challenge students with technological issues and problems. This

learning environment provides an opportunity to analyze technology on historical, sociological, ethical, environmental, and economic levels. Guiding students through a humanistic process, identified as the technological method, students learn how to identify problems, research for information, identify possible solutions, analyze probable solutions, implement a solution, and evaluate the results of the applied solution to the identified problem (Minnesota Department of Children Families and Learning, 1999).

The technological world is divided into content areas of: communications, construction, manufacturing, energy and power, transportation, biotechnology, and emerging technologies. Each content area has a specific body of knowledge that involves the systems and processes within that specific content. The systems and processes are composed of technological elements, components, and devices that function in micro and macro systems. These systems then work together to provide a cycle of inputs, processes, outputs and feedback (Hendricks, 1999).

A list of the content areas for technology education, as described by The Minnesota State Board of Teaching and The Minnesota Technology Education Association, with simplified examples of the systems and processes to establish an understanding of each content area follows:

Communication Technology includes the graphic and electronic forms of communication involving the processes of designing, drafting, photography, printing, technical writing, and computer-based communications. The systems that support communication technology are: data processing, programming, transmitting, and

receiving information in a process form problem (Minnesota Department of Children Families and Learning, 1999).

Construction Technology includes the fields of residential, commercial, and civil construction. Within each field there are systems that support construction technology. These systems include: wood, concrete, steel, composites, electrical, mechanical, and site development problem (Minnesota Department of Children Families and Learning, 1999).

Manufacturing Technology includes custom, intermittent, and continuous types of manufacturing involving the processes of forming; separating, combining, measuring, and finishing selected materials. The systems that support manufacturing use: research and development, automation, material handling, and quality control problem (Minnesota Department of Children Families and Learning, 1999).

Energy and Power Technology includes radiant, chemical, thermal, mechanical, and electrical forms of energy. These forms of energy involve the processes of extracting, conserving, measuring, controlling, converting, transmitting and storing energy forms. The systems that support energy and power technology are: fossil fuel, nuclear, electrical, fluid, and renewable energy resources problem (Minnesota Department of Children Families and Learning, 1999).

Transportation Technology includes terrestrial, marine, atmospheric and space modes of transportation. The transportation forms involve the processes of propulsion, suspension, guidance and control problem (Minnesota Department of Children Families and Learning, 1999).

Biotechnology includes plant, animal and machine applications of biotechnology with the processes for propagating, growing, maintaining, harvesting, adapting, treating, and converting problem (Minnesota Department of Children Families and Learning, 1999).

Each content area is broad-based in nature in order to provide latitude for the diversity of the subject matter. The broad-based description also provides opportunity to insert technological innovations (e.g., developments from existing technologies) and technological inventions. The content areas, published under the Minnesota Plan, are influenced by the guidelines established by The International Technology Education Association.

The International Technology Education Association with the combined effort of The National Science Foundation, and National Aeronautical Space Association created a document, Technology for all Americans, in order to establish National Standard in education for technological literacy. Within that document, a domain of technology has been defined with established quality criteria within each educational curriculum. The Technology for all Americans project has established five content areas in which to establish pedagogues for technology. The five content areas include: the nature of technology, technology and society, design, abilities of the technological world, and the design world. In each content area there are standards identified on which assessment of student and curriculum performance are based.

The content area of the Nature of Technology has three standards for curriculum assessment. The three standards can be summarized as the understanding

of characteristics and scope of technology, understanding of core concepts and relationships among technologies and the connection between fields of study or content areas.

The Technology and Society content area has four standards that focus on the effects of technology on societal structures, the environment, and the role of society with the development and use of technology in the past, present and future (International Technology Education Association, 1996).

The Design content area consists of three standards that focus on the attributes of design and engineering, design with a focus of problem-solving, techniques of troubleshooting, research and development, invention, innovation, and experimentation (International Technology Education Association, 1996).

The content area of the Abilities of the Technological World is divided into three standards that emphasize the ability to apply the design process. The ability to use the design process allows for the maintenance of technological products and systems with an assessment of impacts (International Technology Education Association, 1996).

The final content area of Design World has a focus on the identification, selection, and comprehension of technological systems. This process involves all the content areas of medical, Bio-technical, energy, communication, transportation manufacturing and construction (International Technology Education Association, 1996).

The content of technology education has a critical concern. The rapidly changing content requires teachers to continually upgrade their knowledge and expertise (Hill, 2000). With a curriculum base that is broad in spectrum and teacher preparation programs that do not possess a common base of technical competencies, practicing teachers and administrators are left wondering what technical competencies do technology educators need to be successful (Rogers, 1996).

Safety Competencies

Occupational Safety and Health Association (OSHA) defines a competent person as a person who is knowledgeable of application standards, is capable of identifying workplace hazards relating to specific operations, is designated by the employer to perform workplace operations, and has the authority to take appropriate actions to correct hazardous conditions or environments within their workplace. Developed in 1970, the United States Congress passed the Occupational Safety and Health Act. It was to assure, so far as possible, every working man and woman in the nation safe and healthful working conditions and preserve our human resources. Under further governance, The Department of Labor and Industry administered the Minnesota Occupational Safety and Health Association (MNOSHA) established by a Federal Act in 1973 (Minnesota Department of Labor and Industry, 1999).

The State of Minnesota has enhanced The Occupational Safety and Health Act by developing a “general duty” clause for employers and employees in Minnesota. The general duty clause states that employers must provide a workplace and working conditions free from recognized hazards that may cause death, serious injury, or harm

to their employees. Under the general duty clause, employers are also required to comply with established safety and health standards issued by the association. Employers need to continually evaluate their workplace to identify safety and health concerns, plus establish a protocol for eliminating identified hazards within the work environment. The employer must also promote safe work practices among employees, and provide the necessary protective equipment at no cost to the employees (Minnesota Department of Labor and Industry, 1999). Through the use of employee training and education, employers can meet the established goals of the Occupational Safety and Health Act to reduce the death and injury rate of employees and provide a safe work environment.

In general, training refers to instruction and practices for acquiring the knowledge of rules, concepts and attitudes necessary to function effectively in specified task situations. Regarding occupational safety and health, training can consist of instruction in hazard recognition and control measures that reduce hazards. It also involves the knowledge and performance of safe work practices, awareness of preventive actions to reduce hazards, proper use of personal protective equipment, and procedural knowledge for emergencies. A complete training program should also provide workers with knowledge on how to obtain additional information about potential hazards. Employers should also provide training opportunities for employees to gain knowledge and skills in order to assume a more active role in implementing hazard control programs. Having educated employees, with

empowerment, will cause organizational changes that will enhance worksite protection for all employees (Cohen, Colligan, 1998).

Protecting employees through the use of hazard recognition and awareness is only part of the responsibility of an employer. In order to be classified, as a competent person an employee needs to be designated by the employer to perform workplace operations. This designation of workplace skill should only be honored after the completion of an orientation and training period. An employee must be trained on all machinery or equipment operations that they are required to use on a particular job or duty. Only trained personnel, or those undergoing supervised on-the-job training, should operate shop machinery or equipment. The operator training programs should be tailored to an employee's work area in order to learn more and draw greater benefit from training that duplicates their daily duties. As a minimum, the training program should include (Cohen, 1998):

- Identification of hazards for each piece of equipment and surrounding environment.
- Safety procedures for machine and equipment operation and maintenance.
- Instruction on how to perform work duties in a safe manner using appropriate health and safety practices.
- Emergency shutdown procedures for each machine or piece of equipment.

Meeting this minimum training requirement establishes a general foundation for an employee to start working within an environment with a goal to reduce risks or hazards.

The distinction between worker training and education programs is often blurred and depends on the role that the worker is expected to assume in the process. Worker training has a tendency to limit the worker's responsibility to the prevention of workplace hazards, whereas broader responsibility in the identification and prevention area requires more instruction towards worker education (Cohen, 1998). Occupational Safety and Health training involves instructing workers in recognizing known hazards and using available methods for their protection and the protection of others. In contrast, worker education prepares workers to deal with potential hazards of unforeseen problems. Guidance should also be provided so that workers are empowered to be more informed and knowledgeable to seek actions aimed at eliminating the hazard.

Fundamental programs involve instruction in prevention of work-related injuries and illness through the proper use and maintenance of tools, equipment, and materials. Workers should have general knowledge of emergency procedures; have the ability to recognize the need for medical monitoring, and know the proper use of personal protective equipment.

Recognition programs include instruction, emphasizing awareness of workplace hazards, knowledge of methods of hazard elimination or control, understand right-to-know laws and procedures to collect and distribute information on workplace hazards or potential hazards to appropriate bodies. The OSHA Hazard Communication Standard requires employers to inform workers of chemical hazards found in their work areas and of ways to reduce apparent risk. Use of material data

sheets and labels, along with training, are the three means prescribed for communicating the essential information (Cohen, 1998).

Problem solving programs aim instruction at giving workers the information and skills enabling them to participate in hazard recognition and control activities, to help identify/solve problems through teamwork, to use union and management means, and to exercise the rights to have outside agencies investigate workplace hazards when warranted (Cohen, 1998).

Empowerment programs provide instruction to build and broaden worker skills in hazard recognition and problem-solving skills directed to improve the work environment. Additionally, the training should be devised so employees demonstrate their knowledge, skills, and level of understanding required to perform their assigned task. Upon the conclusion of the training and education of employees, the supervisor must determine that the employee has comprehensive knowledge of the features of equipment, understands all applicable safety rules, and is skilled in operating equipment (Cohen, 1998).

Teacher preparation programs must equip trade and industry teachers with the skills needed to implement comprehensive accident prevention plans and manage their occupational laboratories effectively. There should be an established comprehensive plan for accident prevention on site that is continually reviewed and revised. If for no other reason than the principle of "in loco parentis" and its accompanying theory of liability, teachers must be prepared to demonstrate their

commitment to providing for the welfare of their students. The critical elements of an accident prevention plan should include the following components:

- Analyzing the laboratory for potential hazards. This is a primary component of the foreseen ability test applied during the determination of liability based upon alleged negligence. When analyzing for potential hazards, what are the reasonable foreseen unsafe conditions and the possible consequences that might result from these conditions?
- Designing and implementing strategies to eliminate or control identified hazards. It is not sufficient to simply identify potential hazards. Negligence also consists of the failure to act as a reasonable, prudent person would under the circumstances involved.
- Integrate safety instruction throughout the curriculum. Both general and specific safety rules and procedures must be infused throughout the entire course of instruction.
- Develop, practice, and enforce appropriate safety rules. Safety rules must be taught, posted, reinforced frequently, and followed by the instructor in order to model proper actions and attitudes for students.
- Develop and practice accident /emergency procedures. In compliance with school policies, teachers must understand thoroughly and follow expected rules of behavior in regard to accidents and emergency situations. Teachers need to instruct and have practice exercises with students. The teacher does not have to possess expert

knowledge of medicine, but has to act as a reasonable and prudent person would under the circumstances.

- Provide, demonstrate, and require the use of personal safety equipment. The duty of the teacher is to provide students with appropriate personal safety equipment and to regulate student's usage of that equipment.

In conclusion, research from industry could be the first step to help develop curriculum and instill hazard control and safety programs that will enable teachers be more technically competent in supervising the activities in high school laboratories. Trainers are also needed to develop and supervise the health and safety policies within that school setting. If trainers and supervisors don't have a good theoretical and conceptual base, they simply cannot design relevant, realistic effective training programs. The Technology Education teacher has a dual role in a health and safety program. First, the teacher needs comprehensive training programs that are continually revised and updated. This would ensure that the employer has a qualified and competent person as a classroom teacher. Secondly, the teacher has to convert the health and safety training to an age appropriate training program that will be affective within the classroom setting and encourage fundamental concepts to be carried outside the classroom (Olson, 1994).

CHAPTER 3

Methodology

Introduction

The methods and procedures used in the development of this chapter of the research provide information in the following areas: the subjects, the instrumentation, and the procedure. All of the listed areas will be addressed to provide an overview of the key information included in the methodology.

Subjects

The subjects in the study included teachers who are actively employed by a Minnesota public school and have an active membership in the Minnesota Technology Education Association.

Instrumentation

A survey-based instrument was used to assess the safety and training/education programs for technology education teachers within their current employment in a public school. The survey instrument also addressed what safety training/education programs were provided by the employer as well as those that were not provided by the employer as part of an orientation or ongoing safety and health program.

At the time of the survey, there was not an instrument that was tailored to the questions that needed to be addresses. Therefore, the researcher developed an instrument containing the desired questions. Appendix “A” contains a sample of the consent form that was sent to each subject along with the survey. The consent form

was provided in order to establish an acknowledgment that the information that a subject provides will be used in a study. Appendix "B" contains the survey questionnaire that was sent to each subject to determine the perceived level of safety and health training/education as it relates to current technology education teacher employed in public schools.

The following is a synopsis of the questions on the survey:

The first questions stated; " Are you a technology education teacher that is currently licensed by The State of Minnesota?"

This question helped to determine if the individual subject is currently licensed in the State as a technology educator. The subject was asked to respond by with a yes or no answer on the survey questionnaire.

The second question stated; "Are you currently employed as an educator for a public school in the State of Minnesota?"

This question helped to determine if the individual subject was actively employed in a public school district at the time the survey was given. The subject was asked to respond by a yes or no answer on the survey questionnaire.

The third question stated; "Do you have knowledge of a health and safety committee within the district that you are employed?"

This question help to determine if the individual subject has knowledge of an existing health and safety committee and if that committee has made provided information for their employees. The subject was asked to respond by a single choice

answer on a lickert scale that ranged from strongly agree to strongly disagree on the survey questionnaire.

The forth question stated; “Has your employer provided a “Right to Know” training within the past 2 years?”

This question helped to determine if an employer has established a training program for chemical and hazards substances that are within the work environment of its employees. The subject was asked to respond by a single choice answer on a lickert scale that ranged from strongly agree to strongly disagree on the survey questionnaire.

The Fifth question stated; “Do you have access to “Right to Know” information that is provided by your employer?”

This question helped to determine if an employer has provided documentation for chemical and hazards substances that can be obtained for employee awareness. The subject was asked to respond by a single choice answer on a lickert scale that ranged from strongly agree to strongly disagree on the survey questionnaire.

The sixth question stated; “Has your employer provided any training on equipment or machines within your teaching assignment that you are required to use?”

This question helped to determine if an employer has provided training on proper use, hazard recognition, safety, and maintenance for equipment or machines within the work environment that is assigned as the current teaching responsibility.

The subject was asked to respond by a single choice answer on a lickert scale that ranged from strongly agree to strongly disagree on the survey questionnaire.

The seventh question stated; “Does your employer provide personal safety equipment that is required within your current working environment at no cost to you?”

This question helped to determine if an employer has provided personal protection equipment that is required in their work environment. The subject was asked to respond by a single choice answer on a lickert scale that ranged from strongly agree to strongly disagree on the survey questionnaire.

The eighth question stated; “Do you have knowledge of safety and hazard reduction policies within the district you are currently employed?”

This question helped to determine if an employer has knowledge of or training in a hazard reduction program in their current school. The subject was asked to respond by a single choice answer on a lickert scale that ranged from strongly agree to strongly disagree on the survey questionnaire.

The ninth question stated; “Do you have knowledge of or are currently using an established safety curriculum that has been developed by the district that you are currently employed at?”

This question helped to determine if an employer has provided curriculum requirements on health and safety that for students. The subject was asked to respond by a single choice answer on a lickert scale that ranged from strongly agree to strongly disagree on the survey questionnaire.

The tenth question stated; “ Has your employer provided training on blood born pathogens and the cautions needed to prevent exposure?”

This question helped to determine if an employer has provided training on blood born pathogens with emphasis on prevention of exposure or transmission. The subject was asked to respond by a single choice answer on a lickert scale that ranged from strongly agree to strongly disagree on the survey questionnaire.

The eleventh question stated; “Has your employer provided results regarding health and safety inspections for your work environment?”

This question helped to determine if an employer has provided information, from the results of an inspection, on the condition of the work environment. The subject was asked to respond by a single choice answer on a lickert scale that ranged from strongly agree to strongly disagree on the survey questionnaire.

The twelfth question stated; “Do you have access to a health and safety funding that would allow for improvement of hazardous equipment and to address environmental concerns?”

This question helped to determine if an employer has provided funding or acknowledgement of funding opportunities for teacher to improve hazardous conditions by purchasing approved equipment. The subject was asked to respond by a single choice answer on a lickert scale that ranged from strongly agree to strongly disagree on the survey questionnaire.

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 the design of the survey, a list of subjects was obtained from the membership database on the Minnesota Technology Education Association web site. The survey instrument was distributed to all potential subjects on April 10, 2002 with a conclusion date for survey collection of April 17, 2002. The distribution of the survey was done via e-mail, using membership e-mail addresses that were available on the MTEA website.

CHAPTER 4

Results

Introduction

This chapter will answer each research question that was addressed in chapter one by interpretations of the data collected through the survey. The primary purpose of this study was to ascertain teacher's perceptions regarding safety training that is provided by their employing school district.

Demographics

The subjects in this study were technology education teachers that had current membership in the Minnesota Technology Education Association. The following is the information gathered by surveys that were returned.

The surveys were distributed to 203 individual members of the Minnesota Technology Education Association. Of the 203 surveys that were distributed via e-mail, 45 surveys were returned by the termination date of April 17, 2002. The completion and return of 45 surveys indicates a response rate of 22.2% for this study.

Research Questions

1. Do Minnesota Public Schools have a safety and accident prevention program established for technology education teachers and students?

The presence of a health and safety committee within public schools was well represented in the responding surveys. Ninety-six percent of the total responses had knowledge of a health and safety committee with only 4% of the respondents not

having knowledge of a committee in their school. This evidence shows that public schools have the administrative committee in place; but the effectiveness of the health and safety committee is in question. Seventy-one percent of technology educators responded that they had knowledge of safety and hazard reduction programs within their current employment, whereas twenty percent did not have knowledge of a safety and hazard reduction program. A useful tool in the safety and hazard reduction program is the use of safety audits or inspections of classroom and laboratory environments. The survey results indicated that sixty percent of the surveys indicated that teachers have received information regarding health and safety inspections about their work environment, as opposed to the 38% of the survey responses who indicated they received no information regarding inspection results. Safety and hazard inspections will also involve the use of personal protective equipment. Personal protective equipment should be provided to the employee, free of charge, if their work environment requires that protection. Only 42% of technology educators indicated that they were provided personal safety equipment for the hazards within their work environment at no out of pocket expense. The effectiveness of a health and safety committee does not only affect the employees of a school district, but also the students in the classroom. When technology education teachers were asked their opinion about having a school endorsed or developed safety curriculum for students, only 27% of the technology educators were currently using an established curriculum that was develop by the district that they were employed.

2. Are Minnesota Public Schools providing safety and accident prevention training for technology education teachers?

The survey results from technology educators indicated that there is a lack of safety and accident prevention training within the public school sector. The responses from the survey indicated that 84% did not receive training. The 84% was a sum of the combined responses of 51% strongly disagreeing to any training; with an additional 33% disagreeing to district provided training. The collected survey responses only indicated 7% of the teachers received training from their employer.

Part of safety and accident prevention training is the element of Right to Know. Right to Know training was almost evenly split on the element of training. A total of 47% of the responses indicated that they had training with regards to Right to Know. The 47% was a sum of 38% strongly agreeing to employers providing training, while an additional 9% agreed to having had training. In contrast, a total of 42% of the respondents did not receive training. This was compiled by combining a 24% response rate for strongly disagreeing and an 18% response rate for disagreeing to employers providing training within the past two years. The remaining 11% of the surveys replied with a no comment regarding the Right to Know training within their employed district. Though 47% of the technology education teachers received training on Right to Know, a total of 77% indicated that access to Right to Know documentation is available.

3. Are Minnesota Public Schools providing safety and accident prevention training opportunities through professional staff development?

Over the past two years employers have provided training opportunities for a total of 47% of the survey responses. Thirty- eight percent of the subjects strongly agreed, while an additional 9% agreed to having had training. In contrast, a total of 42% of the surveys compiled had no training over the past two years. This was a summation combining a 24% response of strongly disagreeing and 18% disagreeing to training by employers.

4. Are technology educators teachers instructing courses that they do not have the technical competencies in safety to teach the required curriculum?

Ninety-eight percent of the responding subjects indicated that they were a licensed technology education teacher by holding a current Minnesota technology education license. Only one survey response indicated that they were not a licensed by The State on Minnesota in technology education. There was no identifier in the survey that was linked to when a teacher received their teaching licensure, so there is no correlation made to the new licensure requirements in the State of Minnesota.

Within the ninety-eight percent of the licensed instructors in the survey, eighty-four percent indicated that had received no additional or supplemental training for their current teaching assignment by their employer. Seven percent of the technology educators indicated that they did received training on equipment or machines that they are required to use for their teaching assignment.

CHAPTER 5

Summary, Conclusions, and Recommendations

Summary

This study was designed to obtain information about health and safety training for technology educators while employed by a public school system. A survey was developed by the researcher and sent via e-mail to 203 active members of the Minnesota Technology Education Association. Ten of the twelve questions on the survey used a five-point Likert scale measuring system because it allowed for recording of a wide range of attitudes and opinions. Forty-five of the members returned a completed survey via e-mail and participated in this study. Responses to the questions were recorded and analyzed by the researcher. While analyzing the data, an understanding was developed on the health and safety training of technology educators in public school institutions.

Conclusion

Although the survey response was relatively small to the number of surveys sent, several common themes were shared among the teachers. Based on what was found, it could be concluded that Technology education licensure in the State of Minnesota was present in almost all of the survey responses. This only indicates that there are licensed instructors in laboratory environments and makes no acknowledgement to the knowledge base or competencies of the instructor within that school laboratory environment. Currently the State of Minnesota has established competency testing for the application process for licensing, but there are many

licensed instructors that are grandfathered and have received no competency testing from the State of Minnesota.

It can also be concluded, nearly all surveys responded with knowledge of a health and safety committee in their employed school. The presence of the health and safety committee could be a major contributor to a significant positive response to the aspect of funding available for the improvement of hazardous equipment and other environmental concerns that exist in the laboratories. Along with the funding to provide improvements, the majority of the teachers had access to inspection report summaries on the health and safety concerns within a teachers' work environment.

Safety and hazard reduction policy was present in the majority of the responding teachers, but there was a major contributor to a safety and hazard reduction program that was not well represented. The survey concludes that there was only a small representation of teachers using an incorporated safety curriculum, supported by a school district, which is taught to students. The strong evidence of safety and hazard reduction policy is offset by the lack of education and training for students and does not have a directive that includes staff development or training that is mandated for instructors to teach in technology laboratory environments.

It is clear that the participants in the survey had available resources to reduce the risk factors or lessen the hazards within the teaching environment but indicators show that there is a deficiency in the education or training of students and teaching personal. Hence, a conclusion may be made that teachers are not being trained within

their current teaching assignment and lack the competencies mandated by The Occupation Safety and Health Association.

Recommendations

It is the recommendation of this researcher to use this study as a reference for further studies dealing with health and safety training for technology educators. The overall scope of health and hazard reduction programs reaches far beyond the perceptions of the study. More studies need to be conducted due to the fact that all elements of health and safety were not addresses in this study because of the narrow focus of presently employed teachers and OSHA standards. The conclusion in this study resulted in the following recommendations:

- Develop a curriculum model for the State of Minnesota for technology education health and safety. This would establish a resource for all teachers in the State and establish a directive for school and classroom curriculum expectations. A provided curriculum model using best practices would standardize health and safety for public schools in Minnesota.

- Establish funding incentives for health and safety documentation and compliances within the schools. This recommendation would provide an additional push for schools to increase their health and safety commitment in order to receive additional funding. Establishing a program that does not punish but provides opportunity for schools to demonstrate continuous improvement with established goals to meet would provide traceable evidence of compliancy.

- Conduct a similar study in which technology educators are asked their perceptions of health and safety issues within the laboratory environments they are currently assigned to teach in. The benefit of this research would be to provide an analysis of current working conditions for teachers and students in relation to the laboratory environments with a correlation to OSHA regulations.
- Conduct a similar study in which technology educators are asked their perceptions of health and safety inspections that have been conducted within their laboratory environments. The benefit of this research would provide an analysis between teachers assessed hazards and hazards identified by OSHA or any governing insurance institution for that school system.
- Conduct a similar study in which technology educators and curriculum coordinators are asked their perceptions about staff development training that involves health and safety training for teachers. The benefit of this research would provide an analysis between teachers and school administration with regards to the training opportunities with an emphasis on the positive and negative benefits on providing specialized training during existing staff development time.
- Create a series of in-services that educate technology educators on the best practices of safety and equipment operation. This would provide an opportunity for teachers to increase or replenish their knowledge on risk reduction within their work environment and increase knowledge on the best practices within laboratory environments. This would also help in the development of health and safety curriculum that is taught to the students in laboratory environments.

- Create teacher re-licensure criteria based on credit hours of continual study on operational safety and environmental health training. This would link professional training to teacher state licensure and would mandate a 5-year documentation of health and safety training for each technology education teacher with an active teaching licensure.

These recommendations will help with the implementations of the standards for OSHA with safety and hazard reduction programs. These efforts will build professional interest in the areas of technology education and continually improve the work and learning environments in our public school systems.

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Appendix A

Consent Form for the Survey of Active Members of the Minnesota Technology Education Association

Delroy Eric Nyren of Industrial/ Technology Education at The University of Wisconsin-Stout is conducting a research project titled, An Investigation of Teacher Safety Training Within Current Teaching Assignments. We would appreciate your participation in this study.

It is not anticipated that this study will present any medical or social risk to you. The information gathered will be kept strictly confidential and any reports of the findings of this research 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 participating in this research, you may do so, without coercion or prejudice. Simply do not respond to the survey questions and delete the attached file.

Questions or concerns about the research should be addressed to Delroy Eric Nyren, the researcher, (Delroy Nyren, (651)-773-62430) or Dr. Elbert Sorrell, research advisor, (Dr. Sorrell, (715)-232-2630). Questions about the rights of research subjects can be addressed to Sue Foxwell, Human Protections Administrator, UW-Stout Institutional Review Board for the Protection of Human Subjects in Research, 11HH, UW-Stout, Menomonie, WI 54751, Phone (715) 232-1126.

Consent Form

I understand that my participation in this study is strictly voluntary and I may discontinue my participation at any time with out prejudice.

I understand that the purpose of this study is to investigate the problem, Teacher Safety Training Within Current Teaching Assignments.

I further understand that any information about me that is collected during this study will be held in the strictest confidence and will no be part of my permanent record. I also understand that that the strictest confidentiality will be maintained throughout this study and that only the researchers will have access to the confidential information. I understand that at the conclusion of this study all records, which identify individual participants, will be destroyed. I am aware that I have not and am not waiving any legal or human rights by agreeing to this participation.

By returning the questionnaire I verify that I am 18 years of age or older, in good mental and physical condition, and that I agree to and understand the conditions listed above.

Appendix B

Survey of Employed Technology Education Teachers with Membership in the Minnesota Technology Education Association

This is a survey for current members of the Minnesota Technology Education Association and currently employed by a Minnesota Public School. The survey is designed to provide useful information concerning issues of safety training from employers.

Directions: Please answer the following survey question by checking the appropriate response based on your experience of current employment.

1. Are you a technology education teacher that is currently licensed by The State of Minnesota?

Yes ___ No ___

2. Are you currently employed as an educator for a public school in the State of Minnesota?

Yes ___ No ___

3. Do you have knowledge of a health and safety committee within the district that you are employed?

Strongly Agree ___ Agree ___ No Opinion ___ Disagree ___ Strongly Disagree ___

4. Has your employer provided a "Right to Know" training within the past 2 years?

Strongly Agree ___ Agree ___ No Opinion ___ Disagree ___ Strongly Disagree ___

5. Do you have access to "Right to Know" information that is provided by your employer?

Strongly Agree ___ Agree ___ No Opinion ___ Disagree ___ Strongly Disagree ___

6. Has your employer provided any training on equipment or machines within your teaching assignment that you are required to use?

Strongly Agree ___ Agree ___ No Opinion ___ Disagree ___ Strongly Disagree ___

7. Does your employer provide personal safety equipment that is required within your current working environment at no cost to you?

Strongly Agree — Agree — No Opinion — Disagree — Strongly Disagree —

8. Do you have knowledge of safety and hazard reduction policies within the district you are currently employed?

Strongly Agree — Agree — No Opinion — Disagree — Strongly Disagree —

9. Are you currently using an established safety curriculum that has been developed by the district you are employed?

Strongly Agree __ Agree __ No Opinion __ Disagree __ Strongly Disagree __

10. Has your employer provided training on blood born pathogens and the cautions needed to prevent exposure?

Strongly Agree __ Agree __ No Opinion __ Disagree __ Strongly Disagree __

11. Has your employer provided results on health and safety inspections for your work environment?

Strongly Agree — Agree — No Opinion — Disagree — Strongly Disagree —

12. Do you have access to a health and safety funding that would allow for improvement of hazardous equipment and to address environmental concerns?

Strongly Agree __ Agree __ No Opinion __ Disagree __ Strongly Disagree __

Appendix C

Summary of Individual Survey Questions

1. Are you a technology education teacher that is currently licensed by The State of Minnesota?

Ninety eight percent of the responding subjects indicated that they were a licensed technology education teacher by holding a current Minnesota technology education license. Only one survey response, out of the forty-five, indicated that they were not a licensed by The State on Minnesota in technology education.

2. Are you currently employed as an educator for a public school in the state of Minnesota?

Ninety eight percent of the responding subjects indicated that they were employed as an educator by a public school. The same survey response that did not hold a current teaching license in question number one also indicated that they were not employed in a public school in The State of Minnesota.

3. Do you have knowledge of a health and safety committee within the district that you are employed?

The presence of a health and safety committee within public schools was well represented in the responding surveys. Ninety six percent of the total responses had knowledge of a health and safety committee with only 4% disagreeing to any knowledge of a committee in their school in which they are employed.

4. Has your employer provided a “Right to Know” training within the past 2 years?

The Right to Know training was almost evenly split on the element of training. Thirty eight percent of the subjects strongly agreed to employers providing Right to Know training, while an additional 9% agreed to having had training. This had a combined percentage response of 47%. In contrast, a total of 42% of the surveys compiled came from combining a 24% response of strongly disagreeing and 18% disagreeing to employers providing training within the past two years. The remaining 11% of the surveys replied with a no comment regarding the Right to Know training within their employed district.

5. Do you have access to "Right to Know" information that is provided by your employer?

Having access to Right to Know documentation received a 53% agree response and a 24% strongly agreed response for a combined percentage total of 77% of the subjects had access to Right to Know information. Eleven percent had no comment in response to the question and an additional 11% disagreed to having access to right to know information.

6. Has your employer provided any training on equipment or machines within your teaching assignment that you are required to use?

Fifty one percent of the surveys responded with strongly disagreeing to any equipment or machine training provided by the employer. An additional 33 % also responded with disagreeing on the question of equipment and machine training. The total percentage tabulation for the lack of training by an employer was 84%, while

only 7% of the responses had training on equipment or machines required for their teaching assignment.

7. Does your employer provide personal safety equipment that is required within your current working environment at no cost to you?

Forty two percent agreed strongly that their employer provided personal safety equipment, followed by a 22% of the responses strongly agreeing. The survey concluded that a total of 64% of the survey respondents having personal safety equipment provided by the employer at no personal expense.

A total of 29% of survey responses did not have personal safety equipment provided at no cost to the employee. This total percentage was combined from 18% disagreeing to the question and an additional 11% strongly disagreeing.

The balance of the survey responses, 7%, replied with a no comment to the question.

8. Do you have knowledge of safety and hazard reduction policies within the district you are currently employed?

A total of 71% of the survey respondents had knowledge of safety and hazard reduction programs within their current employment whereas 20 % did not have knowledge of a safety and hazard reduction program. The balance of the survey responses, 9%, replied with a no opinion to the question.

9. Are you currently using an established safety curriculum that has been developed by the district you are employed?

Teachers that are currently not using an established safety curriculum totals 47%. The 47% is a combined percentage of 29% of the surveys responding with a statement of disagree and 18% responding with a strongly disagree.

Twenty seven percent of the responding surveys had no opinion to the question, and an additional 27% responded with agreement or strongly agreeing to the question.

10. Has your employer provided training on blood born pathogens and the cautions needed to prevent exposure?

Seventy seven percent of the survey responses had training for blood born pathogens. Forty four percent of the 77%, responded with a strongly agree and 33% responded with an agreeing statement.

There were 22% of the responding surveys that have not received training from their employer on blood born pathogens.

11. Has your employer provided results on health and safety inspections for your work environment?

Sixty percent of the survey responses have received information regarding health and safety inspections and their work environment. The sixty percent was a total percentage compiled from the survey responses of forty two percent strongly agreed and 18% agreed to the question.

There were a 38% of the survey responses that received no information regarding inspection or testing. This was a combined total percentage of 29% disagreeing and 9% strongly disagreeing to receiving information.

12. Do you have access to health and safety funding that would allow for improvement of hazardous equipment and address environmental concerns?

Heath and safety funding had a 78% positive response to the question. With 49% agreeing and 31% strongly agreeing to have access to funds to improve hazardous and environmental concerns. There was a 13% no opinion to the survey question, with an additional 7% disagreeing to having access to funds for hazard and environmental concerns.