DESIGNING TECHNOLOGY EDUCATION CURRICULUM

BASED ON BUSINESS/INDUSTRY NEEDS

by

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ABSTRACT

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The purpose of this study was to determine the degree of importance building trades employers in the Sheboygan Falls area placed on ten employability skills and ten technical skills deemed valuable for entry-level employees to possess. The objectives of the study were to identify the knowledge, skills, and attitudes that are viewed as important by residential and commercial construction employers in the Sheboygan Falls area in order to make modifications to the existing technology education curriculum. This study was conducted by mailing questionnaires to building trades employers of the Sheboygan Falls area. The employers were randomly selected from a Sheboygan County phone book. They were given a description of ten employability skills and ten technical skills and asked to circle the number that corresponds to the relative importance of each skill in regards to an entry-level employee. The anonymous responses were mailed back in a stamped, self-addressed envelope. The results determined that the

employers surveyed favored employability skills over technical skills and that there were modifications that could be made to improve the school's technology education curriculum.

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CHAPTER ONE

Introduction

Introduction

Preparing students for life after school has long been the goal of public education. In each particular nation, state, region, and town, life after school varies greatly. While some communities are rural and consist mainly of agricultural job opportunities, others abound in industrial job opportunities; still others rely heavily on commerce or a technologically based economic foundation. Tapping into local employers for ideas of how to best educate today's youth is not only a good idea, it is essential for providing the best, most relevant and applicable education possible and maximizing the potential of both business and education (Hastad & Tymeson, 1997).

Due to a lack of skilled workers in many industries, Alan Greenspan, Federal Reserve Chairman, stated that it is necessary to "continue to explore ways of developing creative linkages between businesses and educational institutions to better prepare students for the rising demands of the workplace and to help workers ... renew and upgrade their skills" (Greenspan asks communities . . . 2000, p.1). This need to develop partnerships with local industry is especially true in the area of technology education as it is an area of education that can have a direct impact on the preparedness of industry's future employees. Technology education provides students with hands-on learning of marketable skills in areas such as computer use, electronics, automated manufacturing, computer-aided design, and the building trades (Smith, 1999).

The shortage of skilled workers is widespread across America, but it is especially evident in areas of technology. This shortage continues despite the fact that employers invest more than they did in 1991 to train and educate their employees.

Nearly 90% of manufacturers surveyed reported a shortage in at least one job category (Skilled-worker shortage continues, 1998). The continued shortage of workers has caused additional problems. Companies are filling positions with employees who are unskilled or who have the wrong skill sets for the positions they are filling. Firms are turning down orders or passing up opportunities in new markets because they cannot fill the required jobs (Jesitus, 2000).

Because of the lack of skilled workers prepared to enter the workforce, industry has been forced to take action: "The gap between existing skills and desired or required skills is the basic impetus for the development of business/industry standards at all levels-local, state, and national" (Lankard, 1995, n. p.). Developing adequate, useful skills in high school that match industry standards produces a win-win situation: students acquire the preparation necessary to begin successful, rewarding careers, and industries select from a pool of skilled workers prepared to assume entry-level positions and advance in the industry through experience and on-the-job training as well as advanced technological instruction (Hastad & Tymeson, 1997).

Some in the field of education are suspicious of such a relationship, however, because of the fear that business and industry involvement in education will ultimately lead to schools that simply produce graduates who are prepared for nothing but unsatisfying careers in local industries as opposed to well-educated individuals who are ready to face the demands of real life after high school (Kozol, 1997). Levine (1986) found differently; her research suggested that "[businesses] support the multiple goals of schools: to prepare individuals to be good citizens, to be economically independent, and to live personally fulfilling lives. The modern

business view is neither narrow nor vocational" (p. 47). A survey reported in the May 2000 issue of *Technology and Learning* magazine found 78% of respondents (educators involved with businesseducation partnerships) to be enthusiastic about the partnerships.

The advantages of successfully developing a partnership between a school district and local businesses and industries can affect all parties involved: teachers, students, business/industry and the community, which comes out a winner by being able to retain bright young people for meaningful jobs as well as having a stronger, more competitive economy (Limpert, 1997). Establishing the business-education link most directly impacts the students, teachers, and business people involved. Harbaugh (1985) found that "in the long run, business can provide education with moral and political support; education can provide business with students better prepared for the 21st century" (p. 25). Other aspects of establishing such a link that are mutually beneficial include opportunities for students to tour businesses and industrial operations. These visits have been found to create enduring links between schools and businesses and offer opportunities for enhanced student learning (Donlevy & Donlevy, 2000).

Enhanced student learning and more relevant teaching practices are both benefits of business-education partnerships. Business leaders are becoming increasingly concerned with how they can support public education and help it change for the better. Topics being discussed are curricula, teaching methods, and characteristics that graduates should possess (Limpert, 1997). The intention is to have a system based on what employees need to be able to do, rather than on what educators

and trainers have traditionally assumed they need to know (O'Brien & Hart, 1999). Ways in which schools in general, and teachers specifically, can benefit from collaboration include relevant classroom instruction (Bottage & Osterman, 1998; Moulton, 1997; Wink, 1997), opportunities for teachers to observe first-hand the expectations that businesses have of their employees (Bunting, 1999), curriculum development ideas (Bunting, 1994), teaching and instructional supplies, leadership training for teachers, and job-shadowing opportunities for students (Bunting, 1994; Moulton, 1997).

When students see that their programs are supported by industry, they feel more driven to succeed because they know their efforts will be rewarded in the real world (The role of business . . . 1994). The above-mentioned improvements to curriculum, teaching supplies, and instruction have been found to have a substantial impact on student learning. The practical skills developed by students through business-education partnerships include cooperation (Bottage & Osterman, 1998; Farrell, 1992), problem solving (Bottage & Osterman, 1998; Boutwell, 1994; Farrell, 1992; Wink, 1997), writing/language skills (Bottage & Osterman, 1998; Farrell, 1992), planning solution strategies and designing tests and experiments (Farrell, 1992), communication (Bottage & Osterman, 1998; Faber, 1999; Farrell, 1992; O'Brien & Hart, 1999; Wink, 1997), organization (Bottage & Osterman, 1998; O'Brien & Hart, 1999), teamwork (Faber, 1999; O'Brien & Hart, 1999), and dependability (Wink, 1997).

The benefits of a successful business-education partnership lie not only with educators and students, but with industry as well. One of the most immediate advantages to industry is ensuring a productive future workforce (Wink, 1997). Other

benefits include: a) cost-saving efficiencies, b) serving as a symbol of mutual community service, c) greater opportunities for grantseeking and other external funding, d) new employment opportunities, e) building public and political support for future initiatives, f) increased accountability, and g) research and teaching opportunities (Hastad & Tymeson, 1997). Industry leaders see developing this type of relationship as a great opportunity not to be overlooked. David Mauldrin, a training manager, stated, "If we don't do something that is heavily involved with the schools, we're going to miss out" (cited in Hesseldahl, 1998, p. 46).

The school district of Sheboygan Falls in Sheboygan Falls, Wisconsin, is located in east central Wisconsin, nine miles west of Sheboygan. The community has a population of nearly 6,000 people residing in a rural, suburb-type setting. Sheboygan Falls is primarily a blue-collar town, with employment opportunities ranging from agricultural to industrial. A large number of jobs are available in the construction industry. Job opportunities are available in both residential and commercial construction in companies with more than 100 employees to as few employees as one. These companies, both large and small, are finding it hard to hire and retain workers qualified to fill entry-level positions.

Despite the vast number of job opportunities that these businesses offer, the technology education department of the School District of Sheboygan Falls does not offer a course in the building construction trades, even though many students are interested in pursuing a career in construction. Developing knowledge and skills in this area would be relevant and beneficial for a student looking to begin a career with one of the local construction companies.

Problem Statement

The Technology Education department at the School District of Sheboygan Falls does not have a building construction trades course in its existing curriculum. The district may need to modify its technology education curriculum to meet the present and future employment needs of local construction companies and to adequately prepare its students for the job opportunities that await them after graduation from high school.

Purpose of the Study

The purpose of this research is to collect data from residential and commercial construction companies in the Sheboygan Falls area to identify the knowledge, skills, and attitudes that students should possess to be prepared to begin a career in their companies. Questionnaires will be distributed to construction employers in the fall of 2002. The information collected will be used to create curriculum modifications that are advantageous for all parties involved: students, teachers, businesses, and the community in general.

Research Objectives

The objectives of this research project were as follows:

1. Identify the knowledge, skills, and attitudes that are viewed as important by residential and commercial construction employers in the Sheboygan Falls area.

2. Identify the knowledge, skills, and attitudes that are currently being taught in Sheboygan Falls High School's technology education program.

3. Identify modifications that could be made to the technology education curriculum to meet the needs of residential and commercial construction employers in the community.

Justification for the Study

This research project was justified by the following three reasons:

1. Completing this study will be beneficial for the students of the School District of Sheboygan Falls. The results of the study will be used to modify course content to reflect the needs of construction employers in the area, thereby providing a greater opportunity for students to acquire the knowledge and skills that will make them more desirable to those employers.

2. Completing this study will also be beneficial to the technology education teachers of the School District of Sheboygan Falls. Teaching content that directly addresses the needs of construction employers will make instruction more relevant to the students.

3. Completing this study will help construction employers in the Sheboygan Falls area. By taking courses that are aligned to industry needs, students will have a greater opportunity to acquire knowledge, skills, and attitudes valued by employers. The desired result will be a more qualified pool of applicants from which employers can select.

Assumptions of the Study

This researcher makes the following assumptions:

1. That a significant amount of questionnaires will be returned.
2. That the responses received will be complete, thorough, and truthful.

Limitations of the Study

This study will be limited by:

1. Construction employers in the Sheboygan Falls area will be sent a questionnaire that asks them to list and explain the knowledge, skills, and attitudes that they find most desirable in new employees. The study will be limited by the number of responses returned.

2. As the questionnaire will involve open-ended questions, the feedback provided could range from none at all to very thorough responses. The researcher cannot control the amount or quality of the feedback provided by the people who complete the survey.

3. Because the questionnaire will be distributed to construction employers in the Sheboygan Falls area, the information received may not be generalizable to other areas. Employers in other areas may not desire the same knowledge, skills, and attitudes desired by local employers.

4. Because of the geographical specificity of the research topic, little information that directly applies is available; therefore, some generalizations regarding research of the topic have been made.

Definition of Terms

The following terms are defined for clarity of understanding regarding this study. Definitions are taken from *Merriam-Webster's collegiate dictionary* (10th ed.) (1996).

Attitude: a state of readiness to respond in a characteristic way to a stimulus

Business: a commercial or sometimes an industrial enterprise.

Curriculum: a set of courses constituting an area of specialization.

Employer: one who provides a job that pays wages or a salary.

Industry: a distinct group of productive or profit-making enterprises.

Knowledge: the fact or condition of knowing something with familiarity gained through experience or association.

Skill: a learned power of doing something competently: a developed aptitude or ability.

Technology education: problem-based learning utilizing math, science and technology principles (www.iteawww.org/A1.html).

CHAPTER TWO

Review of Related Literature

Introduction

In order to determine the knowledge, skills, and attitudes that should be included in the survey that was sent to the sampling of construction employers in the Sheboygan Falls area, a review of literature was necessary. This review accomplished two objectives. First, it provided a rational for this project by showing that there is a lack of necessary knowledge and skills for entry level employees for construction jobs in the Sheboygan Falls area. Second, it provided a list of essential skills to include on the survey that was sent to construction employers in the Sheboygan Falls area. This review of literature was divided into three parts: What entry level technical skills do construction employers seek in new employees, What entry level employability skills do construction employers seek in new employees, and What skills do high school students possess, especially those students not attending a four-year college.

The Skills Employers Want: Technical Skills

Research showed that employers in all areas of industry—from manufacturing, to communications, to construction—seek knowledge, skills, and attitudes on two different levels. On one level, employers seek technical skills required to be competent in a specific occupation in an industry sector, and on another level, they seek employability skills, which are basic to most jobs and will be covered later in this chapter (U. S. Department of Labor, 1991; Rogers, 1995; *Construction Cluster Skills Standards,* 1999). Research in the area of technical skills was divided into three sections: skills that construction employers desire, skills that apprenticeships and training programs teach,

and skills listed in the Secretary's Commission on Achieving Necessary Skills (SCANS) report.

Because no recoverable resources were found that directly stated the knowledge, skills, and attitudes desired specifically by construction employers, this information was inferred from the training programs examined in the literature review. These findings may be deemed relevant because training and apprenticeship programs are designed based on the input of local employers.

Research pertaining to training and apprenticeship programs revealed that the technical skills for carpentry training are categorized into similar competencies (*Carpentry. Occupational Competency Analysis Profile,* 1995; *Construction Cluster Skills Standards,* 1999; Overtoom, 2000). According to the *Construction Cluster Skills Standards* (1999, p. 7), standards for any career are broken into the following three areas:

> **Core Standards** are those skills essential for all learners regardless of career goals. These include local and state academic standards as well as national career and workplace standards.
>
> **Cluster Standards** refer to those competencies common to related occupations in an industry sector. They provide the broad foundation for entry level, technical and professional careers.
>
> **Occupational Specific Standards** consist of the technical skills and knowledge particular to a given occupation. Many of these are available at the state and national level.

Core standards are similar to the aforementioned employability skills, which will be discussed later in this chapter. The occupation specific standards and benchmarks

found necessary for the construction industry, according to *Construction Cluster Skill Standards* (1999), are listed below:

Standard 10: Demonstrate knowledge of the construction industry, related careers and economic issues that affect the industry.

Benchmarks:

1. Describes the various sectors in the construction industry and their inter-relationship.
2. Describes the impact of the economy on the industry.
3. Knows the various entities involved in the industry (e.g., unions, small businesses, companies, associations).
4. Describes the work and workplace of occupations in the industry.
5. Reports on the wages of workers in the construction industry.
6. Reports on the history of the construction industry [in a specific state].
7. Describes local, state, and federal regulations affecting the industry.
8. Understands supply and demand concepts in relation to industry.
9. Describes construction needs relative to location, transportation, utilities, and labor supply.
10. Describes the mortgage loan process.
11. Describes how to run a construction business.

12. Reports on the cost of construction [in a specific state]. (p. 19)

Standard 11: Applies technical skills and knowledge used in the industry.

Benchmarks:

1. Correctly selects, uses and maintains tools of the industry.
2. Reads and interprets blueprints.
3. Demonstrates proficiency with manual drafting.
4. Demonstrates a basic proficiency with CAD.
5. Cleans and maintains work area.
6. Inspects and reports equipment failures.
7. Plans sequence of work operations.
8. Estimates time and costs to complete projects.
9. Receives, inspects and stores parts and supplies.
10. Determines appropriate materials and equipment needed for job. (p. 20)

Standard 12: Understand and apply workplace safety measures.

Benchmarks:

1. Demonstrates knowledge and application of basic first aid.
2. Demonstrates knowledge and application of shop and workplace safety procedures.
3. Describes methods of treating hazardous materials.
4. Understands substance abuse policies in the workplace and how they relate to safety.
5. Understands business cost of an injury.

6. Reports shop, environmental and equipment safety violations and understands the importance of such reports.
7. Explains the terms of proximity work.
8. Understands and practices safe lockout/tagout procedures.
9. Knows about use and care of personal protective equipment.
10. Follows safe lifting procedures.
11. Demonstrates knowledge of federal safety regulatory process and role of OSHA.
12. Explains the function of Material Safety Data sheets.
13. Practices fire prevention in dealing with various flammable materials. (p. 21)

The technical skills listed in *Construction. Occupational Competency Analysis Profile* (OCAP; 1995) are similar to those listed above; however, OCAP has many additional skill requirements, called competencies rather than standards. The competencies listed in OCAP are much more specific than those listed above. The additional competencies include being able to perform basic cutting, shaping, and fastening operations; assist in the preparation of building sites; construct entrance platforms and steps; construct all-weather wood foundations; construct forms for slabs and paving, construct foundations and footing forms; construct sills and sill sealers; erect girders, beams, and collars; install floor joist systems; install bridging; install subflooring; lay out walls and rough openings; frame walls and rough openings; frame metal wall partitions; construct ceiling framing; construct gable roof framing; construct hip/valley roof framing; install finish framing components; install prefabricated roof

trusses in accordance with truss information package; install drip edges, eaves, flashing, and vents; install fiberglass or asphalt shingles and caps; install wood shingles and shakes; install exterior doors, windows, and hardware; install fascia, soffits, frieze board, and moldings; install exterior siding/covering; install exterior trim accessories; ventilate attics and crawl spaces; install thermal insulation and vapor barriers; install gypsum wallboard; install wall paneling; install suspended ceilings; install finish flooring; install interior doors; install window trim; install baseboards and moldings; install cabinets; install storage devices; construct rough stairs; install finish stair components; install storm windows and doors; and install porches and decks.

The Skills Employers Want: Employability Skills

Empowering prospective employees with the technical skills to succeed in a trade is only half the battle. Study after study revealed that employers are much more concerned with employability skills than they are with technical skills (U. S. Department of Labor, 1991; Rogers, 1995; *Construction Cluster Skills Standards,* 1999). Overtoom (2000, p. 7-8) stated, "Although technical skills prepare participants [in construction training programs] for entry-level employment and are instrumental in getting them 'in the door,' they are not enough. Industry experts articulate that employees are more likely to keep the job and progress in a career if training is integrated with employability skills." She stated that there are nearly as many definitions of employability skills as there are pieces of literature describing them. She does, however, go on to provide her own definition:

> Employability skills are a holistic constellation of transferable core skill groups that represent essential functional and enabling knowledge, skills, and attitudes

> required by the 21st century workplace. They are necessary for entry-level employment, further education, upward mobility of incumbent workers, and for lifelong career success. (p. 3)

Grubb (cited in Overtoom, 2000), also describes employability skills with qualifiers such as motivation, initiative, judgment, ability to work with others, and communication skills.

The Secretary's Commission on Achieving Necessary Skills (SCANS) was a committee organized by President George P. Bush to examine the skills deemed necessary to succeed in the workplace of the 21st century. The initial findings of the committee were published in 1991, and in it were identified five competencies that coincide with a three-part foundation of skills and personal qualities that lie at the heart of job performance essentials.

The three-part foundation consists of "basic skills," which consist of reading, writing, arithmetic, listening, and speaking; "thinking skills," which consist of creative thinking, decision making, problem solving, seeing things in the mind's eye, knowing how to learn, and reasoning; and "personal qualities," which include responsibility, self-esteem, sociability, self-management, and integrity/honesty.

The five competencies identified by SCANS address issues of resources, interpersonal skills, information skills, knowledge of systems, and an understanding of technology. Effective use of resources includes identifying, organizing, planning and allocating resources, such as time, money, materials and facilities, and human resources. Interpersonal skills are defined as the ability to work with others in the following ways: participating as a member of a team, teaching others new skills, serving clients and customers, exercising leadership, negotiating agreements, and working with a diverse

population. The information skills consider the acquisition and use of information and the ability to evaluate it, organize and maintain it, interpret and communicate it, and use computers to process it. A knowledge of systems is defined as being able to understand complex inter-relationships. Workers should be able to understand systems, monitor and correct performance within a system, and improve or design systems. Finally, workers should be technologically competent. This includes selecting appropriate technology for a given situation, applying technology to a task, and maintaining and troubleshooting equipment.

While the SCANS report provides an overview of the general skills that all employers need, it does not address needs specific to the construction industry. OCAP (1999) included two categories of employability skills that are desired specifically by construction employers. They are communication skills and mathematics skills. The communication skills are further broken down into the following categories: reading; writing; listening/visual literacy; and oral communication. Mathematics skills are also broken into categories. They include: numbers and number relations; measurement; estimation and mental computation; data analysis and probability; algebra; geometry; and patterns, relations, and functions.

Construction Cluster Skill Standards (1999, p. 9) includes all those listed in the previous paragraph, plus the following additions:

Academic Standards

3. Understand and apply the fundamental concepts, principles, and processes of science to the construction industry.

4. Demonstrate creative thinking, problem solving, decisionmaking and visualization.
5. Apply computer literacy skills and knowledge.

Generic Workplace Readiness.

1. Demonstrate knowledge and skills to make viable career choices and obtain employment in the broad construction industry.
2. Demonstrate personal qualities of self-esteem, self-management, and responsibility.
3. Demonstrate acceptable behavior governed by the rules of society and the workplace.
4. Demonstrate an understanding and ability to work with others.

Having discovered the skills that construction employers seek in entry-level employees, it is now appropriate to examine the skills that high school students have to serve as a basis of comparison.

The Skills High School Students Possess

According to the SCANS report (1991) the outlook for the average American high school student is bleak. People from all sectors of industry were interviewed, including business owners, public employers, unions and workers, and supervisors in shops, plants and stores. This is what they reported:

> The message to us is universal: good jobs will increasingly depend on people who can put knowledge to work. What we found was disturbing: more than half our young people leave school without the knowledge or foundation required to

find and hold a good job. These people will pay a very high price. They face the bleak prospects of dead-end work interrupted only by periods of unemployment.

The previous section of this chapter detailed the basic skills that employers seek. Included in those skills were reading, writing, and arithmetic. SCANS (1991) estimates that less than half of high school students achieve the reading and writing minimums, and even fewer reach the math minimums. Furthermore, many schools today do not even directly teach listening and speaking skills.

Research showed that very little is documented about exactly what trade-specific skills students learn in high schools. One reasons for this may include the fact that only a small percentage of high school students actually take high school coursework relating to the trades because those classes are generally elective credits. Another reason for the lack of data on this topic may be due to the fact that high school technology education classes tend to operate independently of one another, providing for little consistency in the skills that would be acquired from school to school.

Despite the inconsistency among technology education programs, technology education teachers in Wisconsin do have a template for teaching construction technology-*Standards for Technological Literacy: Content for the Study of Technology* (2000), which is a document published by the International Technology Education Association. It proposes standards and benchmarks for teachers of technology education. Standard 20 reads: "Students will develop an understanding of and be able to select and use construction technologies" (p. 191). While standards are broken down for grades kindergarten through 12, only the standards for grades six through 12 follow; standards F-I are for grades 6-8, and standards J-N are for grades 9-12:

F. The selection of designs for structures is based on factors such as building laws and codes, style, convenience, cost, climate, and function.

G. Structures rest on a foundation.

H. Some structures are temporary while others are permanent.

I. Buildings generally contain a variety of subsystems. These subsystems include waste disposal, water, electrical, structural, climate control, and communication. Most of these systems are referred to as utilities.

J. Infrastructure is the underlying base or basic framework of a system. An infrastructure often includes the basic buildings, services, and installations needed in order for a society or government to function, such as transportation, communication, water, energy, and public information systems.

K. Structures are constructed using a variety of processes and procedures. In some cases, the procedure used depends on the type of material available. For example, welds, bolts, and rivets are used to assemble metal framing materials. Sometimes procedures are selected as a function of cost, skills, and preference of the worker, or the level of quality desired. Citizens should be equipped to evaluate the appropriateness of procedures used.

L. The design of structures includes a number of requirements. One of the most important design constraints with structures is function . . . Other important constraints include appearance, strength, longevity, maintenance, and available utilities. The design and construction of structures are regulated by laws, codes, and professional standards. Common design constraints used by engineers and architects in the design of structures include style,

convenience, safety, and efficiency.

M. Structures require maintenance, alteration, or renovation periodically to improve them or to alter their intended use.

N. Structures can include prefabricated materials. (p. 194-196)

A review of the national standards for construction reveals that they are much more general than the technical skills that construction employers seek as stated above. A study done by Rogers (1995) examined the appropriateness of technology education curricular content as perceived by secondary trade and industrial educators. One finding was that technology education's focus on humanistic concerns and societal needs "has neglected the knowledge, skills, and attitudes related to the tools, equipment, materials, and processes of industry" (Rogers, 1995, n. p.). This finding was corroborated by a statement made by Robert Kellogg (2001):

> "Carpenters, roofers, electricians, masons, and workers with other skills in the building trades are in short supply . . . it becomes evident that our schools are working hard to prepare our students for college and the dot-com world, but we are not preparing students for some of the most important and rewarding work around." (n.p.)

These reports indicate that the emphasis in high school curricula may be in the wrong areas. Griffith & Wade (2001) indicate that more than 65% of all jobs in the year 2000 required specialized education (more than high school but less than a four-year degree), nearly tripling since the 1950s, while the percentage of jobs requiring at least a four-year degree has hovered around 20%, as it has for the past 50 years.

CHAPTER THREE

Methodology

Introduction

This chapter will describe the subjects chosen for this study and relate how the subjects were selected. It will also provide pertinent details about the instrument used to collect the data for the study, the amount of time expected to complete the survey, the procedures used to collect the data, and the data analysis.

As indicated earlier, the purpose of this study was to determine the knowledge, skills, and attitudes that construction employers in the Sheboygan Falls area deem valuable in entry-level employees. The objectives of this study were as follows:

1. Identify the knowledge, skills, and attitudes that are viewed as important by residential and commercial construction employers in the Sheboygan Falls area.
2. Identify the knowledge, skills, and attitudes that are currently being taught in Sheboygan Falls High School's technology education program.
3. Identify modifications that could be made to the technology education curriculum to meet the needs of residential and commercial construction employers in the community.

Selection and Description of Sample

The subjects used for this study were 100 building trades employers from the Sheboygan Falls area. The sample was selected from the McLeodUSA *Sheboygan County and Surrounding Area Directory*, December 2001/2002. A survey was mailed to the address of every second listing under the following headings: architect, cabinetmaker, carpenter, concrete/flat work, drywall installer, electrician, flooring installer, glazier, heating/ventilating/air conditioning, heavy equipment (operator),

insulation installer, land surveyor, mason, painter/paper hanger, plasterer, plumber, roofer, steel/sheet metal, tile setter, general contractor. These building trades subcategories were derived from a Trade Unions and Subcontractors of Wisconsin website: http://www.buildingtradesdir.com/guilds/wisconsin/index.html (September 23, 2002). Because many businesses were listed under multiple headings, in selecting every second entry, repeat entries were skipped and the entry directly following was included in the survey. The sample represented both union and nonunion and residential and commercial shops.

Instrumentation

The instrument used in this study was designed to ascertain the degree of importance that local building trades employers placed on predefined employability and technical skills to be possessed by entry-level employees. In order to determine whether or not employers' preferences differed relating to trade, size of company, etc., they were also asked to identify the following: the trade that they represented; whether or not their employees were union or nonunion; whether they do residential work, commercial work, or both; the amount of business done per year in millions of dollars; and number of building trades workers employed.

The data collection instrument was in the form of a four-page pamphlet. The first page was a letter introducing the researcher and explaining the purpose of the research study as well as identifying the difference between employability skills and technical skills. On pages two and three, ten employability skills and technical skills, respectively, were listed and defined. Employers were asked to rank the importance of each skill for an entry-level employee on a scale from one to five, five being the

highest. Finally, on page four employers were asked to provide demographic information about their company such as the building trade represented, type of work done, and number of building trades employees. A copy is included in Appendix A.

The skills that were included in this survey were selected from a variety of sources. The Employability Skills were adopted from a similar study done by Thomson (2001). The Technical Skills were chosen from numerous sources referred to earlier in this study. Among those influential resources are *Carpentry. Occupational Competency Analysis Profile,* 1995; *Construction Cluster Skills Standards,* 1999; & Overtoom, 2000.

Procedure

The instrument was mailed to each of the selected businesses with a self-addressed stamped envelope in November of 2002. Information was provided that indicated the purpose of the study and instructions for the completion of the questionnaire. The contact people were asked to return the completed survey in the enclosed, self-addressed, stamped envelope. They were informed that their participation was completely voluntary and that all information collected was to be kept strictly confidential. Lastly, they were assured that they could not be identified and that they would not be contacted in any way by the researcher.

Data Analysis

There are three specific research objectives of importance to this study. The first objective was to ascertain the degree of importance that building trades employers in the Sheboygan Falls area place on ten given employability skills and ten given technical skills. When this data was received, it was tallied and analyzed by recording the degree

of importance placed on each of the ten skills listed under the headings of "employability skills" and "technical skills." The scores for each individual skill were then summed and averaged by calculating the mean.

The second research objective was to identify the knowledge, skills, and attitudes that are currently being taught in Sheboygan Falls High School's technology education program. The data for this objective was gathered through a review of syllabi for courses offered during the past two and one half years. Although the district possesses no standardized curriculum, a review of the syllabi indicated that some general conclusions can be made about the knowledge, skills, and attitudes commonly taught within the offered technology education courses. An outline in Appendix B indicates those competencies.

The third research objective was to identify modifications that could be made to the technology education curriculum to meet the needs of residential and commercial construction employers. The information obtained from the employers through research objective one was compared to the actual material being taught, found in research objective two, to determine commonalities and differences between the two.

CHAPTER FOUR

Analysis of Findings

Introduction

The purpose of this study was to ascertain the level of importance that building trades employers in the Sheboygan Falls area placed on ten employability skills and ten technical skills in regards to entry-level employees. It also sought to identify the knowledge, skills, and attitudes that are currently being taught in the Technology Education curriculum at Sheboygan Falls High School. Finally, it sought to identify modifications that could be made to improve the technology education curriculum at Sheboygan Falls High School.

Objective One

The first research objective was to determine the level of importance that building trades employers in the Sheboygan Falls area placed on ten employability skills and ten technical skills in regards to entry-level employees. The survey (Appendix A) provided employers with a list of ten employability skills and ten technical skills. The employer was asked to circle the number (1-5) that corresponded to the relative importance that he/she places on the individual skill (one being less important and five being more important). One hundred surveys were sent to Sheboygan Falls area building trades employers; fifty-three were returned and tabulated.

The results of the survey were measured by adding the score of each individual skill and dividing by the number of surveys returned (53). As an example, had one particular skill received a score of "5" from every respondent, that skill's average would be "5." After compiling the average score for each skill listed on the survey, the following results were established. Building trades employers in the Sheboygan Falls area indicated that, overall, employability skills are more important regarding entry-level

employees than are technical skills. The average score for the ten employability skills was 4.15, while the average score for the ten technical skills was 3.83.

The employability skills identified as most important by building trades employers of the Sheboygan Falls area were "Responsibility Traits" and "Integrity Traits," each receiving an average score of 4.8 out of 5. See Table 1. Responsibility traits include qualities such as consistently working hard and dependability in regard to attendance and punctuality. Integrity traits include characteristics such as honesty and trustworthiness and following rules established in the workplace and in society. Following closely behind with an average score of 4.7 was the skill identified as "Listening Skills," which is defined as receiving, interpreting, and responding correctly and appropriately to oral instructions and communications. The third most important skill (average score of 4.5) was "Teamwork Skills." These skills are represented by such qualities as being sociable, friendly, and polite with the ability to work cooperatively with others. Several employability skills received an average score of 4.1, those being "Speaking Skills," "Mathematics Skills," and "Personal Health Traits." These were followed by "Reading/Writing Skills" and "Technology Skills," each of which had an average score of 3.9. Finally, the skill labeled "Computer Skills" received the lowest average score, that being 2.5.

Table 1

Mean Scores for Employability Skills

Employability Skills	Total Score	Mean Score
Speaking Skills	218	4.1
Listening Skills	249	4.7
Reading & Writing Skills	209	3.9
Math Skills	222	4.19
Computer Skills	135	2.5
Technology Skills	207	3.9
Teamwork Skills	240	4.5
Responsibility Traits	257	4.8
Integrity Traits	256	4.8
Personal Health Traits	218	4.1

Average scores for Technical Skills ranged from a high of 4.5 to a low of 2.7. See Table 2. The technical skill deemed most valuable by Sheboygan Falls area building trades employers is the ability to read a standard ruler accurately to the 16th of an inch, the average score being 4.5. Following close behind with scores of 4.3 , 4.2, and 4.0, respectively, were the ability to "demonstrate knowledge and application of basic job-site safety"; "correctly selects, maintains, and uses tools of the industry"; and "cleans and maintains work area." Three technical skills received an average score of 3.9. They are, "plans sequence of work operations"; "determines appropriate materials and equipment needed for job"; and "demonstrates knowledge of trade-specific vocabulary." Receiving a score of 3.8 was the skill identified as, "reads and interprets blueprints/project plans." Rounding off the technical skills category were the skills defined as "estimates time and

cost to complete projects" and "demonstrates proficiency with manual drafting" receiving average scores of 3.1 and 2.7, respectively.

Table 2

Mean Scores for Technical Skills

Technical Skills	Total Score	Mean Score
Selects, maintains, and uses tools of the industry	223	4.2
Reads and interprets blueprints/project plans	199	3.8
Demonstrates proficiency with manual drafting	144	2.7
Cleans and maintains work area	213	4
Plans sequence of work operations	205	3.9
Estimates time and cost to complete projects	163	3.1
Determines appropriate materials &equipment needed for job	207	3.9
Reads a standard ruler accurately to the 16th of an inch	236	4.5
Demonstrates knowledge and application of basic job-site safety	230	4.3
Demonstrates knowledge of trade-specific vocabulary	209	3.9

These findings support many of the ideas presented in the literature review (Chapter 2) of this study. Numerous researchers (Bottage & Osterman, 1998; Farrell, 1992; Boutwell, 1994; Farrell, 1992; Wink, 1997; Faber, 1999; & O'Brien & Hart, 1999) have found that employers in general seek not so much the technical skills that are required for a job but those described in this survey as "Employability Skills."

These researchers found that skills such as cooperation, problem solving, writing/language skills, communication, organization, teamwork, and dependability are highly regarded by employers, while the more technical skills can be trained on-the-job, especially when considering entry-level employees.

Objective Two

The second research objective was to identify the knowledge, skills, and attitudes that are currently being taught in the Technology Education curriculum at Sheboygan Falls High School. A review of syllabi, lesson plans, and anecdotal evidence of classroom activities provided the data of the knowledge, skills, and attitudes that are currently taught in the technology education curriculum. See Table 3 and Appendix B.

"Employability Skills" are general skills that are taught throughout the entire high school curriculum, and they are regularly addressed by the technology education department in the following ways. Students are required to practice speaking and listening skills as they perform oral presentations detailing the projects they have completed and explaining procedures necessary to complete a task. They are required to read and write when learning introductory material to units of study, and they are often required to practice math skills in computing surface area and volume calucations, including calculating board foot measures and costs for projects they build. They are often required to work together and use computer and technology skills when completing projects. Finally, they are held responsible for their actions and are required to complete tasks in a timely manner, while being expected to be in class every day, on-time.

Although there currently is not a building trades program at Sheboygan Falls High School, many of the technical skills listed on the survey are addressed to at least some degree withing the existing curriculum. For example, teachers do teach how to read a ruler, and they hold students accountable for that skill by administering weekly measuring quizzes until each student earns a perfect score for three consecutive quizzes. Safety in all lab activities is stressed, and students are required to demonstrate safe and knowledgable use of a piece of equipment and pass a written test before being allowed to use any power equipment. Students are required to read blueprints and project plans and even to develop their own plans of procedure for completing their projects. Finally, students are held responisble for cleaning and maintaining their work areas.

Because an actaul building trades program does not exist, some of the technical skills are not addressed at all. For example, trade specific vocabulary is not covered, nor is manual drafting. Estimating the time and cost to complete a project and determining the appropriate materials and equipment needed for a job are irrelevent, due to the fact that such things are not currently in the curriculum.

Table 3

Knowledge, Skills, and Attitudes Currently Taught

Descriptor	Evidence of Being Addressed
Speaking/Listening Skills	Required oral presentations (career research project) Presenting solutions to problems to the class
Reading and Writing	Textbook readings to introduce units of study Writing evaluations of completed projects Writing written reflections to summarize learning activities Reading magazine articles/plans for completing woodworking projects Writing plans of procedure for completing woodworking projects
Teamwork	Working together to complete problem solving projects Organizing and operating a manufacturing enterprise
Computer/Technology Skills	Learning the AutoCADD program Programming the CNC routers, mills, and lathes
Responsibility Traits	Students are held accountable for their attendance and punctuality
Reading a Ruler	Students are given weekly quizzes until they earn three perfect scores in a row
Knowledge and Application of Basic Job-Site Safety	Students pass a written safety test with 100% accuracy Students demonstrate safe use of all applicable equipment
Cleans and Maintains Work Area	Students are assigned cleanup jobs Students are evaluated upon how well they perform their cleanup responsibilities
Plans Sequence of Work Operations	Students write plans of procedure for some of their woodworking projects

Objective Three

The third research objective was to identify modifications that could be made to the technology education curriculum to meet the needs of residential and commercial

construction employers in the community. A comparison of research objectives one and two suggests several areas in need of improvement.

In the area of employablity skills, three main discrepencies exist between skills deemed valuable by employers and skills taught in the school's curriculum. The first skill in question is labeled "Listening Skills," defined as receiving, interpreting, and responding correctly and appropriately to oral instructions and communications. While students are, of course, expected to listen to oral instructions, this skill is not specifically addressed in the current curriculum. This is an area in need of improvement. The next employability skill that is lacking in the curriculum is "Teamwork Skills." While the concept of teamwork is stressed in the Introduction to Technology coursework, individual performance is given more emphasis as students advance through the progression of techology education course offerings. Finally, a discrepency exists under the heading of "Reading/Writing." Because the school does not offer a building trades course, there is very little opportunity for students to practice reading and writing skills as they relate specifically to that area.

Three deficiencies also exist in the technical skills taught. The first shortcoming falls into the category of "correctly selects, maintains, and uses tools of the industry." Because there is no building trades program, students do not learn about all the different tools used in the industry. Next is "plans sequence of work operations." Although students do some minimal planning in the form of writing plans of procedures for some of their projects, their experiences are limited and not directly related to planning sequences of operations for a construction project. Finally, students are not required to

"demonstrate a knowledge of trade specific vocabulary." This stands to reason, given that a building trades curriculum is not currently being taught.

Table 4 indicates the five employability skills and five technical skills deemed most valuable by local building trades employers. It also indicates the skills that are currently taught in the high school curriculum.

Table 4

Comparison Between What Employers Want and What is Being Taught

Top 5 Employability Skills & Technical Skills	Currently Being Taught
1. Integrity Traits (4.8)	
2. Responsibility Traits (4.8)	X
3. Listening Skills (4.7)	X
4. Teamwork Skills (4.5)	X
5. Math Skills (4.19)	X
1. Reads a Standard Ruler Accurately to the 16^{th} of an inch (4.5)	X
2. Demonstrates Knowledge of Basic Job-Site Safety (4.3)	X
3. Selects, maintains, and uses tools of the industry (4.2)	
4. Plans sequence of work operations (3.9)	X
5. Demonstrates knowledge of trade-specific vocabulary (3.9)	

As reflected in Table 4, many of the employability skills and technical skills that local employers desire are being currently taught. There are, however, many areas in need of improvement. Table 4 includes only the top five employability skills and technical skills because those are the skills most desired by building trades employers.

CHAPTER FIVE

Summary, Conclusions, and Recommendations

Introduction

This chapter will summarize the progress of the study thus far. It will then provide conclusions about the data collected and provide recommendations based on

those conclusions. Finally, recommendations for further research on this topic will be suggested.

Summary

The purpose of this study was to ascertain what knowledge, skills, and attitudes are deemed most valuable by building trades employers in the Sheboygan Falls area as they relate to entry-level employees. This information was then to be used to create a building trades curriculum for Sheboygan Falls High School that reflected the needs of local employers. A review of literature revealed that necessary knowledge, skills, and attitudes for entry-level employees can be broken into two categories—employability skills and technical skills. Through the review of literature, two lists were derived. One list described ten common employability skills, while the other list described ten common technical skills related to the building trades industry. These lists, in the form of a survey, were then mailed to 100 local building trades employers, who were randomly selected from the yellow pages of a local phone directory. The employers were asked to participate in the study by rating the importance of each of the ten employability skills and ten technical skills on a scale from one to five. Employers were also asked to provide information about their companies regarding what type of service they provided, how many building trades people they employed, and whether they were a union or a nonunion shop.

The second and third objectives of this study were to identify the knowledge, skills, and attitudes that were being taught in Sheboygan Falls High School's technology education program and to compare them to what the local employers deemed valuable, respectively. The second objective was realized through a review of syllabi, lesson plans,

and anecdotal evidence of classroom activities. Objective three was accomplished by comparing the findings of the first two research objectives.

The results of the survey from objective one indicated that local building trades employers place a higher overall value on employability skills compared to technical skills. This reinforces what was indicated in the review of literature. The employability skills that ranked the highest were Responsibility Traits and Integrity Traits, followed closely by Listening Skills. Employability skills deemed less valuable were technology skills and computer skills. The technical skills that received the highest rankings were the ability to read a standard ruler, and knowing and applying basic job-site safety practices, respectively. Technical skills receiving lower scores included estimating time and costs to complete a job, and proficiency in manual drafting.

The finding of objectives two and three indicated that the current curriculum does address some of the knowledge, skills, and attitudes valued by local employers, but there are areas of need still to be addressed. These ideas will be further developed in the next section of this chapter.

Conclusions and Recommendations

Research objective number one was to determine the level of importance that building trades employers in the Sheboygan Falls area placed on ten employability skills and ten technical skills in regards to entry-level employees. Based on the data it is concluded that local building trades employers place more emphasis on employability skills than they place on technical skills, generally speaking. The employability skills they ranked most valuable are Responsibility Traits and Integrity Traits, followed closely

by Listening Skills. The technical skills ranked most valuable are the ability to read a standard ruler, and knowing and applying basic job-site safety practices, respectively.

Based on the conclusion it is recommended that technology education curriculum be modified to include methods of evaluating students' responsibility and integrity. Suggestions include emphasizing the importance of punctuality, dependability and independence to address the issue of Responsibility Traits, and emphasizing trustworthiness and following rules to address the issue of Integrity Traits. It is also recommended that the curriculum continue to include the already practiced emphasis on ruler reading and basic safety rules.

Research objective number two was to identify the knowledge, skills, and attitudes that are currently being taught in the Technology Education curriculum at Sheboygan Falls High School. Based on the data it is concluded that the curriculum currently addresses the following employability skills: speaking and listening skills, reading and writing skills, teamwork skills, computer and technology skills, and, to some extent, responsibility traits. The curriculum addresses the following technical skills: reading a ruler, exercising safe work practices, reading blueprints/project plans, and cleaning and maintaining work areas. Based on these conclusions, research objective number three can be addressed.

Research objective number three was to identify modifications that could be made to the technology education curriculum to meet the needs of residential and commercial construction employers in the community. Based on the conclusions of research objective number two, it is recommended that the technology education curriculum be modified to address the "employability skills" of integrity and listening skills. As stated

above, integrity traits might be evaluated by incorporating some means of assessing students' ability and willingness to follow rules of the workplace and ability to continue working independently without constant prodding from the teacher. Listening skills might be developed through practice responding to oral directions to complete tasks. It is also recommended that the technology education curriculum continue to address the "technical skills" of ruler reading and practicing safe habits with tools and machines. A "technical skill" that should be added to the curriculum is to incorporate a component that deals with selecting, maintaining, and using tools of the industry. This might involve adding a course of study in which students learn about the many different facets of the building trades and have a chance to observe and participate in activities requiring them to use the tools of the industry.

Recommendations for Further Research

While this study has provided valuable information for the improvement of the technology education curriculum at Sheboygan Falls High School, it is by no means comprehensive. The information gained through this study is specific to the building trades industry, which addresses only one of the four primary components of any technology education curriculum—that being the construction component. The other three components—manufacturing, transportation, and communication—have yet to be addressed in such a thorough manner. It is recommended that someone do a study of similar depth in the areas of manufacturing, transportation, and communication in order to ensure that the school's technology education curriculum is as good as it can be.

REFERENCES

Bottage, B. & Osterman, L. (1998). Bringing the workplace to the classroom. *Educational Leadership, 55* (8), 76-77.

Boutwell, C. (1994). Will the jobs be there? *Thrust for Educational Leadership, 23* (5), 14-17. Retrieved June 16, 2000 from: http://www.ebsco.com

Bunting, C. (1994). Building a school-industrial partnership. *Middle School Journal, 25*

(15), 43-45.

Bunting, C. (1999). School reform--does it really matter? *Clearing House, 72*, 213-216.

Carpentry. Occupational Competency Analysis Profile. (1995). (ERIC Document Reproduction No. ED 388 871)

Construction Cluster Skills Standards. (1999). (ERIC Document Reproduction No. ED 448 336)

Donlevy, J. & Donlevy, T. (2000). What's up in factories?: Introducing teachers and students to the dynamic world of modern manufacturing. *International Journal of Instructional Media, 27*(1), 2-6.

Faber, M. (1999). Industry/education collaborations produce long-term job survivors. *Tech Directions, 58* (10), 29.

Farrell, A. M. (1992). What teachers can learn from industry internships. *Educational Leadership, 49* (6), 38-39.

Greenspan asks communities to help improve worker skills. (2000, May). *Techniques: Connecting education and careers, 75* (5), 6.

Griffith, J. & Wade, J (2001). The relation of high school career- and work-oriented education to postsecondary employment and college performance: A six-year longitudinal study of public high school graduates. *Journal of Vocational Education Research, 26* (3). Retrieved June19, 2002 from Digital Library and Archives.

Harbaugh, M. (1985). Schools are bullish on business. *Instructor and Teacher, 94* (9),

24-27.

Hastad, D. N. & Tymeson, G. (1997). Demonstrating visionary leadership through community partnerships. *The Journal of Physical Education, Recreation and Dance, 68* (5), 47-50.

Hesseldahl, A. (1998). Reaching the future workforce. *Electronic News, 44* (2249), 46.

International Technology Education Association Home Page. (2000). [On-line]. Available: www.iteawww.org/A1.html

Jesitus, J. (2000). The real cure for the skills shortage. *Industry Week, 249* (4), 2.

Kellogg, R. S. (2001, March). But who will fix my plumbing? [Electronic version] *The School Administrator Web Edition*. Retrieved June 18, 2001, from www.aasa.org/publications/sa/2001_03/kellogg.htm

Kozol, J. (1997). Students' needs or corporate greed? *Education Digest, 63* (1), 4-6.

Lankard, B. (1995). *Business/Industry standards and vocational program accountability*. (ERIC Digest No. 157). Retrieved June 14, 2000 from: http://www.ebsco.com

Levine, M. (1986). Business and the public schools. *Educational Leadership, 43* (5), 47-48.

Limpert, C. G. (1997). Improving business-education relationships. *Quality Progress, 30* (7) 71-73.

Merriam-Webster's collegiate dictionary (10th ed.). (1996). Springfield, MA: Miriam-Webster.

Moulton, S. K. (1997). Can business really make a difference in schools? *Connection*:

New England's Journal of Higher Education and Economic Development, 12 (1), 26-27.

O'Brien, E. M. & Hart, S. J. (1999). Action learning: The link between academia and industry. *Educational Research, 41*(1), 77-89.

Overtoom, C. G. (2000). Project build: Integrating technical and employability skills in a construction industry-based welfare-to-work training program (Contract No. COPC-OH-96-066). Washington DC: Department of Housing and Urban Development.

Rogers, G. E. (1995). Technology education curricular content: A trade and industrial education perspective. *Journal of Industrial Teacher Education, 32*, (3), n. p.

The role of business in today's educational reform. (1994). *Educational Record, 75* (1) 57-58.

Skilled-worker shortage continues. (1998). *Techniques: Making education and career connections, 73* (2), 6.

Smith, G. (1999). Vo-tech careers in the 21st century. *Career World, 27* (1), 24-26.

Standards for technological literacy: Content for the study of technology. (2000). Reston, VA: International Technology Education Association.

Thompson, S.R. (2001). *The Five Most Important Entry-Level Employability Skills the Employers of the Chippewa Valley seek in Entry-Level Job Applicants.* [On-line].

Trade Unions & Subcontractors. (2002). [On-line]. Available: http://buildingtradesdir.com/guilds/wisconsin/index.html

U. S. Department of Labor. (1991). *What work requires of schools: A SCANS report for*

America 2000. Washington, DC: U. S. Department of Labor. Retrieved on June 24, 2002 from http://wdr.doleta.gov/SCANS/whatwork/whatwork.htm.

Wink, D. (1997). Let's put learning first. *Industrial Distribution, 86* (4), 144.

APPENDIX A

Instrument

From: Rick Conrad
Sheboygan Falls High School
220 Amherst Avenue
Sheboygan Falls, WI 53085
(920) 467-7890 ext. 3122

To: Building Trade Employer/Director of Human Resources
Various Building Trade Employers of Sheboygan County, WI

Dear Building Trade Employer:

My name is Rick Conrad, and I am a technology education instructor at Sheboygan Falls High School. I am currently pursuing a Master's Degree from the University of Wisconsin—Stout. I am contacting you in hopes that you will assist me on a thesis project that I am developing to improve the technology education curriculum in my school as well as to positively impact you directly by providing you with a larger pool of *qualified* job applicants.

My thesis topic investigates the importance of the employability skills and technical skills that students might possess as they graduate from high school. Employability skills consist of basic skills, thinking skills, and personal qualities viewed as necessary to be successful in most any job, while technical skills refer to specific skills related to a particular industry. I hope to determine the knowledge, skills, and attitudes viewed as important by building trade employers in order to make instruction at Sheboygan Falls High School more relevant, while at the same time providing you—the employer—with more qualified applicants.

I believe that this is an important study that will provide valuable information useful to educators and employers alike. With your input, we can determine the knowledge, skills, and attitudes that are most important for our students to possess to become successful employees.

I am enclosing a stamped, self-addressed envelope in which you may return the enclosed survey. The survey is designed in such a manner that it can be completed in only a few minutes. The survey consists of three parts and is on one page, back-to-back; please complete both sides. I will do a follow-up contact in two weeks should one of our mailings be lost or delayed. If you have any questions regarding the thesis project or how the information will be used, please contact me at the address/phone number above.

Your participation in this survey is voluntary, and I assure you that your individual response will be kept strictly confidential. For those who decide to assist me in this pursuit, I thank you in advance for your help.

Sincerely,

Rick Conrad

Listed below are ten basic **employability skills** compiled from a selection of various research projects. Please circle the number that corresponds to the importance you place on each skill. In other words, how important is it for an entry-level employee to possess the given skill?

Employability Skills

Relative Importance More . . . . . Less	**Skill**
5 4 3 2 1	A) Speaking Skills: The worker can express himself/herself using the spoken word and can communicate effectively with fellow workers, supervisors and/or clients/customers.
5 4 3 2 1	B) Listening Skills: The worker can receive, interpret and

respond correctly and appropriately to oral instructions and communications.

5 4 3 2 1 C) Reading/Writing Skills: The worker can interpret written materials and can effectively express himself/herself in written form.

5 4 3 2 1 D) Mathematics Skills: The worker can perform basic arithmetic functions such as division and multiplication and can accurately interpret graphs, diagrams and measurement instruments.

5 4 3 2 1 E) Computer Skills: The worker understands the basics of how computers work and how to use them for obtaining information.)

5 4 3 2 1 F) Technology Skills: The worker understands the proper procedures for selecting, setting up, operating and maintaining machines commonly used in the workplace.

5 4 3 2 1 G) Teamwork Skills: The worker is a sociable, friendly and polite person who is able to work cooperatively with others.

5 4 3 2 1 H) Responsibility Traits: The worker consistently works hard, can be relied upon to complete a task, and is dependable in regard to attendance and punctuality.

5 4 3 2 1 I) Integrity Traits: The worker is honest and trustworthy and consistently follows the rules established in the workplace and in society.

5 4 3 2 1 J) Personal Health Traits: The worker demonstrates a concern for his/her personal well-being and maintains acceptable standards in regard to hygiene, physical appearance and dress.

Listed below are ten **technical skills** required of many building trades employees.
Please circle the number that corresponds to the importance you place on each skill.
In other words, how important is it for an entry-level employee to possess the given skill?

Technical skills

Relative Importance **Skill**
More . . . . . Less

5 4 3 2 1 A) Correctly selects, maintains, and uses tools of the industry

5 4 3 2 1 B) Reads and interprets blueprints/project plans

5 4 3 2 1 C) Demonstrates proficiency with manual drafting

5	4	3	2	1	D) Cleans and maintains work area
5	4	3	2	1	E) Plans sequence of work operations
5	4	3	2	1	F) Estimates time and cost to complete projects
5	4	3	2	1	G) Determines appropriate materials and equipment needed for job
5	4	3	2	1	H) Reads a standard ruler accurately to the 16^{th} of an inch
5	4	3	2	1	I) Demonstrates knowledge and application of basic job-site safety
5	4	3	2	1	J) Demonstrates knowledge of trade-specific vocabulary

Please provide the information requested below. The information is strictly confidential and will only be used for the purposes of this research. There is no way for you to be identified, nor will you be contacted for any reason.

A. Using the list below, please indicate the number that best describes the building trade you represent:

#: _____

1. architect	8. glazier	15. plasterer
2. cabinetmaker	9. HVAC technician	16. plumbing/pipe trades
3. carpenter	10. heavy equipment operator	17. roofer

4. concrete/flat work
5. drywall installer
6. electrician
7. flooring installer
11. insulation installer
12. land surveyor
13. mason
14. painter/paper hanger
18. steel/sheet metal
19. tile setter
20. GENERAL CONTRACTOR

B. Please check one: _____ union _____non-union

C. Please check the type of work you normally do: _____residential _____ commercial _____ both

D. Amount of business done per year (please check one):

_____ less than $5 million _____between $5 – 30 million _____ $30-90 million _____ > $90 million

E. Number of <u>Building Trades</u> workers employed: _____

Thank you for participating in this research project. I hope we both can benefit from the results! Please return the survey to me in the enclosed envelope for your convenience.

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

NOTE: Questions or concerns about the research study should be sent to Rick Conrad, the researcher, at (920) 451-1203, or Michael Galloy, research advisor, at (715) 232-2163. Questions about the rights of research subjects can be addressed to Sue Foxwell, Human Protections Administrator, UW-Stout Institutional Review Board for the Protection of Human Subjects in Research, 11 Harvey Hall, Menomonie, WI, 54751, phone (715) 232-1126.