NATIONAL INDUSTRY-BASED SKILL STANDARDS TECHNICAL COMMITTEES: PERCEPTIONS OF ADOPTION OF STANDARDS IN VOCATIONAL EDUCATION PROGRAMS

By

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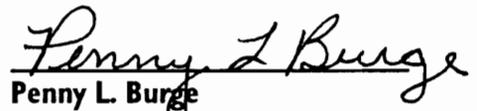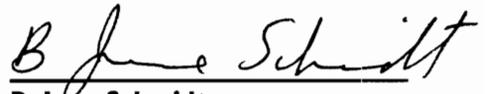
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(ABSTRACT)

Over the past fifteen years, concern has developed for the condition of the American economy. As a result, business and education leaders in the United States have acknowledged the interdependence between education and the economy. The keys to linking education and the economy are workforce preparation and performance. One major outcome of the concern about the economy and workforce preparation has been the development of industry-based standards, including certification of occupational skills and competencies. The identification, by those who developed the standards, of their perceptions of their adoption might enable business and industry and the labor and education communities to better utilize skill standards.

The purpose of this study was to develop an understanding of the perceptions of national industry-based skill standard technical committee members regarding the adoption of skill standards in vocational education programs at the secondary and post-secondary education levels. The study addressed four main research objectives using both quantitative and qualitative methodology. The objectives related to technical committee members' demographic and occupational characteristics and perceptions of the process and results of the standard development project; their perceptions regarding vocational educators use of skill standards in workforce preparation programs; their perceptions regarding factors which would enhance or inhibit the adoption of the standards by vocational educators; and their perceptions of how skill standards will impact the effectiveness of vocational education.

Skill standards technical committee members' perceptions of their work on the committees and their perceptions of adoption of the standards by vocational educators provide valuable information to assess the skill standard projects and determine whether the work of the committees has been focused on the goals set by the Perkins Act, the U. S. Departments of Education and Labor, and the National Skill Standards Board. From the results of this study findings related to the use of the

standards by vocational educators, enhancers, inhibitors, and impacts of the standards are reported. Themes associated with international competitiveness, the standard development process, and committee representativeness were also included.

Perceptions of technical committee members provide an opportunity to determine how the standards will be adopted by vocational educators as well as the strengths and shortcomings of the committees and possible future directions. Thus, this study provides implications for skill standards committees as well as recommendations for further research.

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I am part of all that I have met.

--Alfred, Lord Tennyson

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CHAPTER I

Introduction

*Skill standards provide a framework needed to ensure that
noncollege bound students and workers have the portable
skills needed by today's fast-changing, global economy.*

-- Robert Reich, Secretary
U. S. Department of Labor

Sixty percent of U.S. adults believe schools in their communities are not devoting enough attention to helping non-college bound students develop the skills they need to find jobs after graduating (National Career Development Association [NCDA] & National Occupational Information Coordinating Committee [NOICC] (1994). About nine million of the nation's 33 million youth aged 16 to 24 will not have the skills to meet employer requirements for entry-level positions. Further, 55 million dropouts and 3.8 million high school graduates lack basic skills taught in secondary schools (U. S. General Accounting Office, 1990). What worked reasonably well in the past to prepare our youth for employment will not meet the demands for today and beyond.

In today's economy, there is increased emphasis on quality, variety, customization, convenience, and timeliness of goods and services, placing greater emphasis on the skills of the individual front-line worker. While it is important to prepare new entrants for the workforce, nearly 85% of America's workforce for the year 2000 is in the workforce today. Of that number, an estimated 25 million need to update their skills to keep pace with the changing economy and technology (Office of Work-Based Learning, 1992). Solutions are needed to prepare the nation's workforce to meet the changing requirements of business and industry.

Over the past ten years, concern has developed for the condition of the American economy. As a result, business and education leaders in the United States have acknowledged the interdependence between education and the economy. The keys to linking education and the economy are workforce preparation and performance. One major outcome of the concern about the economy and workforce preparation has been the proposed development and implementation of industry-based standards, including certification of occupational skills and competencies (Warnat, 1992). Advocates for national skill standards posit that standards would improve the U. S. workforce and produce quality in the international marketplace by being measured to the best skill standard systems in the world. These standards would also provide better vocational

education and more portable employment credentials for U. S. workers. Increased accountability among schools, teachers, and vocational programs would also be an advantage of national skill standards. This increased accountability would require educators to prepare graduates with entry-level work skills which will meet the needs of business and industry. The Commission on the Skills of the American Workforce (1990) suggested skill standards as a major reform for the education and training field. Before and since the publication was released in 1990, both the U. S. Departments of Labor and Education have been studying industries that have developed national skill standards to determine how the government can encourage other industries to develop similar standards.

Labor Secretary Robert Reich (U. S. Department of Labor, Office of Information, 1993) supports national, voluntary, industry-based skill standards. The Secretary argues that the standards will provide a framework needed to ensure that noncollege bound students and workers have the portable skills needed by today's fast-changing, global economy. Skill standards were also mandated in the Carl D. Perkins Vocational and Applied Technology Education Act of 1990 (Perkins Act) (U. S. Congress, 1990) and are integrally related to the Goals 2000: Educate America Act (U. S. Congress, 1994). The Perkins Act authorized the establishment of a program of grants to industrial trade associations, labor organizations, or comparable national organizations for purposes of organizing and operating business-labor-education technical committees. The Act required that these committees should establish national standards for competencies in industries and trades.

The Goals 2000: Educate America Act (U. S. Congress, 1994) incorporates the fundamental requirements for development of skill standards and is built around three basic principles: (a) skill standards must be voluntary; (b) skill standards must be industry-led with active participation of business, labor, education, and others; and (c) the process must knit together and integrate, but not duplicate, work already carried out by industry, by states, or by the educational system. Reich (U. S. Department of Labor, Office of Information, 1993), said, "There is a disconnect between the skills people have and the skills the economy requires. Part of the problem is determining how to move a workforce suited to one sort of economy quickly and smoothly into a world grown suddenly quite different." (p. 2)

In order to move the workforce into the new economy, the U. S. Departments of Education and Labor are supporting a number of projects through matching grants. Grants with funding from either the Department of Education or Labor have been made to organizations or associations who have an interest in setting worker qualifications. The organizations and associations, or partnerships of both, provide funds to match, or nearly match, those of the U. S. Departments of Education and Labor. These projects will create a coalition of employers, labor organizations, vocational-technical educators, and others to develop skill standards in industries and trades that will serve as the basis for a certification process including job specific, academic, and reasoning skills. In addition, these grants are used to: (a) develop

methods for using skill standards for vocational-technical curriculum development and for certification; (b) ensure nondiscrimination of minorities and women in the application of skill standards; (c) develop a means of determining the quality of performance of certified versus non-certified personnel; and (d) suggest means to identify and accommodate future skill standards at national and world class levels (U. S. Department of Labor, Employment and Training Administration & U. S. Department of Education, Office of Vocational and Adult Education, 1992).

The matching grants for developing skill standards provided financial assistance for organizing and operating business-education-labor technical committees. The committees will prepared skill standards that identified the knowledge, skill, and level of ability an individual needs to perform successfully in the workplace (Office of Public Affairs, 1993). The U. S. Department of Labor (1993) maintained that skill standards ensure a common, standardized system for classifying and describing the skills needed for particular occupations and the skills possessed by individual workers. Reich (U. S. Department of Labor, Office of Information, 1993) indicated that skill standards can aid communication among employers, educators, trainers, and workers regarding specific skill levels and needs.

Problem Statement

Leaders of the U. S. Departments of Education and Labor believe that skill standards and certification systems have potential value and both departments initiated efforts to help industry, labor, and education groups develop these standards (U. S. General Accounting Office, 1993). In establishing matching grants, it was envisioned that the grant recipients, using technical committees, would identify (a) standards that establish entry and career advancement criteria; (b) broadly-defined occupational categories that crosscut individual firms or industries; (c) methods for benchmarking standards to world-class levels and for maintaining the currency of the standards; (d) preferred training delivery mechanisms, competency-based assessment tools, and certification arrangements; (e) incentives for development and implementation of national skill standards; and (f) the relationship of skill standards to existing occupational licensing and civil rights concerns (U. S. Department of Labor, 1992).

The two departments awarded 22 grants totaling more than eight million dollars to support the development of voluntary skill standards for occupational competencies. The first grants were awarded by the U. S. Departments of Education and Labor in 1992 to industry trade associations to develop and implement voluntary skill standards. Those thirteen grant recipients have completed the first phase of the skill standards process. Since skill and certification standards were developed so recently, little attention has been given to how these standards might be used by industry and education. The identification, by those who developed the standards, of their perceptions of the adoption of the standards might enable

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business and industry and the labor and education communities to better utilize skill standards. Therefore, the purpose of this study was to determine the perceptions of technical committee members regarding the adoption of national skill standards in vocational education programs at the secondary and post-secondary education levels.

Research Objectives

The purpose of the research will be addressed by accomplishing four main research objectives using both quantitative and qualitative methodology. The research objectives of this study have been developed to determine the perceptions of technical committee members regarding the adoption of national skill standards in vocational education programs at the secondary and post-secondary education levels. The following are specific research objectives of this study:

1. Identify the grant recipient technical committee members' demographic and occupational characteristics and perception of the process and results of the standard development project.

2. Determine the technical committee members' perceptions regarding vocational educators' use of skill standards in workforce preparation programs.

3. Determine technical committee members' perceptions of factors that would enhance or inhibit the adoption of skill standards by vocational educators.

4. Determine how technical committee members perceive skill standards will impact on the effectiveness of vocational education.

Significance of the Study

Because national voluntary skill standard development grants are so recent, research on their procedures and outcomes is just beginning. A search of recent literature has not revealed studies which have been completed to achieve an understanding of the perceptions and projections of technical committee members regarding the adoption of national skill standard development in vocational education. Additionally, the study provided awareness of the possible acceptance of and barriers to skill standards as they relate to vocational education.

This study contributed to research on national voluntary industry-based skill standard development. Both business and industry and education will be able to look to this research to seek recommendations which could provide focus for educators as they develop curriculum, determine performance measures, strengthen their business partnerships, and create professional development activities.

This study offered projections and predictions made by developers of the skill standards of how skill standards will be accepted and possible barriers to their implementation by vocational education. The projections and predictions of those who developed the standards will serve as a guide to other business and industry organizations as they develop national industry-based skill standards. Furthermore, the inhibitors reported in this research provide cautions for business and industry and educators in the adoption and implementation of national skill standards.

Conceptual Framework

In our rapidly changing technological society, representatives from business and industry, labor, and education play an important role in collaborating with vocational education to assure that entry level workers are prepared with relevant entry-level skills. Koffel (1994) suggests that education must provide the kinds of schooling individuals need to become successful employees. To do this a knowledge of the workplace is essential. Additionally, one conclusion of the SCANS report (Secretary's Commission on Achieving Necessary Skills, 1991) is that American's schools must help students develop a new set of competencies and foundation skills if they are to enjoy a productive, full life. These competencies and foundation skills were defined by determining skills needed in the high performance workplace.

The adoption of technologies in service and manufacturing businesses has led to increased skill requirements needed to perform a variety of tasks in the high performance workplace (Flynn, 1988). Therefore, to prepare workers for the high performance workplace, vocational educators need a knowledge of what the workplace situation is today. Failure by vocational educators to acquire a knowledge of the workplace situation could hinder production gains and economic growth. An understanding of the skill requirements of business and industry provides a basis for vocational educators to establish a curriculum that prepares workers with the skills needed to meet these requirements. Additionally, with national industry-based standards in place, not only can vocational educators better assess worker skills, but relevant vocational education reforms can be made in other areas such as teacher preparation.

The U. S. government has come to recognize that human capital development is important for the economic success of our country. Wooldridge (1992) posits that there is a skills deficit and the expectation is a significant fall in demand for unskilled workers and a major increase in demands for skilled laborers. The move toward "smarter jobs" appears to have accelerated in the past ten years because of a rise in information technology. This realization has led to the belief that training and education of workers are critical. Business and industry's success is largely "embodied in the collective skills and knowledge of its people and the organizational procedures that shape the way employees interact" (Harvard Business Review, 1994, p. 79).

History of Skill Standards in Vocational Education

Vocational education has consistently emphasized the importance of linkages with business and industry beginning with the passage of the Smith Hughes Act of 1917 when using business and industry councils became a formal standard of operation (Center for Vocational Education-Business Cooperation, 1986). In fact, a basic principle of effective vocational education policy and program design is the preparation of skilled individuals for employment. The rationale for the linkages with business and industry has been that there are mutual benefits to be realized through collaboration.

Business participation in vocational education at local and state levels usually involves the service of business, industry, and labor representatives on advisory and technical committees to improve curriculum planning, operation, and evaluation. In addition, business and industry and labor collaborate in apprenticeship training, vocational student organizations, and career education. They also collaborate in other ways such as providing materials and equipment to schools. Communication is necessary among business, industry, labor, and education in order for vocational educators to meet the needs of preparing today's students for entry-level occupations. A willingness for schools to modify curricula to meet the changing needs of business and industry has long been an important reason for collaboration. State and local curriculum developers are continuing to involve business and industry in developing and validating skills and competencies through the use of advisory and technical committees.

The use of advisory and technical committees and the involvement of business and industry on these committees is well grounded in literature (Cochran, Phelps, & Cochran, 1980; Wentling, 1980; Parks & Henderson, 1987; South Carolina Department of Education, 1990; Center for Vocational Education-Business Cooperation, 1986). Dorsten and Hollenbeck (1989) posit that the critical elements of successful collaboration between education and business are important and include reciprocity in resource exchange, trust and commitment, structural compatibility, and system openness. The use of advisory and technical committees is a fundamental method of collaborating to develop skill standards.

The mandates of the Perkins Act (U. S. Congress, 1990) and recent collaboration between the Departments of Education and Labor to provide matching grants for developing voluntary industry-based skill standards and certification, required that advisory and technical committees be involved in their development. The Goals 2000: Educate America Act (U. S. Congress, 1994) further developed the concept of voluntary industry-based skill standards and certification by establishing a National Skill Standards Board to oversee and administer skill standard and certification development. This board must consist of representatives from business and industry, labor, education, training institutions, and government. Using technical and advisory committees, with representatives from business, industry, and labor, at the local and state levels has

been an effective way to provide entry-level skills for vocational education graduates. While the development of national standards and certification is voluntary, the use of business and industry, labor, and education members on national advisory and technical committees is mandatory for those accepting the matching grants.

Research Assumptions

This section enumerates three assumptions germane to this study. The assumptions listed were necessary to establish a prudent starting point for the study.

1. It was assumed that all grant recipients had technical committees consisting of business and industry, labor, and education representatives.

2. It was assumed that all technical committees had met the first stage requirements for skill standards development as outlined in their grant recipient's award.

3. It was assumed that the experience in developing worker skill standards varied among the grant recipients.

Limitations

By design, this study was restricted because of the imposed limitations and other extraneous variables. Various design applications were employed to minimize the effects of these limitations. The following limitations were identified.

1. Because technical committees were in various stages of skill standards development, their level of development was a limitation of this study.

2. The responses of members of the technical committees did not represent any group or organization but only their individual perceptions and projections.

3. The results of the study were limited to perceptions of survey respondents and interviewees.

4. Because of the qualitative nature of this study, the researcher's background as a vocational educator played a role in the analysis of the findings.

Definitions

For the purposes of this study, the terms below were defined based upon cited literature or they were operational in nature.

Business and Education Standards Program. A grant program under Section 416 of the Perkins Act (U. S. Congress, 1990) providing matching grants to coalitions of employers, employees, educators and other training

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providers, national labor and trade associations, and organizations to form technical committees to develop skill standards (Office of Public Affairs, 1993).

Skill Standards (also called voluntary industry-based skill standards): The specific knowledge, skill, and ability levels that translate into jobs and productivity required by employers (Office of Public Affairs, 1993). They also ensure a common, standardized system for classifying and describing skills needed for particular occupations and the skills possessed by individual workers (U. S. Department of Labor, 1993).

Technical Committees: Representatives from business, industry, labor, and education who held direct responsibility for developing national skill standards in various industries and trades.

Organization of the Study

Chapter 1 presented an introduction to the study, a problem statement, research objectives, significance of the study, conceptual framework, research assumptions, limitations, and definitions. Presented in Chapter 2 is the overview of literature related to skill standards, impact of technological change, historical developments, international aspects, state initiatives, and the processes and methods used to develop standards and certification.

Covered in Chapter 3 is the methodological approach which includes the research design, pilot study, subject selection, instrumentation, data collection, data analysis, and summary. Chapter 4 presents the report of the research findings. Contained in Chapter 5 are the summary, conclusions, and recommendations.

CHAPTER 2

Overview of Literature

Development, of itself, does not create opportunity...
opportunity is for the skilled.

-- Ron Leighton, Member of Parliament
for Newham Borough, East London

This chapter contains a review of pertinent literature related to skill standard development. The literature review provides a background for the need for technical committees to have input into national skill standard development. This review also describes procedures which have been used to develop skill standards and certification. A pertinent review of literature is reported below which addresses the four objectives of this study:

1. Identify the grant recipient technical committee members' demographic and occupational characteristics and perception of the process and results of the standard development project.

2. Determine the technical committee members' perceptions regarding vocational educators' use of skill standards in workforce preparation programs.

3. Determine technical committee members' perceptions of factors that would enhance or inhibit the adoption of skill standards by vocational educators.

4. Determine how technical committee members perceive skill standards will impact on the effectiveness of vocational education.

The first section is an introduction which is followed by one on the impacts of technological change. The third section reviews selected historical developments of skill standards and certification. In the fourth section, a review of the international aspects of skill standard development are discussed including examples of how and why other countries have developed standards. The fifth section presents a discussion of state initiatives in developing business skill standards, and the sixth section discusses technical committees and their role in developing skill standards. The seventh section provides a literature base and description of the methods used by technical committees to develop standards and competencies including job analysis, instructional systems design developed by the United States Air Force, Vocational-Technical Education Consortium of States (V-TECS), and DACUM (Developing A CurriculUM). The chapter concludes with a brief summary.

Introduction

The changes and structure of labor demands brought about by technological changes affect the skill requirements of business and industry and how vocational education responds to these changes. Along with technological changes come widespread complaints from high-technology business and industry employers that schools are not adequately responding to their needs. Thus, establishing stronger partnerships and other linkages between vocational education, business, and industry becomes essential to business and industry's success. These linkages and partnerships are also essential in making vocational education responsive to business and industry by providing entry-level workers who possess the skills needed to be successful in the workplace--skills needed by today's fast-changing global economy. The connection between skills people have and those the economy requires is made evident in the report of literature which follows.

Impact of Technological Changes

For the past twenty-five years, technological and economic changes in business have brought attention to the gap between job skill requirements and worker competencies. Technological changes increase the complexity of jobs and demand that employees engage in higher-level cognitive activities (Goldstein & Gilliam, 1990). What worked well in the past will not meet the demands of technological change.

Flynn (1988), using empirical evidence on the effects of technological change, reviewed approximately two hundred case studies published between 1940 and 1988 to investigate the impacts of technological change at the workplace. The cases spanned a wide variety of industrial organizations and technologies and economic and social circumstances. Evidence from the case studies demonstrated that technological change at the workplace created both high-skill requirements and deskilling of many existing tasks. In addition, these changes created the need for vocational education to be responsible to the needs of business, industry, and labor.

The adoption of technologies in manufacturing has led to increased skill requirements needed to perform a variety of tasks involved with machine operation, maintenance and repair, computer programming, systems analysis, and equipment design. For example, one case study showed that workers needed greater skills when automated machinery was introduced in a fabricated metals firm:

An operator of the newer machine must be of a higher skill level, must have more mechanical knowledge and comprehension than any worker under the previous production arrangement. The worker exercises judgment in knowing when dies require adjustment or need to be replaced, must lubricate and tend

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the machine, be able to stop in the case of a jam, cut out and remove the jammed strip, refeed the steel strip through the machine, and resume operations. The operator is not required to change the set-up of the machine. (Pennsylvania State Employment Service, 1965, p. 29)

Office automation also generates relatively high-skill needs for a variety of tasks. Flynn's (1988) analysis of the case studies on office technologies, especially those involving data processing technologies, indicated a need for highly skilled workers. In the 1950s an insurance company adopting electronic data processing needed people who could:

....shape the office's systems to fit the machines, bearing in mind the form in which raw data first becomes available for processing and the ultimate end products which this data must be used to turn out....translate the requirements of the analysts into a language on which the machine can operate so as to produce the desired results in the most efficient manner....understand the basic principles of the machine's operation and ...handle the machine and its peripheral equipment in a careful and methodological fashion. (Paul, 1962, p. 31)

The review of the case studies reported by Flynn (1988) also identified two major categories of worker problems facing employers adjusting to technological change at the workplace: (1) meeting the new, relatively high skill requirements generated by the change, and (2) reallocating displaced workers. When employers adopt newly emerging technologies, they are faced both with uncertainty about the quantity and quality of skills needed and with the lack of appropriately trained workers. In the early 1980s employers in need of workers skilled in electronic technology emphasized the importance of formal education in the field. The experience of a large public utility firm was typical:

"In the old days,"...(the director of engineering) says, "engineers often came up through the craft ranks. Now we're looking for people with at least a bachelor's degree in electrical engineering, math or science. We still promote craft people, but they have to take a lot of continuing education to catch up." The reason engineering jobs are requiring ever-higher levels of formal education has to do with the nature of electronic technology...."When state-of-the-art equipment was all either mechanical or electro-mechanical, working with it was an effective way to learn it," (the director of engineering) says. "But computer and electronic technology is harder to grasp--formal education is essential to understanding it." (Crossman & Laner, 1969, p. 60)

In summary, Flynn (1988) posited that failure to meet the requirements that the demands for new, highly skilled labor created by the adoption of new technologies could hamper productivity gains and economic growth. This author also stated that anticipating new and emerging skill requirements is particularly difficult because they do not appear in past

employment trends and are not identified by traditional forecasting techniques. The case studies indicated that as skill training evolves, skills are becoming more generalized and transferable among job tasks and employers--one of the reasons the Departments of Education and Labor have established national industry-based skill standards. Flynn's research provided a framework in which technologies are seen as a dynamic phenomena whose skill and training requirements change as the technologies evolve.

Flynn's research on how the structure of labor demands affected the skill requirements of business and industry provided evidence of the importance of vocational education to establish a curriculum that prepares entry-level workers with the skills needed to meet these requirements. This author also provided evidence that vocational education must adapt to the diverse and evolving technological changes and skill needs by providing job-related program development, curriculum, and instruction. The strong usage, by business and industry, of technical and advisory committees at local, state, and national levels is an important example of how vocational education can respond to technological change and prepare entry level skill workers.

Literature provides evidence that changes in technology have made it difficult for business and industry to hire skilled workers. This study will provide some insight as to how vocational educators can work with business and industry to provide skilled workers who can meet the needs of changing technology.

Selected Historical Developments
of Skill Standards and Certification

As the United States has evolved from an industrial society to a technological one, a need for change in worker skills has emerged which has brought changes to skill standard and certification regulations and development. In their study of industry-driven credentialing and accreditation of programs, the Institute for Educational Leadership (Institute) (1992, Vol. III) estimated that only one percent of the U. S. labor force held certification for a specific occupation with the largest number of certified workers concentrated in the service industry sector, which included subcategories of business services, health care, engineering services, and personal services.

The Institute (1992, Vol. III) conducted an extensive study of existing associations and other organizations which were involved with setting worker standards, credentialing, or accrediting programs. They identified approximately 200 associations and organizations: "perhaps the most comprehensive listing that has ever been developed" (p. 1). With only approximately one percent of U. S. workers being certified, there is no strong tradition of establishing worker skill standards and those that do exist are state specific and usually not national in scope.

As early as the nineteenth century, medical and accounting societies and other similar groups became interested in raising standards and establishing codes for competency and ethical behavior (Shimberg, Esser, & Kruger, 1972). These societies set up qualifications for membership, stipulated the type and extent of training required, prescribed conditions of employment, set up conditions required for maintenance of status within a given society, and stipulated circumstances under which membership might be revoked (Shimberg, et al., 1972). Thus, there exists an array of voluntary and government entities that are already actively involved in the quality assurance of their profession by setting standards and certification systems. For example, the American National Standards Institute (ANSI) was founded in 1918. It is an umbrella organization that does not establish standards; this task is done through 250 qualified technical and professional societies, trade associations, and 1,100 individual companies that voluntarily submit standards to ANSI for approval (Institute, 1992, Vol. 1). The American Welding Society is an example of an organization that uses ANSI procedures for maintaining and updating standards. The National Commission for Certifying Agencies (NCCA) is another certifying agency which was created in 1989. It is an organization of organizations established by the National Organization for Competency Assurance (NOCA) as a commission to establish voluntary standards for and recognize compliance with these standards by agencies certifying individuals in a wide range of professions and occupations. NCCA approval criteria and standards are only national and voluntary standards for certification agencies, in essence it certifies the certifiers (Institute, 1992, Vol. III).

Health Occupations Certification

Regulating health occupations was initiated as far back as the early nineteenth century primarily for the purpose of combating quackery. However, it was not until the early twentieth century that a significant number of licensing laws relating to the health occupations were enacted. Shimberg, et al., (1972) reported that between 1910 and 1919 approximately 130 statutes regulating fourteen health professions was passed. In 1967 there were 25 regulated health occupations; today approximately 85 are listed in the Dictionary of Occupational Titles (U. S. Department of Labor, Employment and Training Administration, 1991). As the health industry continues to grow and new medical technologies have emerged, that number will increase. All states have regulations for health occupations which require a specified amount of education, related work experience, and passing an examination (Shimberg, et al., 1972). In addition, many health related associations and boards have procedures for regulating occupations related to their association. One example is the American Physical Therapy Association (APTA) whose education programs have been recognized since 1928 (Institute, 1992, Vol. III). In 1977 the APTA established the Commission on Accreditation of Physical Therapy Education, which since 1983 has been the sole accrediting body for entry level education for physical therapists and physical therapist assistants in the U. S.

Each occupation has a separate set of criteria. A resolution passed in 1980 by APTA established a goal that by the end of the decade, entry level requirements for the profession would result in a post-baccalaureate degree.

Construction Occupation Licensing

The logic for licensing practitioners in certain construction trades is compelling. Electrical wiring that fails to conform to code requirements may cause fires and subsequent damage to life and properties. Gas leaks may cause explosions or asphyxiation. A building that is not properly constructed may collapse. Thus, it is not difficult to visualize a need for individuals involved in various aspects of construction to be experienced, to possess a minimum competence, and to demonstrate familiarity with requirements of local building codes.

Plumbing and electrical work are by far the most frequently licensed of construction occupations, but actually there are many construction occupations which are regulated and require meeting established standards and regulations. This has caused tremendous diversity in licensing practices across the nation. While there is widespread existence of state and local regulations of plumbing and electrical contractors, there is little uniformity with respect to regulating other construction fields. Basic requirements for regulating construction occupations are left to the states and localities and the implementation is nearly always delegated to a board. In most states the law stipulates equal representation on boards for conflicting-interest groups--contractors and workers (Shimberg, et al., 1972). Regulations for becoming certified in construction occupations vary but in most occupations passing a test is mandatory. There is a minimum amount of training required and often there is a minimum age requirement. In addition to state and local regulating boards, there are many trade and independent associations which set standards for construction occupations. The Independent Electrical Contractors (IEC) was founded in 1958 and represents non-union contractors. The Institute (1992, Vol. III) reported that in 1992 there were 545,000 electricians in the U. S., 85% of whom were independent. IEC sponsors a four year apprenticeship program requiring 8000 hours of supervised training which is managed by local committees who establish entrance requirements. Participants must be at least 17 and usually they must have completed one year of algebra and have good aptitude in science and/or mechanics (Institute, 1992, Vol., III). The IEC is participating in one of the skill standards grants as are other construction related associations.

Service Occupation Certification and Licensing

Employment in service occupations has seen tremendous growth in recent years and that growth is predicted to continue. Much of this growth can be attributed to social and technological changes. We have become a society which enjoys

more leisure and recreation activities, has become accustomed to having the latest in electronic devices, has the need and desire to travel, and eats "on the run," all requiring specialized services which in turn are rapidly developing standards and skill requirements.

Both men and women are spending more money on services related to personal grooming. Cosmetology is an area which has seen tremendous growth in recent years and it is also one that has been regulated and had standards for many years. The rationale for regulating cosmetologists was established in 1925 and is based on the need for sanitary conditions as well as on the fact that cosmetologists use a variety of potentially harmful chemicals in their work (Shimberg, et al., 1972). Regulating cosmetologists is handled at the state level and also includes shop owners, schools of beauty culture, and instructors. Most states also regulate and require written as well as practical testing for manicurists, pedicurists, and electrologists. In order to be licensed, a cosmetologist's application must satisfy a number of statutory requirements covering such matters as age, education, citizenship, literacy in English (all written tests have traditionally been in English, but this regulation is gradually changing and some tests are offered in Spanish), residence, and health. In addition the applicant must have completed a training program and served an apprenticeship.

Accounting Occupation Certification

One of the oldest certifying programs in the business services area is the American Institute of Certified Public Accountants (AICPA) which was founded in 1887 and marked the organization of the accounting profession in the U. S. It has more than three hundred thousand members and is responsible for maintenance of the CPA exam (Institute, 1992, Vol. III). Uniformity of the CPA exam has been adopted by all states and the exam was first available in 1917. The exam is now required before any individual can be licensed by a jurisdiction as a CPA. Usually required is a bachelor's degree which has been conferred by a college or university recognized by the state's board of accountancy, and participation in an educational program including a specified number of credit hours in addition to the bachelor's degree. Three broad areas are thought to be needed: general (liberal arts), business administration, and accounting. In 1992 a new policy report was issued by AICPA which called for at least 150 credit hours (five years of college study) in order to obtain the knowledge common to the profession and recommended that state accountancy boards establish this as a requirement for all new applicants after the year 2000. Practical experience is also to be incorporated in the curriculum (Institute, 1992, Vol. III). AICPA is not a separate accreditation board but works with the National Association of State Boards of Accountancy to advise state regulators. There is only one level of credentialing and it requires passing a four part examination consisting of multiple-choice questions and problems.

This overview of historical developments of skill standards shows that there exists a long history and array of voluntary and government entities that are already actively involved in quality assurance within their profession by setting standards and certification systems. This review provides evidence that technical committees should be represented by business, industry, labor, education, and government as well as providing models for the 1992 grant recipient technical committees. More importantly, this review of historical developments provides a background for helping to understand the perceptions of technical committees regarding the adoption of national skill standards in vocational education.

International Certification and Standard Review

As the world's developing and war-torn economies improve their performance, the United States has lost its world market share in manufacturing. The Japanese have been the most formidable challenge but other East Asian nations like Korea and Taiwan are beginning to rival Japan as top international competitors, and the European Community is trying to improve its own competitiveness (U. S. Congress, Office of Technology Assessment, 1991). In a paper on the German Marshall Fund Report on the link between schools and the workforce, Nothdurft (1989) noted that the anticipated effects of the integration of markets within the European Community of 1992 have sharpened the focus on the competence of the European workforce. The author offered a simple equation which demonstrated the results of this report: quality guarantees competitiveness; workforce education and skill credentials guarantee quality. According to Nothdurft (1989), one of the recommendations in the German Marshall Fund report was that one outcome of education and training programs should be nationally recognized and accepted skill standards and certification. Unlike some of our international competitors, the United States does not have a history of establishing skill standards at national and state levels except for some licensed occupations.

There are also generic differences between the United States skill standards system and those of other countries. Some of those differences have been described by the Institute for Educational Leadership (Institute, Vol. IV, 1992) and include:

1. Most other countries are more advanced than the United States in terms of supporting education and/or work based skill standard systems.

2. There is a common thread that in other countries there exists an "exit from compulsory school" examination system that has been supported by the central or territorial government in various ways. These exams are developed and administered by an independent third party (sometimes the central government, but not the individual school).

3. In other countries with skill standard systems there are long histories of the central government supporting and

    promoting a third party certification of skills and knowledge gained through the vocational preparation programs. (p. 4-

    5)

        It has become a common argument across the political spectrum that for American firms to survive in the global marketplace and for the American economy to sustain high wages, we must pursue a high skill strategy. If the United States is to be competitive internationally, there is a need to develop comprehensive learning systems that are flexible and responsive to both industry and individual needs. As all industrial nations adapt to the new global economic competition, they, like the United States, find themselves rethinking the political and institutional foundations of their education and training systems (American Society for Training and Development, Center on Wisconsin Strategy, and Jobs for the Future, 1992). Sheets (1992) maintained that the establishment of a national system of skill standards is the first step in restructuring vocational education.

        In order to establish methods for developing skill standards which provide for competitiveness in the world market and to assess who in each country develops standards, a review of worker certification and standard systems in selected countries is appropriate. The countries described in this section represent a range of standard and certification systems. The countries included are Germany, Denmark, Japan, Canada, United Kingdom, and Australia. In addition, the European Community efforts will be addressed. These countries provide useful lessons for the United States in financing and administering skill standards and certification systems as well as providing important lessons to draw on in developing a national system of skill standards and certification to address a wide variety of workforce policy objectives.

Germany

        The following review of the German Dual System was provided by Sheets (1994) for the National Governors' Association. The development of the German Dual System dates back hundreds of years and has its roots in the guild and apprenticeship systems. The national skill standards were established in Germany through enacting the Vocational Training Act in 1969 and the Act for the Promotion of Vocational Education in 1981. As employees and trainees in private firms, apprentices are trained under federal training ordinances or skill standards. As students in school, apprentices are trained under required curricula established by states and based on national guidelines and standards. The Dual System provides 70% of German youth leaving school between the ages 16 and 18 with highly structured transition to the workplace and it covers approximately 370 recognized skilled occupations in almost every industry. As one of the most mature international

skill standards systems, the German Dual System provides a leading model for developing a school-to-work standards system for the United States.

While federal ministries govern each occupation and establish training ordinances, the Federal Institute for Vocational Training prepares the national training ordinances used to guide and regulate private employer training. There is a central committee which sets policy for the development and dissemination of national training ordinances which are represented by employers, workers, state government and the federal government (Munch, 1991).

The German Dual System has been widely recognized as one of the leading school-to-work transition systems based on national skill standards in the world and has been held up as a model for the United States to emulate as it searches for new ways to improve the transition from school to work. Skill standards play a central role in the German Dual System and the importance of the standards must be understood by America when considering ways to adapt portions of the Dual System in this country (Institute, Vol. IV, 1992).

Denmark

Denmark, like Germany, has a long history of involving business and industry in the education and training of the workforce, establishing standards, and in designing and implementing certification of skills. The current system was established in legislative reforms which came into effect in 1991 and is based fundamentally on the traditional apprenticeship system. The system provides for more than half of Denmark's youth to enroll in basic vocational education which combines practical training in a firm with theoretical and practical training at a technical college. Danish young people spend several months at a worksite and then several months at school (American Society for Training and Development, Center on Wisconsin Strategy, and Jobs for the Future, 1992). There seems to be a focus on joint construction and curriculum development by employers and trade unions of vocational training rather than on setting skill standards. Strong governance authority has been given to business and labor organizations at the national and local levels. Trade committees decide the structure and content of the actual education rather than establishing standards. The Ministry of Education, through its Department of Vocational Education and Training, has the central authority for approving training courses and programs and regulations. The Vocational Education and Training Council advisory committee makes recommendations to the Department of Vocational Education and Training on training duration, structure, objectives, examination and certification requirements for trades and occupations. The Council has representatives from business, labor, education and government.

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Japan

Japan has a highly structured system of transition from school to work or to postsecondary education with national skill standards playing a key role in establishing student credentials and in ensuring quality throughout the system. Japan's major strength, however, is its commitment to upgrading and retraining employed workers through extensive company- and industry-based training programs (Sheets, 1994). The Japanese vocational training system devotes considerable time and resources to defining and testing standards of competence for employed workers. For the most part, national skill standards and certification systems in Japan are driven by government and employer organizations, while professional associations and educational institutions play a secondary role (Institute, Vol. IV, 1992). Beginning with the passage of the Vocational Training Law in 1958, Japan attempted to create a unified system of vocational training that included a national system of trade testing and certification for workers to promote status and recognition for blue-collar workers.

The Ministry of Labor, which sets vocational standards, is advised by a tripartite council consisting of representatives from leading trade unions, employers and employer associations, and government. This council is given two main responsibilities related to skill standards: (a) establish program and curriculum standards for the training in recognized occupations or skills areas, and (b) oversee the testing and certification systems for these occupations or skill areas (Ishikawa, 1986).

The overall Japanese workforce development system devotes considerable time and resources to defining and testing standards of competence for employed workers. As in other industrial countries, the Japanese government plays a major role in regulating occupational competencies and practices to protect the public interest and promote overall economic growth and efficiency.

Canada

The central level of government in Canada does not have a Ministry of Education, yet Canada has undertaken a number of initiatives to provide direction and assistance in the standards setting process for the country. Similar initiatives began at the national level in the United States in 1992 to support the standards setting process and provide assistance to individuals in the pursuit of career choices (Institute, Vol. IV, 1992). In Canada there is no federal, over-arching organization or policy to provide for creating national standards within industries. Training and the recognition of standards within industries functions as a reserve power of the provinces or territories. There is a series of initiatives at the federal level to bring consistency between and among provinces and territories to language and procedures as they relate to the creation of industry and training standards.

The role and responsibilities for creating standards in Canada is fairly similar to the traditional way these roles and responsibilities have been allocated in the United States. In its report, the Institute (Vol. IV, 1992) noted that at the federal level, the government is responsible for creating and implementing particular initiatives that may have implications for the development of standards. At the provincial and territorial level, the government is responsible for registering specific standards.

The role and responsibility of business and industry in Canada and its provinces is to represent management and labor in the standards creation and promulgation process. That is, industry is responsible for developing and registering the standards with the provincial or territorial government. Industry is also responsible for working with colleges and two year institutions to arrange for related instruction and supplementary training. In many cases industry is the designated training site for supplementary training and receives tax dollars to conduct the training. Within the federal system in Canada there is the occupational Red Seal exam (Institute, Vol. IV, 1992) which is the assessment of skills used in dozens of trades, province-by-province, but that allows for licensure in those trades to be recognized across the entire country. The Red Seal exam functions with the apprenticeship programs and is the culminating assessment before someone earns a journey card. The exam is generated by a designated committee of industry representatives.

United Kingdom

The United Kingdom's entrance into the arena of establishing a national system of skill standards began in the early 1980s out of a national effort to rationalize both the education and training systems. According to Jessup (Institute, Vol. IV, 1992), during the past decade the central government has both decentralized and deregulated the employment and training programs. In the United Kingdom there has also been a radical shift in the organization of the compulsory education system with increased autonomy going to the local school and board of governors that must include parents, local businesses, and other community representatives. In addition, the National Vocational Qualifications board was established and is the heart of the United Kingdom's skill standard system. Under the Board, the National Council for Vocational Qualifications has responsibility to design the overall framework of qualifications, accredit the organizations that develop the qualifications, accredit the awarding bodies which design and award the qualifications, and insure the quality control of assessment. The Council has 13 members representing industry, education, trade unions, and professional associations. There are approximately 150 industry led bodies which specify standards and training and awarding bodies which examine and issue certificates of qualifications and assure the reliability of the assessment instruments. The standard or competency system in the United Kingdom is based on employment functions and not occupations or industries. In addition, third party

assessments by organizations award certificates of qualifications. In the Royal Society of Arts, for example, the Business, Education and Technical Council, and the City and Guilds have long been associated with awarding of workplace credentials (Institute, Vol. IV, 1992).

Australia

The Australian National Training Board only recently advocated the establishment of national core competency standards for both occupations and industries. Because a wide range of indicators and studies at the beginning of the 1980s showed the country was losing ground in the international marketplace, the National Training Board was created by various departments and agencies of federal government. This Board recognized that several interrelated components are essential to achieving an effective, efficient, responsive, and coherent education and training system (Institute, Vol. IV, 1992). These components, as reported by the American Society for Training and Development, the Center on Wisconsin Strategy, and Jobs for the Future (1992), are: (a) competency standards, development of training objectives and curricula, accreditation of training programs; (b) delivery by public and private sector providers, assessment of both prior learning and of mastery of competencies; (c) certification of mastery, monitoring and verification of system outcomes and quality; and (d) review of standards and curricula for continual updating to meet industry needs (p. 9).

The Australian National Training Board advocates the establishment of national core competency standards for both occupations and industries. These competencies, which are developed by industrial partners and approved by the Board, must be broad-based, related to realistic workplace practices, and understandable to trainers, supervisors, and potential employers. The most important component of the Australian system is the National Vocational Training Board which is organized much like a company and is an incorporated entity established by the commonwealth, state, and territorial governments. The Board's charge is to provide the National Vocational Training System with clear mandates about the types of skills that workers need, provide clearly delineated career paths for workers incorporating transferable skills, and be flexible (Institute, Vol. IV, 1992, p. 38) The Board works in partnership with industry and training authorities to achieve common objectives. The industry groups must be made up of employers and labor and must encompass all entities that work within the industry.

The European Community

There is a great deal of activity in Europe on trans-national skills recognition systems. Within the European Community there are a series of initiatives influencing the cross-country movement of workers. One of the core "freedoms" of

the Single Market is the free circulation of workers (Institute, Vol. IV, 1992). In order to achieve this freedom of movement the approach has been that each country must have a process for recognizing the competencies of individual workers. There are two forms of certificates that Europe has had to deal with--the Certificate of Achievement stating how well an individual has done in a course, exam, or practice and the Certificate of Entitlement which states what an individual is allowed to do (Institute, Vol. IV, 1992). There are two different commissions that address the two forms of certification. There continue to be problems in the development of trans-national standards due to a lack of common occupational classification systems across countries. There are no European qualifications that recognize the worker's competencies but there is a European Organization for Testing and Certification. Efforts are underway to promote international vocational qualifications in all European Council countries through a consortium of organizations.

Overview of Initial Preparation Models

In both Denmark and Germany the framework for their skill standard systems are school-to-work transition models. They both also have long histories of closely involving business and industry in their workforce education and training. Business and industry play the key role in establishing standards and in designing and implementing certification of skills. For example, the German Dual System is a leading international example of a school-to-work transition system based on national skill standards.

There is a critical feature of their skill standard systems which ties Canada and Japan together. This feature is the focus each country places on the development of skill certification systems for the occupations that have a substantial amount of mobility across jurisdictions (Institute, Vol. I, 1992). These are mostly in the crafts and trades occupations. National skill standards in Japan are driven largely by government and employer organizations, and focus heavily on incumbent workers. Canada excels at establishing both a common language and portable credentials.

Both the United Kingdom and Australia have comprehensive, and perhaps the most ambitious skill standard system models (Institute, Vol. I, 1992). During the past decade, there have been dramatic shifts and certification of skills has become viewed as central to the comprehensive strategy of both economies. The development of industry driven skill standard systems are having direct impact on the organization and structure of vocational preparation institution in both countries.

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<u>International Organization for Standardization</u>

In 1946 the International Organization for Standardization (ISO) was founded to promote the development of international standards and related activities. It is composed of member bodies from over 90 countries (Institute, Vol. IV., 1992). The United States member body is the American National Standards Institute (ANSI). In 1987 ISO published a series of five international standards (ISO 9000, 9001, 9002, 9003, and 9004) that provide guidance on the selection of an appropriate quality management program (system) for a supplier's operation. In some cases, compliance with one of the ISO standards has been mandated by a United States, foreign national, or regional government body if a company wishes to conduct business in the European Community. Thus as skill standards are developed in the United States, the ISO policies must be considered.

Coming to national skill standard development late in game poses disadvantages to the United States, yet at the same time there are advantages. The Institute for Educational Leadership (Vol. I, 1992) posits that one advantage is that the United States can learn from the countries described in this review and others to overcome the limitations of other countries by establishing one national comprehensive system for workforce development. Another advantage to the United States is that with government as the catalyst, from the beginning it can base its skill standard system on strong partnerships between business and industry, labor, education, and government with the private sector assuming the lead. An important commonalty for this study is that all countries researched in this overview of literature used representatives from business and industry, labor, and education to establish mechanisms for developing skill standards.

The above review of skill standard and certification history and development in other countries gives an overview of international efforts to develop processes and systems for recognizing a person's competencies and skills. The review provides lessons for the development of skill standards and shows that representatives from business, industry, labor, and education have provided important contributions to skill standard development and certification in the countries reviewed. The Institute for Educational Leadership (Vol. I, 1992) suggested the following lessons:

1. An open and clearly understood process is needed to conduct consultations among the stakeholders;

2. The government has a powerful role to play, particularly as an advocate and promoter of the process;

3. Industries must be responsible for developing the standards;

4. Fiscal support from the government is required to assist the industries in the development of standards that are to have nationwide applicability;

5. The standard setting process is facilitated by creating a standardized language and format that must be followed in creating national standards;

6. The standard setting process is, in fact, a political and negotiated process;

7. There must be education led processes established to facilitate the transformation of standards into curriculum; and

8. The standards generate the need to realign intergovernmental systems. (p. 20-21)

This study builds on the lessons above by determining the perceptions of U. S. technical committee members regarding the adoption of national skill standards in vocational education programs at the secondary and post-secondary education levels.

State Initiatives in Developing
Industry-Based Skill Standards

In 1992, the federal government launched an initiative to create a voluntary national system of industry-based skill standards and certificates as part of a national workforce development and education reform strategy. In addition to the national effort, the Perkins Act of 1984 authorized states to establish technical committees to increase quality of vocational instruction while continuing to modernize programs, and to expand access to these programs for all persons (East Central Curriculum Coordination Center & National Alliance of Business, 1988). A number of states have worked extensively with industries in defining the skills required by successful firms. The National Governors' Association (NGA) (Ganzglass & Simon, 1993) conducted a project to determine state experiences, public and private occupational regulation systems, and what other countries are doing in setting skill standards and establishing assessment and certification process.

The NGA (Ganzglass & Simon, 1993) findings presented case studies of states with major initiatives underway in establishing skill standards and reported that states use similar methods to develop skill standards. This is largely because of the long history of developing competency-based curriculum in vocational education, the extensive work of the Vocational-Technical Education Consortium of States (V-TECS), and the acceptance of the DACUM (Developing A CurriculUM) process as an effective approach for involving business in developing standards. States are rewriting competency statements so that they are more easily measurable and are involving business and industry associations in validating competencies and endorsing credentials to be awarded based on these measures.

Technical Committees

In outlining mandates for matching grants, the U. S. Departments of Education and Labor stated that technical committees, whose members included representatives from business, industry, labor, and education, be intricately involved in developing voluntary industry-based skill standards (U. S. Department of Labor, Employment and Training Administration and U. S. Department of Education, Office of Vocational and Adult Education, 1992). Identifying and specifying skill

requirements by business and industry is not new in the United States. For over fifty years, vocational educators have made use of the skills, knowledge, and experience of business, industry, and labor to enhance the quality of teaching and advising and to develop curriculum and performance standards. Business, industry, and labor have been a part of vocational education programs since 1917 when the Smith-Hughes Act provided funding for vocational education.

A vocational advisory or technical committee is made up of volunteers who agree to serve as advisors to one or more vocational programs. Membership usually includes representatives from business, industry, community agencies, former students, and parents of current students. Because of their working knowledge of the competency requirements of specific occupations, advisory committees can provide valuable advice, guidance, and assistance. The time and energy devoted by the advisory or technical committee helps to increase committee member's knowledge about the vocational program and to increase the teachers' knowledge about the job market, employer needs, and community opportunities (Vocational Instructional Materials Laboratory, 1992). Major roles and goals of advisory and technical committees have been reported in literature (South Carolina Department of Education, 1990; Alabama Department of Education, 1990; Dorsten & Hollenbeck, 1989; and Vocational Instructional Materials Laboratory, 1992). The Vocational Instructional Materials Laboratory (1992) provided the following goals for technical and advisory committees:

(a) provide information which will update, modify, expand, and improve the quality of vocational programs;

(b) support and strengthen the relationship between business, industry, the community, and education;

(c) make recommendations that will strengthen and expand the vocational curriculum, and provide assistance in implementing these recommendations;

(d) assist in identifying needs, determining priorities, and reviewing and evaluating programs; and

(e) articulate long-term goals and objectives of the vocational program to parents, employers, and the community. (p. 4)

As described in the previous section, advisory and technical committees have also become common practice at the state level. The Perkins Act (U. S. Congress, 1990) provided for each state board, in consultation with the state council, to establish a limited number of technical committees made up of representatives from business, industry, labor, and education. The Perkins Act (U. S. Congress, 1990) recognized that business, industry, and labor involvement is a fundamental principle of effective vocational educational policy and program design, and, therefore, mandated that the business community, who are directly involved in developing model occupational curricula, have representatives on each technical committee (East Central Curriculum Coordination Center & National Alliance of Business, 1988).

Technical committees enhance the work and recommendations of the state councils on vocational education because they play a vital role in improving and adapting curriculum to be responsive to business and industry. In addition,

input from technical committees which are in partnership with business and industry help transform outdated curricula into training tools for real world occupations (East Central Curriculum Coordination Center & National Alliance of Business, 1988).

The National Council on Vocational Education (Farley & Winterton, 1988) agrees that technical committees are a worthwhile concept and has provided opportunities for states to share their successes and challenges and to improve the understanding of the potential of technical committees by establishing a network. Committee membership comes from employers, trade and professional organizations, and organized labor.

The U. S. Departments of Education and Labor recognized the importance of using technical committees with representatives from business and industry and labor as an effective way to provide input to the development of industry-based skill standards. The use of business and industry, labor, and education members on national industry-based technical committees is mandatory for those accepting matching grants. Therefore, grant recipient technical committee members' perceptions of skill standard development become important to this study. These members not only represent business and industry, labor, and education, but they know first hand the skill requirements of business and industry and can provide insight into how skill standard development must be a collaboration between business and education.

<center>Processes Used to Develop Skill Standards</center>

The use of task and job analysis, the DACUM model, and the V-TECS model are three processes used by grant recipients to develop voluntary industry-based skill standards. This section explains how these models were developed and describes selected related research.

Job Analysis

The analysis of jobs and job tasks is fundamental to the investigation of industry skill standards by technical committees. Job analysis was broadly defined by Ash (1988) as the collection and analysis of any type of job-related information by any method for any purpose. That is, job analysis attempts to reduce to words the things that people do in their work. Jobs are analyzed, stated Ash (1988), in order to identify the ability requirements necessary for an employee to complete a job tasks successfully, and to identify rewards associated with the job and how these rewards can be used to motivate employee work behavior and satisfy important employee needs. Until the behavioral requirements of a particular job are identified, selection criteria, training programs, or performance evaluation systems cannot be developed. Job analysis is a cooperative effort, usually between the job incumbent, the supervisor, and a job analyst.

Interest in job analysis research and practice has been substantial and varied (Arvey, Salas, & Gialluca, 1992; Schmitt & Cohen, 1989; Gael, 1988; Prien & Ronan, 1971). For example, Gael (1988) provided testimony to this research in a definitive two-volume work The Job Analysis Handbook for Business, Industry and Government (Vol. I and II). This comprehensive, pragmatic reference provided an extensive informational base. Gael posited that job analysis should be a purposeful, ongoing, organizational activity, performed by professionals in order to uncover, synthesize, and disseminate information about jobs that could be used in decisions related to organizational planning and design.

At the core of all job analysis techniques is the usage of job incumbents. McCormick (1976) and Cornellius and Lyness (1980) reported that job incumbents, first-level supervisors, higher level supervisors and others were typically used for collecting job analysis data through observation, interviews, and questionnaires. The use of job incumbents as data-producing agents was stimulated by the job inventory method popularized by the United States Air Force.

Grant recipients have not only used job incumbents and supervisors on technical committees that develop skill standards, but job incumbents and supervisors have also been used to validate the job tasks and skills developed by the technical committees. For example, The Electronic Industries Association and the Electronic Industries Foundation involved more than 500 job incumbents and supervisors in developing and validating electronics technician skill standards to insure that the standards were relevant to a national scope of related occupations (Kaplan, 1994).

Development of U. S. Air Force's Instructional Systems Design

Instructional Systems Design (ISD) began in the fall of 1943. The military realized that training needed to be directed toward developing specific job competencies that would enable its personnel to arrive on the job knowing what to do. There had to be structure and stability in training to ensure the relevance of training to jobs and to make training more efficient. Further, there had to be a way to monitor training inadequacies and correct them systematically (Arvey, Salas, & Gialluca, 1992; Montague & Wulfeck, 1986; Morsh, 1964; Mullins & Kimbrough, 1988; Taber & Peters, 1991). Thus, the process for training in the Air Force switched from all classroom lecture and written examination to practical training with the instructor providing demonstrations to precede student performance.

In Goldman's (1984) research of Instructional Systems Design in the United States Air Force, he reported that in 1950, the Air Force adopted the "developmental approach," a student-centered procedure in which the student learned through controlled self-activity. This approach was essentially problem-oriented using problems which centered around experiences which would give the students the opportunity to use mental and motor abilities to develop the skills necessary to do the job for which they were prepared. The next step in the evolution of the Air Force instruction came in 1961 with the

implementation of programmed learning (Goldman, 1984). This was a complete system which included all instructional materials, equipment, and educational media.

The Air Training Command conducted an investigation to determine the feasibility of an extensive application of this educational technique. About 350 people were trained to develop programmed instructional materials. They produced approximately 100 experimental programmed instructional packages to replace conventionally-taught topics that had each taken from two to thirty hours to teach. When the experimental packages were field tested, the results were encouraging: "though the developers were working with limited resources and experiences, these packages produced an average reduction of 35% in training time and an average gain of 15% in achievement" (Goldman, 1984, p. 471). The Air Force approach to instructional systems development was "hammered out" at a workshop in 1964 and the ISD process delineated by this workshop has since been polished and refined, but basically it is still the same. Researchers are now experimenting with computerized models and methodologies for easier use by training developers (Anderson, 1989; Fletcher & Ellis, 1986; Wallace & Sheffield, 1987-88). The ISD model has been adopted and adapted by business and industry and other branches of the military to analyze jobs and develop training models.

Vocational-Technical Education Consortium of States

The Vocational-Technical Educational Consortium of States (V-TECS) used the Air Force's ISD model and the Educational Testing Service Project as a basis for formulating the V-TECS model (Hirst, 1974). The V-TECS model is used to develop, identify, produce, disseminate, and revise catalogs of performance objectives and criterion-referenced measures. V-TECS was established by the Southern Association of Colleges and Schools in 1973. The Association encouraged states to form the consortium with a mission of providing high quality, business and industry validated, competency-based vocational-technical outcome standards, curriculum resources, and assessment vehicles (V-TECS, not dated).

The consortium theory grew from a real need to develop pools of expertise using job incumbents to solve educational problems, share research efforts and findings, pool financial resources to bring about a greater impact on the solution of a problem, and facilitate shared services such as data processing systems and hardware, expensive pieces of instructional equipment, and development of instructional software (Moore, 1968). The study conducted by Hirst (1974) at the request of the V-TECS Board of Directors developed an activity model for V-TECS. Studied as part of Hirst's problem were trends in the related literature, selected operating projects across the United States, and results obtained from three Delphi probes from a jury of selected experts. Information was collected from the jury concerning the relative importance of an a priori listing of activities and sub-activities. In addition the jury responded to the chronological arrangement and sequencing

of activities. The findings of Hirst's study resulted in the development of the activity model which was adopted by V-TECS. In addition, a master sequence chart was developed by the jury of experts as a guide to the systematic development of V-TECS projects.

In its twenty year history, the twenty-three states in V-TECS have promoted competency-based vocational education. They have developed worker-related standards of performance for 170 occupational domains addressing more than 700 job titles from the Dictionary of Occupational Titles (DOT)(V-TECS, not dated). The V-TECS model promotes the systematic development and implementation of competency-based vocational-technical education through:

    a. the analysis of jobs and organization of job related information;

    b. the development of vehicles for assessing student achievement; and

    c. the design, development, and/or identification of instructional materials that provide a validated link between instructional/training and employment (V-TECS, not dated).

DACUM (Developing A CurriculUM)

DACUM was developed in 1969 by the Federal Department of Regional Economic Expansion, British Columbia, Canada out of a need to solve practical training problems (Mitchell, 1983). It is a system for curriculum development and has been used to make career training more effective. The DACUM approach to curriculum development has gained much popularity among professionals involved in curriculum development for occupational education and training. The following three attributes by Norton (1985), describe the DACUM model philosophy:

    a. expert workers are better able to describe/define their occupation than anyone else;

    b. any job can be effectively and sufficiently described in terms of the tasks successful workers in that occupation perform; and

    c. all tasks have direct implications for the knowledge and attitudes that workers must have in order to perform the tasks correctly. (p. 111)

Over the past twenty-five years, DACUM has evolved into a program planning model which is used to analyze a job or occupational area to describe training goals and recommend instructional approaches to achieve these goals. DACUM analysis provides a systematic approach to determining the competencies that must be performed by persons in a given job or occupational area through the use of business and industry panels (Woloszyk, 1991). DACUM analysis is an effective method of quickly determining, at a relatively low cost, the competencies that must be performed by persons employed in a given job or occupational area.

A modified version of DACUM was used by most states surveyed by the National Governors' Association (NGA) (Ganzglass & Simon, 1993) to develop industry-based skill standards. The NGA results reported by Ganzglass and Simon (1993) outlined modifications of the DACUM procedures used by most states. These modifications usually consisted of the following steps:

    a. developing duties and task lists based on the work of V-TECS and that of other states;

    b. forming a technical committee of eight to twelve incumbent workers and managers;

    c. having the committee review the lists of duties and tasks and construct a list of core competencies for
       a specific occupation or cluster of occupations;

    d. involving a second group of industry experts to review the lists; and

    e. returning the lists to the technical committee for final validation. (p. 15)

The National Center for Research in Vocational Education (NCRVE) (Norton, 1985) adopted the DACUM model for occupational analysis in 1976 and became the major user and trainer in the United States establishing the DACUM Training Institute in 1984. Since 1976 many other curriculum materials development centers, networks, and consortiums have adopted the DACUM model. The NCRVE found the DACUM model to be effective, quick, and cost effective.

DACUM has become a popular process for developing curriculum (Guikema, 1992; Hansen, 1991; Middleton, 1981). Not only have these and other researchers used the DACUM process but they have also made recommendations for improving the model. For example, Middleton (1981) in a study using a task analysis of a hunter's job, developed a set of procedures to improve the DACUM curriculum development process. The major purpose of Hansen's (1991) study was to validate a modified DACUM profile of competencies required by teachers of Principles of Technology at the secondary level. The results of the study found that 46.7% of the bands on the teacher competency profile needed revision and eight new competencies needed to be added. DACUM analysis, using business and industry panels, provided a systematic approach for Guikema's (1992) study of identifying competencies, job tasks, level of difficulty, and levels of employment for apparel and accessories marketing programs.

Grant recipient technical committees have used a variety of methods for analyzing occupational skills and for developing industry-based skill standards. Therefore, a review of these methods was significant to the conduct of this study.

Summary

A review of relevant literature was presented in this chapter. The review showed that representatives from business and industry and labor have been used effectively on local and state vocational education advisory and technical committees

since the passage of the Smith-Hughes Act in 1917. The review revealed that, in our rapidly changing technological society, representatives from business and industry and labor play an important role in collaborating with vocational education to assure that entry level workers are prepared with relevant entry-level skills. The need for changes in worker skills resulting from technological advancements has increased the need for the United States to develop national skill standards and certification. Looking to organizations with a history of developing skill standards and certification provides models for organizations who are just beginning skill standard development. In addition, the historical review has reinforced the importance of involving job incumbents and first line managers and supervisors on technical committees.

The discussion of skill standards development in selected countries supported the need for representatives from business, industry, labor, and education to be active participants in development of U. S. standards. These countries provide models of skill standard systems for the United States to review and draw from for development of our national industry-based skill standard systems. These countries also provide models of whether or not skill standards in the United States should be national in scope; whether skill standards should be voluntary or mandatory; whether tests and exams should lead to licensure or certification of specific skills; whether there should be a clear school-to work transition utilizing apprenticeships, cooperative learning experiences, and other work-related activities; whether credentials should be portable through the country; and whether a national skill standards model should be incorporated into the overall economics strategies of this country.

Denmark and Germany focus on youth apprenticeship approaches to training. Industry has for many years been involved in the education and training of the German and Denmark workforce. The models of skill standards and certification systems of Japan and Canada are that of the crafts. However, in Japan, the employers have central responsibility for the skill standards system while in Canada the individual providences have responsibility. The United Kingdom and Australia have comprehensive models. In both the countries the central government plays the major role in the skill standards systems which are viewed as central to the competitiveness strategy of the overall economies (Institute, Vol. IV, 1992).

The literature review has provided a description of the primary methods used to develop standards and competencies: job analysis, the instructional systems design model, V-TECS, and DACUM. These were examples of the curriculum development models that are used by both vocational education and grant recipients to develop skill standards and certification on local, state, and national levels.

This summary has highlighted literature related to technological changes, historical examples of standards and certification development, other selected countries' activities related to standard and certification development, and methods

used for standard development. No literature was found directly related to the purpose of this study, which is to achieve an understanding of the perceptions and projections of technical committee members regarding the outcomes and impacts of national skill standard development on vocational education. Methods which will be used to investigate and address the purpose of this study are described in Chapter 3.

CHAPTER 3

Methodology

*We must create not a high tech but a high skill economy through
competence-building at all levels of education and business.*

-- Allan Larsson, Director General
Swedish National Labor Market Board

The literature review provided an overview of examples of studies of selected associations that have a history of developing standards and certification requirements and the methods or models used by technical committees to develop these standards. In addition, a review of skill standards development and certification in other countries as well as a brief report of technical committees and their role in developing skill standards were presented. However, the literature did not provide evidence of technical committee members' projections of the possible adoption of skill standards in vocational education programs at the secondary and post-secondary education levels.

The methodology which follows has been selected based on the purpose of this study which was to determine the perceptions of technical committee members regarding the adoption of national skill standards in vocational education programs at the secondary and post-secondary education levels. In addition, the methodology was developed to gather data related to the objectives of this study which were to:

1. Identify the grant recipient technical committee members' demographic and occupational characteristics and perception of the process and results of the standard development project.

2. Determine the technical committee members' perceptions regarding vocational educators' use of skill standards in workforce preparation programs.

3. Determine technical committee members' perceptions of factors that would enhance or inhibit the adoption of skill standards by vocational educators.

4. Determine how technical committee members perceive skill standards will impact on the effectiveness of vocational education.

Using predominantly qualitative methodology, this research explored the experiences of selected grant awardee technical committee members who bring a variety of perspectives to committee involvement. The study also gave attention to

both committee involvement and experiences encountered by the technical committee members that enable them to make projections regarding the adoption of national skill standards in vocational education programs at the secondary and post-secondary education levels. This chapter discusses the research procedures employed for this study including: (a) methodological approach, (b) research design, (c) pilot study, (d) subject selection, (e) instrumentation, (f) data collection, (g) data analysis, and (h) summary.

Methodological Approach

The methodological approach which follows included a brief description of the rationale for the study and the telephone interview process based on research by Patton (1990), Pierce (1992), McCracken (1988) and others.

Rationale for the Study

This research contributes to the future development and implementation of national voluntary industry-based skill standards and examines possible enhancers and inhibitors of the adoption of skill standards by vocational educators. To understand clearly the role technical committee members play in developing skill standards, the researcher focused on and determined what has occurred in the first phase of skill standard development. To achieve the objectives of this study, qualitative methods were used.

The first phase of the study involved a survey that furnished a base of information for the second phase and principal focus of the study. The second phase included telephone interviews with selected technical committee members. Qualitative methodology allows a holistic view which involved understanding phenomena and situations as a whole with the assumption that the whole is greater than the sum of its parts (Patton, 1990). Patton (1990) noted that qualitative data consist of detailed descriptions of situations, events, people, interactions, and observed behaviors; direct quotations from people about their experience, attitudes, beliefs and thoughts; and excerpts or entire passages from documents, correspondence, records, and case histories.

The perceptions and behaviors of those studied were disclosed through telephone interviews that provided for shared communication. Qualitative methodology was appropriate and useful for this study since gathering detailed, in-depth information from technical committee members' facilitated assessing their perceptions regarding the possible adoption of skill standards by vocational educators. Qualitative inquiry operates in real situations and contexts utilizing researcher-subject interaction to uncover information not otherwise accessible (Pierce, 1992). The qualitative approach also analyzed phenomena based on assumptions accommodating a small number of subjects.

Interview Methodology

The telephone interview was used to gather data to achieve the objectives of this study. The interview can be one of the most powerful methods in the conduct of qualitative research. McCracken (1988) posits that social scientific study is improved by a clearer understanding of the beliefs and experience of the actors in question. One way to achieve this clear understanding was with the in-depth interview.

Telephone interviews were chosen for this study because telephone methodology has proven effective with a well defined interview guide (Boser, 1988; Frey, 1983; Heath-Camp, Key, Kelly, & Yahya, 1985; Katz, 1993; Keats, 1988; Lavrakas, 1987; Lindsay, 1982). The advantages and disadvantages of employing telephone interview methodology have been noted by many researchers (Frey, 1983; Haines, 1985; Heath-Camp, et al., 1985; Katz, 1983; Lavrakas, 1987; Lindsay, 1982). These authors reported the advantages of telephone interviews to be:

1. Easily administered.

2. Less costly than personal interviews, yet allow personal contact.

3. Faster to complete than mail surveys and face-to-face interviews.

4. Generally have a high response rate.

5. Provide unlimited geographic access.

6. More directions and explanations can be included.

The disadvantages of telephone interviews as compared to written surveys were outlined in the literature to include the following items:

1. Increased risk of increased social desirability bias.

2. Increased risk of interviewer distortion.

3. Total reliance on respondents retention of what they hear.

4. Total reliance on verbal communication.

5. Respondent's work setting conditions may place limits on what and how much can be asked.

6. Survey call may be at an inconvenient time.

7. Interviewer may bias the study by explaining how she/he feels about the topic or questions.

To combat potential problems associated with the disadvantages, all telephone data were collected by the researcher using a preset script (Appendix A). Each potential respondent was telephoned in advance to make an appointment for the telephone interview. A telephone call sheet (Appendix B) was used to record details about the date and time of each

phone contact. The call sheet also included any special comments made by the respondent and any special follow-up procedures. All interviews were taped and transcribed verbatim.

Research Design

By using survey and telephone interview methodology, the researcher was able to describe the technical committee members' perceptions of the adoption of skill standard development in vocational education. All technical committee members who were identified by obtaining addresses from grant recipient administrators were surveyed using both closed and open-ended questions. This study incorporated a survey to determine the demographic and occupational characteristics of technical committee members as well as member involvement in developing skill standards. Returned surveys were reviewed and analyzed to provide criteria for selecting the subjects for the in-depth interviews. The open-ended portion of the survey was used in the interviewee selection process.

Qualitative methodology was utilized to determine the technical committee members' perceptions regarding vocational educators' use of skill standards in workforce preparation programs, factors that would enhance or inhibit the adoption of skill standards by vocational educators, and how technical committee members perceive skill standards impacted on the effectiveness of vocational education.

Technical committee members from the first thirteen grant recipients were the participants in the first stage of this study. Data were collected using a written survey sent by mail to all technical committee members whose names and addresses were provided by grant recipient administrators. Next, telephone interviews of purposefully selected technical committee members were conducted. To understand clearly the role that technical committees play in developing skill standards, the researcher developed a survey and interview questions that focused on the objectives of this study.

Pilot Study

The survey and possible interview questions were pilot tested under conditions anticipated for the final study. The written survey was pilot tested with members of two technical committees, one each from the Departments of Education and Labor 1993 grant recipients. These grant recipient technical committees were formed the year after the original thirteen committees began their work. The two groups sent the pilot survey were randomly selected from the mailing lists made available by the grant administrators. The pilot study used the research procedures outlined in this proposal. In addition, the survey was sent to the 1992 grant recipient administrators (Appendix C) for their reactions and input for making modifications to the survey and for drafting questions for the telephone interviews. Both 1993 selected technical committee

members and grant administrators were asked to comment on how the written survey should be modified. These responses were analyzed to assess the effectiveness of the survey and the results of the pilot study were to modify the survey (Appendix D), and to complete the interview instrument. The pilot study resulted in the following modifications in the survey: (a) the eight representative groups were divided into subcategories, i.e., service business or industry: employee, manager, trainer; (b) reviewing standards was added to part two ("my role in developing standards was that of"); and (c) in part three statements generated from the pilot study responses were added under each open-ended statement for respondents to check if they applied. See Appendix D for the revised survey which was sent to technical committee members.

Subject Selection

Population

Grant recipient administrators were written (Appendix E) to request mailing lists and telephone numbers of their technical committee members. The population for the survey phase of this study were all identified technical committee participants and technical committee chairs of the original thirteen 1992 grant recipients from both the Departments of Education and Labor identified by these administrators. The technical committees consisted of representatives of business and industry, labor, and education as well as trade associations and trade unions. A letter was sent to the 225 technical committee members briefly describing the study and informing them of the both phases of the study and asking them to participate (Appendix F). All technical committee members were sent a consent form (Appendix G) with the survey and asked if they would participate in telephone interview phase of the study. Appendix H is a list of the grant awardees who provided addresses of their technical committee members and a selected sample of the standards.

A purposefully selected sample for the interview phase of the data collection process was chosen by analyzing the surveys received from technical committee participants. As many as three interviewees were selected from each of eight occupational groups represented on technical committees. Patton (1990) maintains that "there are no rules for sample size in qualitative inquiry. The validity, meaningfulness, and insights generated from qualitative inquiry have more to do with the information-richness of the cases selected and the observational/analytical capabilities of the researcher than with sample size."

The eight groups, which were representative of technical committee composition were: a management and an employee representative from a service business or industry, a management and an employee representative from an industrial or manufacturing business or industry, a union representative, a representative of a nonunion trade or professional association, an educator, and a representative from government. Interviewees were also selected based on their involvement

in developing standards, whether or not they had prior experience in developing industry-based skill standards, and their responses to the open-ended survey questions. Those committee members identified from the survey as providing a diversity of views in responding to open-ended questions related to use, enhancers, inhibitors, and impact were considered for interviews. In each of the eight groups, the researcher ranked the respondents in terms of the completeness and variety of their responses. Those ranked highest were contacted for participation in the in-depth interviews and to schedule a date and time.

<div align="center">Instrumentation</div>

By participating in the survey, the business and industry, labor, and education technical committee participants were able to report demographic and occupational characteristics and perceptions of the process and results of their standard development project. Items for the survey were developed after an in-depth review of research and literature on advisory and technical committees, history of standards and certification development, use of standards and certification in other countries and methods of developing standards. The open-ended questions for this instrument came from the objectives of this study, research and literature, recommendations from the grant administrators, and responses to open-ended items of the written survey. For example, the responses to the question, "What are your perceptions regarding vocational educators' use of skill standards in workforce preparation programs?" were combined according to themes. A question or questions for the interview survey might be "Do you agree that industry-based skill standards would provide a base for curriculum development?" "Why or why not?"

The survey instrument consisted of 45 items in four sections pertaining to the objectives of the study: (a) demographic and occupational characteristics and involvement of technical committee, (b) yes or no response items related to the technical committee members role on the committee, (b) Likert-type items regarding technical committee members' views of the skill standards developed by their committee, and (c) open-ended questions dealing with objectives two through four. The survey instrument was reviewed by a survey research specialist and modified accordingly before being pilot tested. It was also modified as needed based on responses from the pilot test participants and grant recipient administrators.

The findings related to the first purpose, demographic and occupational characteristics and perceptions of the process and results of the standard development project, were obtained from the survey data. The findings related to the other three objectives of the study were obtained from the second phase of the study, telephone interviews.

The second phase of this study included development of an in-depth telephone interview instrument. The interviews were guided by a script (Appendix I) that (a) introduced the interview and explained the rationale, (b) reminded

the interviewee that the conversation would be recorded and that confidentiality would be maintained, and (c) started with broad questions and then became more specific. The interview guide consisted of open-ended questions and statements which were designed by the researcher to facilitate the interview process, to allow for free and flexible responses that could not be expressed in the written survey, and to control for interview bias.

The telephone interview data was confirmed by using cross-data validity checks. The cross-data validity checks included using only one interviewer, using a prepared script, having a sample of the cassette recordings verified with the printed transcripts, and triangulating the data.

Miles and Huberman (1994) write that triangulation is

. . . supposed to support a finding by showing that independent measures of it agrees with it, or at least, does not contradict it. . . . if you self-consciously set out to collect and double-check findings, using multiple sources and modes of evidence, the verification process will largely be built into data collection as you go. In effect, triangulation is a way to get to the finding in the first place--by seeing or hearing multiple instances of it from different sources by using different methods and by squaring the finding with others it needs to be squared with. (pp. 166-167)

To check for representativeness of the findings from the telephone interviews, interviewees were asked to send company mission statements, newsletters, annual reports, performance manuals, etc. to provide evidence of use of skill standards in their work setting or organization.

Data Collection

The first phase of the data collection consisted of mailing surveys to technical committee members and chairs using addresses supplied by grant recipient administrators. A letter was sent to all 225 subjects with the survey explaining the study and requesting their response to the written instrument by mail or fax. A consent form was also sent with the survey asking technical committee members to participate in a telephone interview. A stamped, self-addressed envelope for the respondent's convenience in replying was also enclosed. An organized plan for follow-up by mail, fax, and/or telephone was devised to encourage a high rate of return. A follow-up mailing was sent two weeks after the initial mailing to all participants who had not returned the consent form and survey, requesting that both items be returned. Those not responding after the follow-up mailing were contacted by telephone and asked to return the written survey and consent form. In both the letters and follow-up telephone conversations, the subjects were assured that all information would be confidential.

Initially fourteen people were identified from the twenty-four representative groups as having consented to the interview, completed the open-ended responses to phase three of the survey, and received a high ranking for completeness and diversity of answers to the open-ended questions . Six additional people were then selected from those who also ranked highly. The twenty people selected for interviews were contacted by phone and all 20 consented to the interview. A time and date for the interviews was scheduled. Information from the interviews was collected by telephone and tape recorded and subsequently transcribed. Notes were also written at the time of the interviews. After recordings had been transcribed and verified by the interviewees, a coding system was developed to facilitate the reduction of data and the charting process of the instrument. This served as basis for developing an interview analysis guide (Connell, 1991). As noted by Pierce (1992) the interview guide provides a basis for "exploring and asking questions"--allowing freedom to "build a conversation within a particular area, to work questions spontaneously, and to establish a conversational style--but with the focus on a particular subject" (Patton, 1987, p. 111). This method of data collection generated a variety of perspectives from the interview subjects, allowing for synthesizing, summarizing, and interpreting the information gathered from the interviews.

Data Analysis

The analysis of the data was determined by the objectives of the study and consisted of several phases: (a) review and analysis of surveys for selecting participants for the telephone interviews, (b) use of surveys as basis for interview questions, (c) analyses of interview transcripts to detect responses that appropriately and adequately address the purpose of the study, and (d) analyses of transcript materials to discover themes and patterns that would create a basis for coding and ultimately for developing responses to the research questions.

Review and Analysis of Survey Data

Results of the written surveys were used to select respondents for telephone interviews. Frequencies of demographic items were used to determine profiles of technical committee members and were reported in tabular form. In addition, a table was used to report a compilation of the yes and no answers describing technical members role on the committee and evaluation of the committee on which they served. Means and standard deviations were reported in tabular form in the appendices for responses to Likert-type items. These responses described technical committee members perceptions of skill standards regarding a variety of factors such as adoption, usefulness, durability, and enhancement of relationships between business and education.

Responses from the open-ended questions were reviewed and compiled for obtaining a variety of perceptions regarding adoption of skill standards by vocational education, usefulness of skill standards to vocational education, and enhancers and inhibitors for adoption of skill standards by vocational education. Responses from open-ended questions were evaluated for use in selecting interviewees with a variety of opinions regarding skill standards as related to the objectives of the study. For example, one respondent felt that more emphasis and a larger variety of skills courses should be offered beginning at the ninth grade while another interviewee indicated that vocational education should be taken out of the secondary school and offered at the post secondary level. Results of the analysis of the open-ended questions were used to develop the telephone interview script.

Analysis of Interview Transcripts

Cross-case analysis was (Appendix J, Descriptive Perceptions Matrix) were used to group together interviewees' answers for each question in the interview. The use of cross-case analysis is a way of ordering and grouping or quantifying data so that large sums of data become manageable. Patton (1990) suggests that cross-case analysis is best for open-ended interviews. All collected interview transcripts were analyzed to discover themes and patterns that would create a portrait of perceptions of technical committee participants of the adoption of skill standard development in vocational education. Coding was used to organize the responses of the open-ended questions followed by identifying concepts as they appeared and tallying similar responses. The next level of analysis was to search for relationships and interrelationships among the interviews. As these relationships and interrelationships in the form of themes and patterns began to arise, the portrait of technical committee members' perceptions of the adoption of skill standard development by vocational educators began to emerge.

Those who participated in the interviews were asked to review their interview transcripts for accuracy and modification. The raw data were then condensed, coded, organized, and classified. The results of the analysis of the interviews was presented in the findings. The findings related to the first purpose, demographic and occupational characteristics and perceptions of the process and results of the standard development project, were obtained from the survey data. The findings related to the other three purposes were obtained from the telephone interviews.

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Summary

The methodology of this study was described in this chapter and the design of the study was characterized. This chapter provided information about the selection of subjects, instrumentation, data collection procedures, pilot study, and data analysis of the survey. Procedures for analysis of the telephone interviews were detailed.

CHAPTER 4

Results of the Study

It's really not as much the skill standards as it is the assessment that goes with them. If you put the standards and the assessment together, you should be able to explain to people what it is that you're trying to accomplish. But if you just lay out a standard, sometimes it doesn't communicate everything you need to, and therefore people won't be able to live up to it.

--Interviewee

Primarily qualitative methods were used in this study to determine an understanding of the perceptions of technical committee members regarding the adoption of national skill standards in vocational education programs at the secondary and post-secondary education levels. A survey was used to identify technical committee members' demographic and occupational characteristics and perceptions of the process and results of the standard development project. The survey also served as a base for the telephone interview phase of the study. Telephone interviews were conducted with twenty technical committee members to determine their perceptions regarding vocational educators use of skill standards in workforce preparation, factors that would enhance or inhibit the adoption of skill standards, and how skill standards will impact on the effectiveness of vocational education.

Two hundred and twenty-five surveys were mailed to technical committee members who represented twelve of the thirteen original grant recipients. One grant administrator did not supply the names and addresses of the technical committee he administered because he felt that, as technicians, they would not be able to relate their work to vocational education. Follow-up letters were mailed three weeks later. A telephone interview consent form was mailed with the questionnaire. The twenty subjects were telephoned to schedule the interview sessions. They were sent a letter or a fax confirming the interview time and day. Additionally, they were sent a list of six interview questions for their review prior to the interviews. Subjects were called as scheduled to conduct the telephone interviews.

This chapter contains the following: demographic and occupational descriptions of technical committee members, perceptions of the standard development process and results, and responses to the telephone interviews.

Presentation of the Findings

Findings of this study are presented according to the purposes of the study:

1. Identify the grant recipient technical committee members' demographic and occupational characteristics and perceptions of the process and results of the standard development project.

2. Determine the technical committee members' perceptions regarding vocational educators' use of skill standards in workforce preparation programs.

3. Determine technical committee members' perceptions of factors that would enhance or inhibit the adoption of skill standards by vocational educators.

4. Determine how technical committee members perceive skill standards will impact on the effectiveness of vocational education.

The findings related to the first purpose, demographic and occupational characteristics and perceptions of the process and results of the standard development project, were obtained from the survey data. The findings related to the other three objectives of the study were obtained from the telephone interviews.

Demographic and Occupational Characteristics

The Departments of Labor and Education grant recipient administrators provided the names and addresses of 225 technical committee members who became the initial population of study. Nine surveys were returned by the U. S. Post Office because of insufficient address. Four of the responses were not useable because they were not completed properly. Four surveys were returned after the statistical data had been compiled. Useable data were obtained from 100 surveys or 48 percent.

Following is a description of the demographic and occupational data collected in Part One of the survey. The data are reported in frequencies, means and standard deviations. Fifty-four percent of the returned surveys were from U. S. Department of Labor technical committee members and 46% from U. S. Department of Education technical committee members. The survey respondents represented the following groups on the technical committees: 2 employees, 19 managers, and 7 trainers represented service businesses or industries. Industrial or manufacturing businesses or industries were represented by 22 managers and 4 trainers. Trade associations were represented among the technical committee respondents by 2 union and 5 non-union representatives; and professional associations were represented by 8 paid employees, 2 elected representatives, and 1 professional association volunteer. Seven secondary and 20 post-secondary individuals represented education while 5 subjects from education, 2 from labor, and 2 from other areas represented government. There were no

paid employees or elected representatives representing community-based organizations but 2 volunteers from community-based organizations were included in the respondents.

Most of the 100 technical committee members (91 of the 100) were Caucasian. In addition, those returning surveys included one American Indian, one African-American, and one Asian. Two indicated other ethnicity but did not specify and 4 did not respond to this item. The youngest committee member was 27 and the oldest 79 with the mean age being 47 years. Twenty-six were female and 74 were male. All but one of the subjects had completed high school. Seven had earned associate degrees, 30 had bachelor's degrees, 28 had master's degrees, 15 had doctorates, and 2 marked other and indicated they had completed an apprenticeship.

When asked about their experience in developing skill standards prior to participation on the technical committee, 23 members reported extensive experience, 35 moderate, 30 limited, and 12 no experience. Sixty-three respondents reported extensive experience in the field of education and/or training and development, 22 moderate, 13 limited, and 2 no previous experience in education. There were no descriptions of the terms, respondents perceptions of their own experience were expressed.

<div align="center">Perceptions of the Standard Development Process and Results</div>

In Part Two of the survey, technical committee members were asked to respond to a series of "yes" and "no" items related to their participation on the skill standard development technical committee. Eighty-two of the 100 respondents thought their role was that of advisor, 65 advocate, 55 specific action, 73 recommending standards, and 91 reviewing standards. Eighty-four participants felt they had a clearly defined role, 92 indicated they helped establish relevant skill standards for evolving and generic skills, and 76 indicated they offered new insights to skill standard development. The technical committee was a viable mechanism for developing effective skill standards in the perception of 94 respondents; 83 felt their committee addressed emerging labor needs and technical innovations; 93 indicated their committee included members of diverse opinions yet they reached common goals; and 88 believed their committee effectively accomplished their tasks. The above demographic data are also reported in Table 1.

A series of twenty-four statements was also included in Part Two of the survey. The respondents were asked to rate the statements using a five-point Likert-type Scale. The statements pertained to the views of the respondents about the skill standards developed by the technical committee they represented. Table 2 provides the mean and standard deviation for each item. Those rated highest by the participants in the section regarding "the skill standards developed by their committees" were: are appropriate to their related occupation (mean = 4.48), are appropriate and useful to business and industry

Table 1

Participation on Skill Standard Development Technical Committee

	Number of Responses	
Items	Yes	No

<u>My Role in Developing Standards</u>		
Advising	82	11
Advocacy	65	35
Specific action	55	36
Recommending standards	73	22
Reviewing standards	91	5
<u>Participants on My Technical Committee</u>		
Had clearly defined role	84	10
Helped establish relevant skill standards for evolving and generic skills	92	03
Offered new insights to skill standard development	76	13
<u>The Technical Committee I Served On</u>		
Was a viable mechanism for developing effective skill standards	94	03
Addressed emerging labor needs and technological innovations	83	13
Included members with diverse opinions yet reached common goals	93	04
Effectively accomplished its tasks	88	04

<u>Note.</u> N = 100. Not all respondents marked each item.

Table 2

Technical Committee Members' Views of Skill Standards

Items	Mean	SD
The skill standards developed by my committee:		
Are appropriate to their related occupation	4.48	.65
Are appropriate and useful to business and industry	4.48	.68
Are appropriate and useful to educators	4.38	.74
Will allow for more consistent, targeted instruction and curriculum	4.38	.86
Can be implemented by vocational educators	4.34	.83
Will improve the quality of vocational education	4.28	.84
Facilitate clearer goals and direction for students	4.28	.83
Will enhance the understanding and relationship between education and business and industry	4.20	.78
Can make the U.S. more competitive in the world economy	4.12	.90
Can easily be adapted to education curriculum development	3.96	.94
Demand greater accountability from schools, programs, teachers, and students	3.93	1.19
Are durable	3.74	.89
Provide for changes in technology	3.63	.91
Increased technological demands of the workplace	3.35	.98
Are too broad/general	2.03	.84
Are too specific	1.92	.70

Table 2 Continued

Technical Committee Members' Views of Skill Standards

Items	Mean	SD
The skill standards developed by my committee address:		
Technology skills	4.33	.77
Employability skills	4.11	.88
Problem solving and critical thinking skills	4.01	.87
Communication skills	3.91	.89
Academic competencies	3.76	1.07
Leadership skills	3.35	.96
Global perspectives	2.90	1.20
Cultural diversity	2.83	.83

Note. Responses rated on a 5-point Likert-type scale with 1 = strongly disagree and 5 = strongly agree.

(4.48), are appropriate and useful to educators (4.38), can be implemented by vocational educators (4.35), address technology skills (4.33), facilitate clearer goals an direction for students (4.38), and will enhance the understanding and relationship between education and business and industry (4.20). The statements pertaining to the views of the respondents about the skill standards which rated the lowest were: are too specific (1.91) and are too broad/general (2.03).

Respondents rated "address technology skills" (mean = 4.33) as being the item addressed most frequently by their technical committee, and "address problem solving" (4.01) with the second highest rating. "Address cultural diversity" (2.82) and "address global perspectives" (2.89) were rated lowest on the 5-point Likert-type scale. Table 2 also provides the mean and standard deviation for each item in the section of the survey regarding the skill standards developed by the committee.

Perceptions and Factors Related to Vocational Education

The third part of the survey included four questions related to the perceptions of technical committee participants regarding vocational educators' use of skill standards and factors which will enhance and inhibit the adoption of skill standards by vocational educators. The fourth question in part three asked perceptions of how skill standards will impact the effectiveness of vocational education. The respondents were given a list of statements related to each question and asked to check all that applied. In addition, they were asked to list additional perceptions, enhancers, inhibitors and impacts. Table 3 provides the four questions with the frequency of response to each item.

Question one was, "What are your perceptions regarding vocational educators' use of skill standards in workforce preparation programs?" Ninety-one respondents felt industry-based skill standards would help vocational educators better understand the work preparation needs of business and industry. Eighty-nine indicated that industry-based skill standards would provide a base for curriculum development. Eighty-one felt that industry-based skill standards provide a solid foundation for work-based learning. Only 63 of the respondents felt industry-based skill standards would only be effective for vocational educators if they include measurable performance criteria. Respondents added that skill standards could strengthen business/education partnerships and help vocational educators keep current as technology and standards change. Another response was that skill standards could lead to certification of students and programs.

Eighty-four respondents felt better communication between business and industry and education would enhance the adoption of skill standards by vocational educators; 80 marked business and industry expecting workers to demonstrate the mastery of skill standards as an enhancement to their adoption. Hands on experience, internships, apprenticeships, and school to work programs were factors that would enhance vocational education as perceived by 79 respondents. Sixty-three

Table 3

Technical Committee Members' Perceptions and Factors Regarding Skill Standards

What are your perceptions regarding vocational educators' use of skill standards in workforce preparation programs?	Frequency
would help vocational educators better understand the work preparation needs of business and industry	91
would provide a base for curriculum development	89
provide a solid foundation for work-based learning	81
will only be effective for vocational educators if they include measurable performance criteria	63
What factors do you think would enhance the adoption of skill standards by vocational educators?	
Better communication between business and industry and education.	84
Business and industry expecting workers to demonstrate the mastery of skill standards.	80
Hands on experience, internships, apprenticeships, and school to work programs.	79
Business and industry providing instructional aids to enhance the learning experiences of the students.	63
Having part of vocational education funding based on adoption and use of skill standards	57
What factors do you think would inhibit the adoption of skill standards by vocational educators?	
Lack of communication between business and industry and vocational educators.	86
Educators not willing to change.	83
Business and industry not accepting the standards.	78
Business and industry not demanding better trained workers.	60
Lack of effective assessment and measurement tools.	60
Insufficient financial resources.	58
How do you perceive skill standards will impact the effectiveness of vocational education?	
Make curriculum content more relevant to the needs of business and industry	95
Produce a better prepared entry-level worker and better placement rates for students.	83
Produce students with portable credentials.	78
Provide a structure to better measure skill attainment.	76
Make vocational education more accountable	72

Note. N = 100. Respondents only marked those they felt applicable.

felt business and industry providing instructional aids would enhance the learning experiences of students. Fifty-seven indicated that an enhancement for the adoption of skill standards by vocational educators would be having part of vocational education funding based on adoption and use of skill standards.

Question three asked, "What factors do you think would inhibit the adoption of skill standards by vocational educators?" The statement marked most frequently (by 86 respondents) was lack of communication between business and industry and vocational educators. Educators not being willing to change was felt to be an inhibitor by 83 and 78 indicated business and industry not demanding better workers was an inhibitor. Sixty respondents each marked business and industry not demanding better trained workers and lack of effective assessment and measurement tools as inhibitors. Fifty-eight indicated insufficient financial resources would inhibit the adoption of skill standards by vocational educators.

When asked how they perceived skill standards would impact the effectiveness of vocational education, 95 indicated that the standards would make curriculum content more relevant to the needs of business and industry. Eighty-three marked that use of the standards would produce a better prepared entry-level worker and better placement rates for students and 78 felt vocational education would produce students with portable credentials. Seventy-six suggested vocational educators would provide a better structure to better measure skill attainment and 72 checked that skill standards would make vocational education more accountable.

Responses from Part Three were used to develop the telephone script instrument. Based on the frequencies of the items marked under each of the four questions and the additional statements written by the respondents, an interview script was developed which was mailed or faxed to those respondents who consented and scheduled an interview. Additionally, Part Three was used to develop questions to be asked during the telephone interviews to provide additional insights and details of the interviewees' perceptions regarding the adoption of national skill standards in vocational education programs. The interview instrument which was mailed to interviewees and the script used by the interviewer are Appendix F.

Selection and Description of Interviewees

A purposefully selected sample for the interview phase of the data collection process was chosen by first eliminating those returned surveys which did not include a Consent to Interview form. Returned surveys with consent forms were then divided according to the eight major occupational groups and then by the subgroups each respondent listed on the survey (See Appendix D for subgroup categories). Those surveys that did not contain written responses to Part Three of the survey were eliminated. Only fourteen of the twenty-four subgroups contained surveys with consent forms and written responses to the four questions in Part Three. The researcher then reviewed the written responses on each survey in those

fourteen groups to select one respondent from each subgroup to interview. Six additional interviewees, for a total of twenty, were then chosen based on their responses to the four questions in Part Three of the survey. In selecting persons to interview, the researcher considered whether all questions had been answered, the diversity of opinions, and depth of responses. When reached by telephone, all twenty potential interviewees consented to a telephone interview and the day and time were scheduled. The interviewees were mailed or faxed a letter confirming the day and time and a list of six questions (Appendix F) which would be included in the interview. Interviews were conducted as scheduled and were recorded with consent from each respondent, and the interview tapes were transcribed for analysis.

Description of Interviewees

The twenty interviewees equally represented the Departments of Labor and Education skill standard technical committees. There were five females and fifteen males between 27 and 72 years old and they were all Caucasian. Two interviewees had completed high school and received specialty training in their field, six had earned bachelors degrees, and twelve had earned master's degrees or higher. The groups represented by the interviewees were:

Service business or industry: employee; manager; 2 trainers

Industrial or manufacturing business or industry: employee; 2 managers; trainer

Trade association: non union; union representative

Professional association: 2 paid employees; elected representative

Education: post-secondary (teacher, testing agency, and continuing education accrediting council representative);
secondary, (state director, and teacher)

Government department/agency: 2 education

Six interviewees felt their experience in developing skill standards prior to participation of the technical committee was extensive, eight thought they had moderate experience, five indicated limited experience, and one indicated no experience. Interviewees also reported their experience in education and training and development. Three felt their experience was limited, three moderate and fourteen extensive.

Exploratory Analysis and Case-Ordered Displays of Interview Transcriptions

Cross-case analysis (Miles & Huberman, 1994) was used to explore the twenty interview transcripts. The several hundred pages of transcripts had to be put in a manageable form so that some meaning could be drawn to determine the similarities and differences among the views of the interviewees. A partially ordered meta-matrix was developed narrowing

the transcripts into a more manageable form. "Meta-matrices are master charts assembling descriptive data from each of several cases in a standard format....The basic principle is inclusion of all relevant (condensed) data into 'monster-dogs' (charts)" (Miles & Huberman, 1994, p. 178). During the exploratory phase, the data were not put into internal order; i.e., the researcher did not impose conceptual chronological order or shape the data in any way. The next step was to further condense the data using case-ordered displays. Miles and Huberman (1994) recommend this method for ordering the data by case and then by variable. They posit that cross-ordered displays become a powerful way to understand differences and similarities among cases or, as in this study, interviews. (Appendix I is the Cross-Ordered Descriptive Matrix). The researcher reviewed all twenty transcripts electronically and divided each transcript into seven sections representing the seven interview questions. Next the responses from each interview were transferred to seven files, one for each question. The interview question files were analyzed and key words and phases were transferred to the cross-order matrix and grouped by interviewee and interview question. The matrix was used to write the results of the study.

Analysis of Data by Interview Question

Seven interview questions were developed based on the objectives of this study, the processes used for developing the skill standards, committee membership, and the need for the U. S. to be internationally competitive. Additionally, probing questions used during the interviews came from written survey responses and thus, emerged from the respondents and not the researcher. The analysis of the results is by research question.

What is Your Perception of How Vocational Educators Will Use National Industry-Based Skill Standards?

The first response from the interviews was whether or not they thought the standards would in fact be used. Themes which were asked about or emerged related to this question were:

- (a) whether standards would be used to strengthen business/education partnerships;
- (b) whether standards would be used to develop performance measurement of skills;
- (c) whether standards would be used to help vocational educators keep current as technology and standards change;
- (d) whether standards would be used to initiate individual and/or program certification;
- (e) whether standards would be used to assist students in securing employment; and
- (f) other reasons for use by vocational educators.

Most respondents felt the standards could be used by vocational educators in positive ways. However, they clarified their response with cautions and limitations as they now exist. For example, two said they would have very limited use because they have not been tested and they do not tell how to teach but are rather a list of what to teach. One interviewee indicated they will be of little use because there are no vocational programs in his technical area, and one felt they were just theory at this point and needed more focus and more narrow curriculum development. Another respondent did not think vocational educators would adopt the standards unless business and industry demand it, and education would not reform because "Right now they don't know what kinds of reforms are needed." "They have to have value and there must be incentives before vocational educators will use the standards," said one respondent. Those who felt vocational educators would use the standards provided reasoning in the areas listed above, and examples are provided in the following sections.

<u>Whether standards would be used to strengthen business/education partnerships</u>. Most respondents felt that adopting industry-based standards would create or improve education/business partnerships, strengthen advisory groups, meet the needs of the business community, and increase the acceptance of vocational programs by industry. One respondent felt the relationship in the retail industry was already strong with vocational education--strong enough that the standards will prompt vocational educators to say "Tell us exactly what you want and we'll be happy to deliver." He also maintained that the present curriculum in his technical area was representative of the standards as they exist right now. Not all respondents felt that strongly about the use vocational educators will make of the standards but many felt that the standards will open or set up an interaction for communication between business, industry, and education and "set parameters for more meaningful communications between educators and employers." One interviewee responded:

> We're doing it right now. . . we have what they call a 'defense diversification project' going on. It was some money that came from the federal government to re-train people who lost defense-related jobs. So we are applying those standards and have worked it out. We really structured a year and about three months course based on the skill standards, taking people who came from entirely different disciplines with, say, no machining experience. So basically they represent something similar to students that you have coming in from secondary schools. What we did with that was that we have an instructor and a facility. We had the equipment and building pretty much handed to us, which was a big help in starting the program. We're running it, and basically it's being managed by a community college. They're supplying what we call "related training." In other words, there's two phases to this. There's a classroom phase and then there's a practical machining phase that we do in the machine lab. The

community college provides the basic subjects. The community college has to make sure that students'
math, interpretation skills, and their reading skills are really commensurate with what you want to do,
because this is a program slanted towards giving them the beginnings of becoming computer-controlled
machining people. Then, the Regional Manufacturing Training Center is structuring and giving the
examinations for the national skill standards. In other words, our classroom instructor is working
towards the national skill standards. Every duty performance has a prescribed written examination that
a student is supposed to pass.

<u>Whether standards would be used to develop performance measurement of skills</u>. There was agreement among
interviewees that developing performance measurements was vital to the adoption of national skill standards. Part of those
standards do in fact say that "We're trying to work on developing exactly that--a performance-based type test," indicated
one respondent about the work of his committee. He said the performance-based test "doesn't necessarily mean a hands-on
kind of test, because they are developing a computerized version or simulation that will allow people to see an entire circuit.
The test will give symptoms, and they can probe the circuit, with a cursor or whatever, to demonstrate their trouble-shooting
capabilities. So, the answer to your question is 'yes,' and it is part of the standard from a national standpoint but still in the
developmental stages."

Another respondent said, "There will be a competency-based performance test that will not be administered by
that instructor, but there will be some testing facility somewhere that that person--whoever has taken that class--can go to.
If he has learned those duties properly, he can pass that competency test. If he hasn't, he's not going to pass that competency
test, so he's not going to be certified that he can do that lathe work, or drill press or whatever he was trying to get the
competency." One respondent told of what is happening in his area to assure that the standards will be performance
measured:

> They will be performance-based standards. We are going to give substantial attention to assessment. In
> our detailed plans we are addressing both self-assessment for students as they encounter various con-
> tent--as they move through the program--and a more summative type of assessment, which will come at
> the end of modules and at the end of appropriate time periods, and certainly at the end of the program.
> The intent of the program is to have students really well-prepared for entering post-secondary education
> in a wide variety of science technology areas. Or, if they do choose to move into the employment
> market, have them really ready to fit into the scheme of modern technical employment.

Most committees, in contrast, did not take their work to the stage where the standards were industry tested and performance measures were addressed or developed. Some felt their industry or association would take the standards to this point. Others felt that because federal funding had ended, the standards as written would be all that will exist, and that, unfortunately is not enough. Once the standards are tested, performance measurements need to be developed through the use of paper and pencil testing, simulations, and performance observations. Most respondents acknowledged the difficulty of using only performance measurement and observations, especially to determine certification or licensing proficiency. One respondent felt that curricula must be developed that include performance measurements and test banks.

Whether standards will be used to help vocational educators keep current as technology and standards change. The use of skill standards given most often was related to curriculum: improve curriculum, examine the curriculum and review current practices, curriculum design, develop a curriculum which includes the basics (math, science, communication, and English). A secondary teacher felt the standards he helped develop would be used to update curriculum and "make it more user friendly." Another agreed, saying the standards would "drive vocational education curriculum and give teachers better direction." Determining equipment needs was mentioned related to developing curriculum as was the need to identify and build into the curriculum specific duties and competencies which result from skill standard development.

The development of business partnerships, strengthening advisory committees and industry-based teacher training are further indicators of the ways interviewees felt vocational educators will be kept current in incorporating skill standards into their daily teaching activities. One interviewee provided his opinion of the training provided by business and industry:

> . . . like in the automotive trade (and I'm sure this must fall into electronics and plumbing and the
> other, and certainly nursing, for sure, and medical arts stuff) but there was going to be additional
> training required. I know in our trade, if the school wanted to meet the skill standards that are in place,
> then they've got to come into General Motors training centers, or Ford or Chrysler or Toyota for that
> training. If there's not release time or money for travel, then they're going to say "No." So then they
> can't possibly implement those standards if they can't come to the industry for that training. . . Every
> single car manufacturer provides an avenue by which educators can receive industry training--they have
> to if they want to have trained personnel coming to knock at their door.

Whether or not standards will be used to initiate individual and/or program certification. There were a variety of opinions on the topic of individual and program certification depending upon the committee the interviewee served on. Some

businesses and industries already have certification of individuals or programs in place and they felt that the work of their skill standards committee could strengthen those individual and program certification processes. The automobile industry does provide for volunteer certification of programs and individuals. One interviewee who was a educator on an automobile industry standards committee felt that the standards would strengthen the program certification accreditation process. A respondent from another industry said, "We're doing that right now. I mean, the certificates are being issued for the hands-on skills. We are actually going to conduct those examinations that are listed in the skill standards and we will take five people or whatever we can get at one time and give them the examination. A proctor's going to see whether they can perform the duty standard or not, pass them or not. And we will issue a certificate based on their performance."

Others acknowledged that their committee discussed the need for certification of programs or individuals and determined certification was not needed or that it was too far in the future to be a concern of their committee. Those interviewed from the retail standards committee indicated that their committee addressed certification of individuals and the need for developing a certification program became a part of their work. They acknowledged that a certification program may be developed and set the foundation for that certification but that would be the work of future committees. One interviewee addressed the individual and program certification issue this way:

> We have a great deal of trouble when it comes to trying to figure out what should be happening with certification. We have companies in the CPI--Chemical Process Industries--that do have internal certification programs. Typically, what this means is that they need a way of proving to regulatory agencies that their personnel are properly prepared for running complex equipment involving very hazardous materials. Much of this equipment is relatively specialized, that is, a given employer may have a process of which there's only one in the world. They need to ensure that the personnel responsible for that process are prepared to deal with it. Thus, that provides the basis for certification that must, of necessity, be essentially that process-oriented.

> So, we have that kind of thing that is going on now. Obviously, a student coming out of high school, or even a student coming out of a post-secondary program, is not going to be ready for that kind of certification. We have discussed certification in terms of more fundamental aspects, particularly as it relates to safety. That, of course, can be addressed in conjunction with a variety of regulations that apply broadly across the chemical process industries.

> But we have a number of different organizations that are concerned with these kinds of matters. We don't, at this point, see any particular organization as being the obvious candidate for

conducting a certification program. Our approach to this, thus far, is that, in the chemical area, we do provide what we call approval. You can think of it as accreditation. But we do approve chemical technology programs for chemical laboratory technicians at the current time. So that becomes essentially our quality control mechanism. But it is for the program, not the individual student.

One respondent felt there needed to be a state-wide movement to develop certification that would be a quality indicator for that school that it is training to business and industry standards. This certification would assure that curricula are in compliance with the national standards. Graduates would be certified and thus have portable credentials which would be accepted by business and industry. Some respondents felt that certification of a graduate would not necessarily guarantee that they could meet the entry-level needs of business at a higher rate than graduates who are not certified. In that regard, one replied, "Theoretically, and what people have told us is that if a person presented themselves (to business or industry for a job) with a certification that they have demonstrated the following, and these are skill standards that have been developed through the NRF, etc., they wouldn't automatically guarantee them a job but they would certainly use it as one factor within the employment process."

Whether standards will be used to assist students in securing employment. Interviewees felt that vocational educators will use standards to define the high performance worker, to give students portable skills, to determine graduation requirements, to assist students in securing employment, to build student portfolios, to strengthen the value of the vocational diploma, to define what students need to learn, and to assure employment. The ultimate goal of national industry-based standards is to supply industry with better prepared entry-level workers. Therefore, a major result of the standards programs should assist students in getting employed. One interviewee said that "Schools must be market driven to place graduates in jobs, that education must be practical, and that there needs to be work-based experience for all vocational students." Development of curricula based on national standards, better communication and strengthened partnerships between business and education, performance measured testing, and teacher training by industry should provide the basis for increasing student employment numbers. One industrial trainer summed up the need for making training relevant this way:

I think, from the very beginning, our students pretty clearly understood that they were going to have to be able to measure up to the standards that were there. That their related training in math and the other subjects were important because it's involved in almost every project that you do. You have to be able to interpret the drawing. You have to be able to mathematically determine movements and so on. So I think the students really saw that from the very beginning. I can't visualize that people who would

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be going into a project like that, I don't think they would even attempt it unless they were seriously aware of the fact that they really have to measure up in all these areas or they're not going to pass. It's not an easy thing to do. I would say it's probably too difficult for most secondary school curriculums because you're really doing something that I don't think is done very often in the secondary schools, and that is you're really trying to take the basic subjects--the learning that you're doing in the basic subjects--and immediately apply it to a situation that is a work situation.

Other reasons for standards being used by vocational educators. One respondent indicated that the use of skill standards would improve cooperative education and another indicated the standards, if accepted, would be used to give direction to administrators and drive teacher training. Having consistent outcomes across states and consistent learner outcomes were reasons given for uses of skill standards by another interviewee.

What Do You Think Is Needed to Enhance the Adoption of Skill Standards by Vocational Educators?

This question and the next relate to enhancers and inhibitors of the adoption of skill standards by vocational education. In analyzing the results, it became obvious that in many cases the same factor may be either an enhancer or inhibitor depending upon its presence or absence. A number of themes emerged during this portion of the interviews. What follows is a list of those themes, then a brief summary of each:

(a) industry acceptance of the adoption of national skill standards;

(b) expansion of apprenticeships, internships, and cooperative education;

(c) training opportunities business should provide for vocational educators;

(d) higher expectations of entry-level workers in demonstrating skill mastery of standards ;

(e) performance measurement and occupation specific testing; and

(f) other enhancers needed for adoption of national skill standards by vocational educators.

Industry acceptance of the adoption of national skill standards. Respondents felt that it is very important that business and industry accept the standards. Some felt there needed to be national level acceptance while others felt that local acceptance and buy-in would enhance the adoption by local school systems. Interviewees felt that business must accept the standards and relate their value and expectations to education by providing guidelines, materials, and equipment. There need to be "local alliances of business and educators to plan, develop, and implement curriculum." Standards should be

communicated by business and industry through national associations to local chapters. One respondent believed that industry needs to sell the standards to its own affiliates and be willing to "Fork out the dollars," be willing to accept that the standards will provide "bottom line improvement for their businesses," pressure schools to adopt the standards, and demand higher expectations of graduates.

The results of local business and industry acceptance would enhance and improve vocational programs in several ways. First and perhaps most important is that acceptance by industry would strengthen partnerships and result in better communication between educators and business and industry personnel. Second, local advisory committees would be strengthened and give better direction and leadership to vocational programs. Business and industry acceptance of the standards would open the door for the practical on-the-job training that interviewees felt is necessary for vocational educators to teach the skill standards. By accepting the standards, business and industry are more likely to provide tools and equipment for vocational laboratories.

One interviewee felt that "Business has to take the lead to make sure that the skill standards are accepted and constantly updated, and to assure educators get the information that is needed, whether it's an updated training manual, teacher training, or a new piece of equipment." On the other hand, another respondent had a different view. She indicated that acceptance of the standards must come from employers and workers but there needed to be a healthier separation between business and industry and labor and that labor should have more of a voice. There is too much input from business and industry and not enough "balance between educators, unions, workers, business and government." Another interviewee felt very strongly about the need for industry-driven changes and that industry needed to be willing to "fork out" the money to develop the curriculum, to invest more in technical training than in management. He also indicated that there needed to be changes in federal legislation which provided tax incentives or write-offs tied to business investments in training. Another interviewee felt the major enhancer

> ... is the standards being adopted by the state agencies that are responsible for the individual
> vocational programs. Like anything else, there are going to be educators--vocational educators--who
> are going to, on their own, try and make their program the best it can possibly be and will accept those
> standards and try to adhere to them and get certified. There are going to be others that are going to
> have to be offered incentives in order to do that. One of the incentives might be the state saying, 'You're
> going to be able to do certain things if your program meets these standards." Others are going to have
> to be pushed, for lack of a better word. So I think it's going to all come down to how the state agency
> that is responsible for these programs handles it in their state. I think they're going to have to accept

the standards, first of all, and then try to make the vocational educators in that state accept them and bring their program to the standards.

Expansion of apprenticeships, internships, and cooperative education. There was diverse thinking among those interviewed regarding expansion of apprenticeships, internships, and cooperative education. For example, one interviewee felt that there needed to be a strong student work component, and another indicated that skill standards would improve the cooperative work component of secondary education programs . One interviewee felt the actual skills training would take place mostly at the community college level and by on-the-job training. He felt the responsibility of the secondary schools was "to get the student really well-prepared for entering the post-secondary programs that they would go into. That really includes not only the formalized post-secondary education, but also education at employers' sites, in case they do go into a company training program instead of into a college or other kind of post-secondary institution."

One respondent noted there were not sufficient apprenticeship or cooperative positions for all students, and that this would not have an impact on the adoption of skill standards. Most respondents, however, felt that while apprenticeships, internships, and cooperative education were important to vocational education, there were other issues more important to the enhancement of adopting national skill standards.

Training opportunities business should provide for vocational educators. Most interviewees responded that industry must be responsible for a work-based component of teacher training and preparation for teaching skill standards. This training needs to be continuous and on-going. One respondent felt that vocational educators needed a minimum of two years experience in business and industry before being certified to teach. One interviewee said that this is already the practice in the automobile industry and that good teachers take advantage of the opportunities to train in industry settings: "Our local General Motors Training Center provides a two-week free summer workshop every year. In addition we have several different business groups that are involved in providing training opportunities for instructors--both community college instructors as well as high school instructors." Another interviewee indicated that business and industry must be responsible for updating certification standards and channeling standard updates and revisions to educators.

At least two others felt that it is the responsibility of the community college to accept the standards and provide skill standard training for industry workers--the responsibility of accepting the standards, promoting the standards, and training in the adopted skills should begin with the educational system and not business and industry.

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One respondent said it is not easy to get vocational educators back into industry for training and that in his state and locality, area program funding was tied to training:

> . . . You realize, then, after a while that you've got different levels of instructors. You've got some instructors who could teach the electronics course, and you've got some who need to take it. We started offering training on the front end when we set this up on two different levels--the more experienced person and the one that needed it from the grass roots. They were very honest with that. They wouldn't fool themselves or us. If they were on the beginning level of electronics, they would flock to that training. If they were on the more advanced level of electronics, they'd flock to that one. The three areas that we required when we offered training, everybody got it. And they had to have it, and they knew it.

> The first year was the roughest, but when they saw it meant equipment, which they hadn't had access to in a long time, and they saw it meant we were actually going to carry through with the initiative and that the program was in jeopardy of not being funded and it would mean they would lose their job, there was incentive to do it. It was phased in over a three-year plan, step-by-step process-- "Here's what will need to be done this year, next year,"--and it was monitored. The first year was the roughest. But after that, they saw the benefits. They saw the equipment coming to their programs. They couldn't complain because they had more to work with in the way of equipment and training aids and tools and curriculum and competencies and things that were industry-standard, and industry was right there hand-in-hand with us. There were no complaints after the second year.

Higher expectations of entry-level workers in demonstrating skill mastery of standards. Most respondents addressed this issue indirectly or from a different angle. Some felt that adoption of national skill standards by business and industry would result in higher expectations of entry-level workers in demonstrating skill mastery. However, these higher expectations would be a result of revised curricula, of defining what students need to learn, of performance based-testing and assessment, of the use of portfolios, of business and industry acceptance of the standards and having higher expectations of entry-level workers, of vocational educators helping students make a better connection between school and work, and of a strong skill standard component incorporated in vocational student organization activities. Other variables affecting higher expectations of workers would be establishing certification, licensing, or letters of achievement as indicators that schools are

training to business and industry standards and enhanced work-based experiences for students. One respondent felt there needed to be "a joint effort by business and education to improve student performance and credibility." Another said:

> Yeah, it's going to be on a competitive basis. For example, the employers are going to hire students from those programs where they know they get good students. So if you want your students to be able to get a job after their training is completed, you're going to have to have that reputation. I think, at that point, you're going to bring your program up to standard or your students are not going to be able to compete in the world of work in this skill area.

Performance measurement and occupation specific testing. The lack of performance testing and measurements seem to be the weak link in the standards as they are presently developed and written. There was a great deal of agreement that the skill standards as written had not been taken far enough. The skill standards committees need to continue their work by determining what performance measures "look like." This should be achieved by first taking the standards into industries and testing them. Once the standards are tested, performance measurements need to be developed through the use of paper and pencil testing, simulations, and performance observations. Most respondents acknowledged the difficulty of using only performance measurement and observations, especially to determine certification or licensing proficiency. One respondent felt that developed curricula should include performance measurements and test banks. Another respondent indicated it was up to the individual to provide the measurement: "They have a task list. It spells out the task. Now it's up to the individual program educator to tailor that task to his students as far as what proficiency that student should gain through that task."

Another said, "What we're grappling with now is what do those performance standards look like? What kind of methodology are you going to use? Are you going to use school accreditation? Are you going to use certification tests? Are you going to use a combination of that? Are you going to use student portfolios? What are you going to use as that means for validation of competency of graduates?"

Other enhancers needed for adoption of national skill standards by vocational educators. Teacher/instructor acceptance is needed to enhance the adoption of national skill standards but this may not occur until state and local administrators accept the standards and provide the leadership and atmosphere for change. Some interviewees felt that national skill standards will not be adopted if they are not state supported and administered. This was taken further by the high school educator who was interviewed. He felt that it was very important for standards to be state administered, but

more importantly local administrators must recognize skill standards as being important and necessary. If this acceptance does not occur, the administrators' focus will be directed toward other programs in the local schools. That high school teacher also felt that if teachers did not "buy-in" there would not be adoption of skill standards. To achieve teacher acceptance there must be curriculum which is performance based, up-to-date and updated frequently, simplified, and accepted by local business and industry. Another requirement is initiative taken by local business and industry for teacher training and employment of students. This same teacher felt that there needed to be an awareness of present-day issues and the current atmosphere in high schools.

One respondent thought that it would take federal legislation in order for vocational educators to adopt national skill standards. Several believed the adoption of national skill standards would be tied to the amount of federal funding available for implementation of revised and new programs, for equipment purchases, and for continuous work of the national standards committees.

Several other enhancers were given by interviewees: acceptance and better involvement by parents and the community; improved image and perception of vocational education; taking vocational education out of high school and placing it in the community college, thus giving more emphasis on basic skills at the high school level; attracting students by the ninth grade level; and the development of "some kinds of creative structures for investment in skills training." In talking about parent understanding, one respondent replied,

> . . . if we could somehow bring mom and dad into the equation and do a little bit of education with the
> parents to show them...As a matter of fact, I've got a book that NATEF put out that shows the academic
> skills embedded in vocational skills. It's amazing. You show that to somebody and they say, "I had no
> idea you needed to know these things." To at least show them these are the standards of the trade. This
> is the skills that your son or daughter have to master, to give them a better idea that there's more to
> vocational/technical education than they think plumbers and carpenters and auto technicians are. It is
> a highly skilled trade or trades and does require a substantial education. It's not just something to be
> mocked at and, "I only want my child to be a doctor, lawyer, or Indian chief." It's much more than that.

What Will Inhibit The Use of Skill Standards By Vocational Educators?

The list of inhibitors seemed endless, and often inhibitors were also those things which could be considered enhancers. For example, an enhancer of skill standards would be their adoption by business and industry. Business and industry not accepting the standards was recognized as an inhibitor. There were some common themes among interviewees

but there were also many differences of opinion regarding inhibitors. Many agreed that educators will not use standards unless there are incentives to do so and unless vocational educators see some value to the skill standards. One respondent simply replied, "The biggest thing that would prevent somebody from meeting the standards is somebody who just doesn't want to do that-- it's a lot of work to be able to introduce those into a program. For somebody who doesn't want to do that kind of work and take the kind of training that's necessary, then they're the kind of people that will not meet the standards." Common themes were:

     (a) business, industry, and education acceptance;

     (b) development of performance-based curriculum;

     (c) federal funding and legislation; and

     (d) other inhibitors.

     <u>Business, industry, and education acceptance</u>. All respondents expressed that an inhibitor would be lack of acceptance by business, industry, and education. There must be a general vision by all concerned that the standards are important. While there was agreement that lack of acceptance by business, industry, and education would be an inhibitor, there were varied opinions as to whose responsibility it was to "sell" the standards to the other. For example, one respondent posits that "It's going to take the local vocational educators to do some 'PR' on local employers in order to explain to them what these standards are and how their program [vocational] would be able to serve them [employers] better if they meet the standards." In contrast, an interviewee said that "Business and industry must demand it--period!" He further stated that business and industry must not only demand acceptance by vocational educators but must also buy the concept that national skill standards "can increase productivity on their bottom line." Another interviewee felt that "Unless they get adopted by industry and used by industry, educators won't grab onto them . . . I think industry has to latch onto them first before educators start buying into them." Still another did not believe there is enough industry support "out there." That same interviewee felt that whether the standards are being adopted by vocational educators is also an unknown factor. Educators are saying "Why should we if industry is not doing it? If industry is not using the standards, why should we teach the standards?"

     Another inhibitor related to acceptance by business, industry, and education was a lack of communication. One respondent believes there is "not a lot of communication taking place at all levels; there lies the major problem." She maintained that acceptance of skill standards and the need for changes in technical training and vocational education are not being presented in the "proper fashion to potential users." Educators lack of connection to the workplace and the absence of

a regular communication process inhibits adoption because educators "don't know whether what they are teaching is relevant unless they are connected to employers and whether what they are teaching actually goes on in the workplace." That same interviewee indicated that educators are not going to change unless pressure to change is placed on them by business and industry. Lack of communication is an inhibitor because vocational educators will not understand the standards and their intent. "In fact," said that respondent, "educators will not even know they are available." One respondent summed up the lack of communication among business, industry, and educators this way: "Educators are waiting to see if it works, and business is trying to wait and see if it works; everything that's come out is a matter of 'well, let's wait and see if it works'-- the people who are trying to move the standards forward are really trying to help both groups communicate with each other and bring the 'different cultures' together."

Education cannot just expect business and industry to have all the answers and solutions to the adoption of the standards. One interviewee expressed the opinion that vocational education also needs to take the initiative to educate teachers in an understanding of the national skill standards and workplace skills. If teachers do not enter the workplace for training and retraining, acceptance of standards will be inhibited.

One interviewee maintained that "If industry goes off and muddles and hires a lot of students that don't have that set of skills, then the skill set as a standard has no value or punch to educators and this definitely inhibits their adoption."

Development of performance-based curriculum. A big inhibitor was leaving the standards as written--not testing them in industry and not providing teachers with curricula and performance measured standards. One committee member replied, "Curriculum integration is the big inhibitor--to be able to implement the standards, you've got to have a curriculum that's going to provide information on how the math, science, and English are used in the business and, thus, in the classroom." "There was no development of a measurement of the standards; there's no measure tool or set of tools. There's no assessment program to determine whether or not these standards are being met, and this is certainly an inhibitor," said one interviewee. In contrast, another respondent did not think that the standards, as written, were an inhibitor of their being adopted and replied,

> We talked to I don't know how many thousand people--people who are actual sales associates who
> actually do the job--they're not pie-in-the-sky. They are very practical. We did not re-invent the wheel.
> They are not anything that anybody hasn't seen before. But we tried very hard when we were developing
> them. The assessment tool is even more specific to that point, to make sure that they're applicable to
> the small store equally, if not more so, than the big store because big stores always have access to more

tools than the small store does. We had to be very careful when we wrote them that there was application to the small store. Many of the people on the committee were corporate types who had been in large corporations. But we all had a real understanding of the fact that we had to make these practical to both large and small stores.

Adopting the skill standards is "a lot of work for teachers and they tend to be more rigorous on the teacher as well as the students. . . . thus, [adoption of standards] relies on the effort and desire on the part of the instructor." This respondent also felt the same standards should be the same for secondary and post-secondary schools and there will need to be a means for updating the curriculum on a "regular basis." One inhibitor is that "We have not determined how to measure them." Another felt that the standards are too "narrowly defined from the perspective of the job as opposed to a career and this will be problematic for curriculum developers." Another interviewee believed that "The objective of the document was not really clear. It's an instrument of what I need to teach students or what skills they need but not how I'm going to achieve it. So, what they've achieved now will basically sit on the shelf unless they take it a step further and provide the curriculum assessment tools, and this should be the responsibility of industry and business connecting to provide the curriculum. Therefore, it's going to be inhibited in the way it's written and what they see as useful to them."

Federal funding and legislation. Funding was seen by some to be an inhibitor while others felt that if the standards were important, industry would provide the funding. An important funding need seen by respondents is the expensive equipment needed to operate vocational education programs and the continuous updating and replacement of that equipment. One respondent indicated that "A principle inhibitor is going to be inadequate materials to lead to actual implementation of the standards; there's a substantial amount of specialized equipment that students should have access to." "Schools could come up with a wish list of equipment needs and if the school administrators don't support that funding or if local business and industry cannot provide the funding then there will be no effective program," said another respondent. Another felt the "dollars are a key piece of this--the flow of dollars will affect the rate of implementation, not implementation per se." "The attitude of Congress to cut support and the opportunities for the kinds of programs which skill standards have initiated is an inhibitor," felt other interviewees. Budget cuts "from Washington will force the agenda." "If we don't get government understanding and support of the purpose and whole intent of skill standards, then they're not going to be ready to fund vocational programs." Another felt that "We can over-price the schools out of the vocational education business-- price them out of their program."

"The bottom line comes down to 'If you don't have the money to buy the equipment, provide the training, and initiate mandates for the programs in order for the money to flow to the program--if those things are not done, adoption of skill standards will not happen'," responded one person.

Other inhibitors. Time was a big inhibitor, time to develop curricula, train educators, and develop an understanding by local and state administrators. "If the philosophy is not there, there is not going to be a program," replied one interviewee.

Another felt that educators were tired of "another new program or vocational education reform." One respondent felt that acceptance by the local and state administrators was vital:

> . . . in this area here, it's a hard sell. So I would say what inhibits the use of standards would be a non-acceptance by the school administration. For example, in the state community college system there have been four automotive programs that I know of that have dried up in the last five years--just the five years that I've been there. You say, "Why?" and I don't know why. I think it's because people didn't feel it was necessary. But it is.

> Resistance to change by educators, solely on the basis of "newness," was an inhibitor expressed by some. Two felt that an inhibitor would be the educators' ability to teach the programs. For example, "Most people who have the instructional capability for a machining lab would not possess the educational credentials." Thus, acquiring the "right kind of personnel" will be an inhibitor. "That's the rub," replied one respondent, "If the high schools run the program they have to adhere to the educational rules for credentials. Most people who would have the instructional capability for machining lab would not possess those educational credentials. Yet the schools have to hire the teachers with the credentials who may have never been into the lab. That's what fails utterly, of course, if you're trying to teach machining lab and you can't even run a machine. It's kind of difficult." Another respondent felt an inhibitor would be that "You could possibly have an instructor that likes something that is outdated. And they could be real knowledgeable in it and spend a lot of time teaching that student about that piece of equipment and that design, and the student never see it when he comes out in the workforce."

Parents skepticism of vocational programs as important alternatives to the four-year college degree was yet another inhibitor. The perception most people have of vocational education's programs and graduates was still another given by respondents.

<u>How Do You Perceive Skill Standards Will Impact the Effectiveness of Vocational Education?</u>

A number of themes emerged as the interviewees addressed this question. Themes included those which have already been addressed in other questions: improving the communication between business and industry and education; making the curriculum content more relevant; producing a better prepared entry-level worker; graduating students who will be better able to make the connection between school and work; adopting the standards which will improve the teaching and learning process; and making vocational educators more accountable. In fact, one respondent said at the outset that she had one answer which covered most of the questions asked. One interviewee summed up his response regarding the impact on the effectiveness of vocational education this way:

> If you expect vocational education to produce a product that industry wants, they [business and industry] should make their expectations darn effective. As long as vocational educators know the stated goals then it can be darn effective. So the best we can expect of our students is to learn the skills we asked vocational educators to teach and bring them in their back pocket when they walk through the door; and industry can shape them when they get in the door. We can expect the students will learn the spectrum of knowledge and be able to tie together.

All respondents felt there would be a positive impact on the effectiveness of vocational education but some believed more work needed to be done to further develop the standards before their full potential would be reached. For example, one replied "They can be very effective but not until they can follow through on the entire package, not just a list of skills, but an entire package--until you have a curriculum for educators to adopt, you are saying the skill standards aren't going to be as effective as they need to be. Not only do we need to identify those skills, we also need to identify the method to attain those skills." Another agreed that "The task now is to rewrite the curriculum; to make the curriculum content more relevant to the needs of business. Once local schools can determine the curriculum and an accepted performance level for the standards, produce an improved teaching and learning process, provide the additional training and work experiences for teachers so they can teach effectively, then vocational education will turn out the kind of employee that business needs." He also felt that vocational educators must be held accountable to make the necessary changes and meet the criteria established by the skill standards.

A positive impact which is occurring is that business and industry are communicating with each other. Most respondents felt lack of communication has been a major problem felt, and the development of skill standards has become an effective way to address the need for communication among business, industry, and education. Effective, ongoing communication creates a better direction than many vocational reforms have had in the past. Effective communication can

help educators understand what "needs to be done." "Educators get highly creative once they have an understanding of what is expected of them and their programs. This will enable students to make the connection between the skills being taught and relate them to work."

There was an overall feeling that once the curriculum had been rewritten to meet the needs of business and industry, and teachers had an understanding of what was expected of them--with relevant training then there would be the desired effectiveness. There was disagreement, however, on whose responsibility it was to develop the curriculum. Some felt it was business and industry's responsibility while others felt vocational educators must take the standards as presently developed and develop curriculum which produces graduates who will be more employable. Once vocational educators "buy into the standards," education is going to be more relevant to the needs of business and industry and help students make a better connection between school and work. One respondent felt the goal should be to "help the student become a fully competent, contributing, self-motivating and self-fulfilling member of society. The connection between teaching and learning, the standards, and meeting the needs of business will help students see that meaning taking place."

Vocational educators have a "target to shoot at which is very relevant--a set of minimum standards which will bring vocational education into today's technology." Some respondents felt educators can place their students because they can show industry what the students know. It gives business and industry a common ground for talking and the teacher becomes more responsive to industry. Industry and education will be able to work together to identify what the learner needs to know. There are some things which are important and the teacher can point to them and say, "This is what industry is saying it wants."

Yes, respondents felt in time, with additional work, skill standards could have an effective impact on vocational education. They will help make the curriculum more relevant to the needs of business, make vocational educators more accountable to the needs of business and industry, make students better prepared to enter the workforce, and make business and industry more efficient and productive. In addressing accountability, one interviewee definitely felt that vocational educators would become more accountable as a result of incorporating skill standards into the teacher training programs and responded:

> I could get a student in here and I start showing him things and doing things, and he says, "I've never
> heard of that. I've never seen that." And the person is intelligent. I know that he's telling me the truth.
> I know that the opportunity wasn't afforded him to learn this. Then I'm going to hold that educator
> responsible. I'm going to say, "You told me this boy went through a NATEF-certified course, and he did
> not." I'm not going to deal with those people again.

Another respondent said "The standards show another way that a marriage can occur between business, industry, and education. The standards themselves will give educators a feeling that they are actually providing what industry wants-- a better entry-level worker. Students will be better prepared and that's good for everybody. They provide tools to allow the teacher to carry the educational program further than if those standards didn't exist. They will certainly affect the quality of vocational programs and have a real positive impact." Another believed they would make vocational educators more effective: "It makes the process and the education of the student more applicable to today's business environment so that they are theoretically better educated. They have a better experience because it's a realistic situation, and it's based on fact and not something that doesn't bear any resemblance to the workplace." One interviewee provided this summary to the question of effectiveness:

Basically as you look at it, the skill standards can be very effective in terms of not only improving the product that a particular institution produces, i.e., the student. Once that product is produced, industry will benefit from having better products, from not having to invest their own resources to teaching them again when they get into industry. There's a lot of things across the U.S. that education doesn't meet the bill. Industry is currently having to re-educate employees, whether it be electronics-related or simply English as a second language.

If we have an effective use of the skill standards, industry should be able to at least back off-- I don't know if we'll ever get to the point of not having to do it--at least back off on some of the investment we currently make in that. If you look back to the days that some of us can remember back when they used to have an F.C.C. license. F.C.C. license used to mean something across the U.S. Nowadays it doesn't because it's fallen by the wayside in terms of technology and everything else. I'd like to see the skill standard become the new F.C.C. license. So that it has some meat and it's recognized in industry around the U.S. and around the world, for that matter; that's F.C.C. in another league. I believe it can and will get there. I don't think it's going to happen overnight, by a long shot.

And what you'll find is that it will happen over time. It's going to happen in pockets. You'll find people having success with it and success breeds success. You'll find one company saying, "Hey, this is good," and another company saying, "Hey, that's good." It will be like a snowball coming down the hill. It will pick up momentum.

What's going to happen is education is going to have to start the ball rolling. They have to be out there building that little snowball at the top of the hill, and they have to be patient and hang in

there. After their first year or even two years of a new curriculum industry is not going to see it right

away. The seed they plant today won't graduate--depending on what particular institution they're at--

for two to four years down the road. Then it's going to take that long for an industry to begin seeing it.

So it's like an investment in a small company. You have to start with a few dollars now and depend on it

to grow later on.

So people just have to have faith and kind of believe it's going to go.

Other Areas Addressed in the Interviews

The three questions which follow are not specified by the research questions for this study but they are pertinent to

technical committees' development of national industry-based skill standards. Advocates for national skill standards posit

that standards would improve the U. S. workforce and produce quality, thus improving U. S. competitiveness in the global

marketplace by being measured to the best skill standard systems in the world. Therefore, this researcher believed that

technical committee members interviewed should be asked whether or not their committee addressed the need to be more

competitive internationally.

In outlining mandates for matching grants, the U. S. Departments of Education and Labor stated that technical

committees, whose members include representatives from business, industry, labor, and education, be intricately involved in

developing voluntary industry-based skill standards (U. S. Department of Labor, Employment and Training Administration

and U. S. Department of Education, Office of Vocational and Adult Education, 1992). Additionally, the researcher was

interested in having the technical committee members describe the representation of their committee and the processes used

to develop skill standards.

Did Your Technical Committee Address the Need to be More Competitive Internationally?

One major focus of developing national industry-based skill standards is to make the U. S. more competitive in the

global marketplace. Because of the international focus, interviewees were asked whether or not their technical committee

addressed the need to be more competitive internationally. In addition, they were asked whether or not they agreed that

national skill standards will help achieve global competitiveness for the U. S. All but four of the respondents indicated that

being competitive in the global market was not a focus of their development of skill standards. Those whose committees did

not focus on international competition generally said that the nature of the standards being developed did not lend

themselves to this emphasis. The standards the respondents developed were based on local issues and industries rather than

international issues. The nature of the occupations for which standards were developed and the technical committee membership didn't lead to concern about international competition. The auto mechanic, nurse in the local hospital, high school auto body teacher, and dry cleaner are interested in training and hiring skilled workers for the services they provide, not for the manufacturing of products. For example, one respondent said, "It's the way people look at the health care industry. There are global issues and international corporations in the health care sector, but health care employers and hospitals are not necessarily competing in a national market." In the automobile industry, auto body was another area where the feeling was that the issue is a local, hometown issue and not a global issue and would not impact international competition. A member of the computer-aided drafting and design (CADD) technical committee indicated that the committee agreed that the world out there is communicating electronically, quickly, and rapidly and that CADD is a way of doing that. Yet they did not focus on international competitiveness when developing their standards except in the beginning stages of the committee's work when they looked briefly at what Australia is doing. One interviewee said they did not focus on the need to be internationally competitive, but during the course of their work they did exchange standards with other countries and gave attention to standards developed in other countries. He maintained that the standards his committee developed were "more complete and provide a good deal more depth than do the ones they studied from other countries." "Developing a closer alliance" between business , industry, and education was a reason for studying other countries in one committee--not the competitiveness issue.

Another respondent said they did not look at international competitiveness specifically, rather, "They looked at it in terms of needing to provide a very high level technician or operator compared to what the average is today. We have certainly been giving attention to the standards that have been developed in other countries. We have exchanged now. Some of the people who are involved in standards activities in other countries have suggested to us that they feel that ours are more complete and provide a good deal more depth than do theirs."

One respondent indicated that the committee he served on had "people who went all over the world. So we absolutely were taking a look at how things worked in other countries and how our students are doing relative to other countries." The committee agreed that "If we are going to compete globally we are going to have to strengthen that huge portion of our population. If we did that the right way, we would strengthen everybody."

Bio-science is a global economy, and that was made very clear to that technical committee. High-performance organizations were the focus of the committee, and support was enlisted from high-performance organizations in pharmaceuticals and bio-manufacturing. ISO-9000 became an issue for this committee, as did research and other cutting-edge issues, related the interviewee.

Another interviewee responded to this question by saying that he and others on his committee had studied what other countries are doing but that was not a main focus of his committee. He said,

I really get the feeling that our basic training of our machining people is not as good as theirs. So anything that we do to raise our standard so that the people that run our CNC machines, and so on, are as capable as the people in other countries is going to increase our productivity and our competitiveness. I think we're competing right now, but I think we're competing, strangely enough, on the basis that we really pay our people less than our competitors do in many cases.

A sub-theme of the competitiveness in the global-market issues emerged from the interviews. While some committees did not focus on the need to be globally competitive when developing their standards, they did study what other countries were doing in preparing youth in their technical area. The retail technical committee recognized they did not need to focus on global competitiveness because of the nature of professional selling/retailing and how it contributes to the local economy and local stores for local shoppers. However, some members of the committee and the staff traveled to England to look at the certification program they have developed and to make sure "we are not too far afield" from working on issues that will affect the global market. The other interviewee from the retail industry concurred and indicated the primary reason for studying the British model was their apprenticeship model and the way they certify workers.

What Process Did Your Technical Committee Use to Develop Skill Standards?

DACUM and task analysis, or a combination of the two, were the processes used by many committees. Four interviewees reported that they already had standards in place so their task was to review, revise, update and prioritize. One respondent said the principle activity that led to identification of specific standards applied a modified DACUM process. That committee used the DACUM process in a traditional sense for the first data collection. They then took the product of the first meeting and put it into a context where that became a starting point for the next data collection activity using the modified DACUM process. The modified DACUM process allowed the committee to get to the depth they needed for developing the finished product. Another respondent indicated the processes used by his committee included DACUM in the early stages and then they "did some work with task analysis." That committee worked with ACT and used the Workkeys process for some of the "knowledge pieces." He felt the process was very tedious but effective. Another interviewee who served on the same technical committee concurred that essentially the DACUM process was used, but in conjunction with ACT they looked at supporting generic (basic) skills that are required using the Workkeys process. She indicted they "went right into industry and found out first-hand what the tasks were and what was done in the workplace to be sure the job-specific skills were

supported by an adequate level of generic skills." In describing the process used by one technical committee, the respondent said:

> What they did was a work analysis. I don't like the word "task." The way they went about doing that is the first thing they did was to do focus groups with people in that job in high-performance companies. They asked them what they felt was important for their jobs. They went from focus group to focus group. I guess they did five of these focus groups until they came to a core set of things that people felt were really important. Then they started asking people, management groups, and looked at the same kind of thing. They came back and they tried to define what all that stuff was and put it together in some sort of coordinated picture. Then they went back and validated that with different people from the same organization.

The bio-science committee used the DACUM process, holding three focus groups in Massachusetts, New Jersey, and California. They brought the results in and one interviewee was able to bring "to the table" what she had done in her state using the same process and compare those results. "What was interesting was that all four said the same thing. That allowed for efficient input from a large number of people and yet an ability to be able to synthesize everything that came in to one cohesive set of expectations that could then be developed into standards."

At least two interviewees served on more than one committee. They indicated that DACUM and/or task analysis were used primarily. They found both processes to be effective. One positive result of using focus groups was that different businesses and industries were involved and the focus groups allowed for "hands-on people to participate in the subgroups--people who actually do the work." Most interviewees felt the processes were effective because of good leadership. One member of the retail technical committee said that they exclusively used the DACUM system, which was very effective. "Marketing educators have been utilizing the DACUM process for years and now that the retail industry has recognized DACUM as a worthwhile effort and used it themselves will probably better strengthen the impact and the reception of these standards by educators."

Did Your Technical Committee Include Representatives from Business, Industry, Labor, and Education?

The responses to this question were "yes," a "pretty good mix," a "melting pot of different occupational areas," and "It was diverse." Some felt the committee should be comprised primarily of business representatives. Others disagreed, feeling the committee they served on was dominated too heavily by business and that there were not enough educators, technicians, and labor representatives. The technical nature of the committee and the technical committee member's

background had an impact on the response to this question. Generally, if a committee member felt the committee was not representative, it was in the area of the members' professional background. For example, the members of the automobile standards technical committee--where occupations were dominated by males--focused on the diversity of the committee in terms of business and industry representatives. Their response was whether there was balanced representation from repair shops, manufacturing, dealerships, and industry training. With these committees, there was little concern for representativeness or balance by gender or even ethnicity. An interviewee from the automobile industry responded this way:

> . . . we had the business sector, both from the major manufacturers' side, the dealerships as well as independent repair shops. We saw guys from the big shops, the guys from the small shops. We saw the manufacturers representatives, mainly from the training area, like General Motors and Ford. We saw high school and community college educators. A very small minority of women. Ethnic make-up-- probably about as lean as the male-female ratio.

A representative from the retail technical standards committee felt "representative" meant not only business, education and industry, but gender and ethnicity.

Respondents felt that business, industry, and education were well represented. However, there were indications by some that their committees were not as representative in some areas as they should have been. For example, two respondents felt there was not enough union representation. In fact, one felt strongly about that, stating the committee she served on was "heavily dominated by employers and educators . . . and relatively few workers from these industries, the people who do these jobs." She contended the committee administrators were "not innovative" in terms of really broadening the committee to include not only more labor but people actually doing the job in the workplace. "The people from labor were late to the game because high-tech does not have very much labor employment; we really had to go out and look for somebody to bring in to work with us from a labor perspective," one respondent said.

Another interviewee also felt the committee was representative, and for the most part balanced, but did say there were no technicians. There were "too many corporate types, too many suits, and not enough nuts- and bolts-type people on the committee, there were no technicians," said another. This was the weakest point of all, indicated another interviewee-- not "having people who actually perform the jobs, having a voice from the actual worker rather than the person that represented the worker or the person that educated the future worker." The one secondary educator interviewed felt there should have been more representation from secondary education, from the people who will actually teach the skill standards which were developed. One interviewee from an electronics technical committee felt there were too many consumer electronic groups represented and not enough representation from training and management.

Summary

The findings of this study have been presented related to demographic and occupational descriptions of technical committee members, perceptions of the standard development process, and perceptions of the results of the standard development projects. This chapter also includes summaries of the responses to the 100 returned surveys and the 20 telephone interviews.

Projects funded by the Departments of Education and Labor were represented almost equally in the numbers of returned surveys. Of the eight groups represented on the technical committees, business and education were the groups represented most by those returning the mailed survey. Selected results of the 100 returned surveys included the following: 73 had at least a college degree and 58 had at least moderate experience in education and/or training. Eighty-two felt their role on the technical committee was that of advising and 92 felt they helped establish relevant skill standards for evolving and generic skills. The technical committee was a viable mechanism for developing effective skill standards in the perception of 94 respondents.

Statements that were rated on a five-point Likert-type scale pertained to the views of the respondents about the skill standards developed by the technical committee they represented. The view the respondents rated highest was "the skill standards developed by my committee were appropriate to the related occupation." The view with the lowest rating was "the skill standards developed by my committee are too specific." A second section of the scale pertained to areas that the skill standards addressed most frequently and "technology skills" was rated highest.

The third part of the survey was used to gather the perceptions of technical committee participants regarding vocational educators' use of skill standards and factors that will enhance and inhibit the adoption of skill standards by vocational educators. The fourth question in that section asked for perceptions of how skill standards will impact the effectiveness of vocational education. Ninety-one of the respondents felt industry-based skill standards would help vocational educators better understand the work preparation needs of business and industry and 84 respondents felt better communication between business and industry and education would enhance the adoption of skill standards by vocational educators. The main inhibitor viewed by the technical committee respondents was lack of communication between business and industry and vocational educators. The major impact on the effectiveness of vocational education would be that the curriculum content would become more relevant to the needs of business and industry.

Findings from the twenty interviews related to use of the standards by vocational educators, enhancers, inhibitors, and impacts of the standards. Five themes emerged associated to vocational educators' use of the standards: (a) strengthen

business and education partnerships, (b) develop performance measurements, (c) help vocational educators keep current, (d) initiate certification, and (e) assist students in securing meaningful employment.

The most significant enhancers were industry acceptance, expansion of apprenticeships and cooperative education, teacher training in industry, higher expectations of entry level workers, and development of performance measurements. Inhibitors reported most frequently by interviewees were business and industry not accepting the standards, not carrying the work of the committee to the stage where performance-based curricula is developed, lack of federal funding, and not providing incentives for vocational educators to use the standards. Improved communication between business, industry, labor, and education; making the curriculum more relevant to the needs of business and industry; and producing a better entry level worker were the impacts on vocational education which were given most often by telephone interview respondents.

Interviewees felt that being internationally competitive was not relevant to the development and adoption of their standards. This was due to the committees' focus being more on developing standards for occupations that provide services related to local economies and not global markets. The DACUM process was used most often to develop standards and the interviewees felt this process was effective considering their charge and the time allowed to complete the development of the standards. Generally, the twenty respondents felt their committees were representative of business, industry, labor, and education. There was a concern, however, that not enough technicians or actual workers related to the standards being developed were included on the committees.

CHAPTER 5

Summary, Findings, Discussion, and Recommendations

*These voluntary skill standards will be developed by industry in full
partnership with education, labor, and community stakeholders,
and will be flexible, portable, and continuously updated and improved.*

--National Skill Standards Board, 1996

A summary of the study inclusive of the purpose and research procedures is included in this chapter. Additionally, findings and discussion based on the findings, suggestions for additional research, and recommendations are presented.

Summary

One major outcome of the current concern about the economy and workforce preparation has been the proposed development and implementation of industry-based standards (Warnat, 1992). Advocates for national skill standards posited that standards would improve the U. S. workforce and produce quality in the international marketplace by being measured against the best skill standard systems in the world. These standards would provide better vocational education and more portable employment credentials for U. S. workers. Increased accountability among schools, teachers, and vocational programs would also be an advantage of national skill standards. This increased accountability would require educators to prepare graduates with entry-level work skills which meet the needs of business and industry. The Commission on the Skills of the American Workforce (1990) suggested skill standards as a major reform for the education and training field. The Perkins Act (U. S. Congress, 1990) authorized the establishment of a program of grants to industrial trade associations, labor organizations, or comparable national organizations for purposes of organizing and operating business-labor-education technical committees. The Act required that these committees should establish national standards for competencies in industries and trades which identify the knowledge, skill, and level of ability an individual needs to perform successfully in the workplace (Office of Public Affairs, 1993). The U. S. Department of Labor (1993) maintains that skill standards ensure a common, standardized system for classifying and describing the skills needed for particular occupations and the skills possessed by individual workers. A result of the evidence that the skill standards can strengthen both education and business and industries' reform efforts toward building a high performance workplace was the Goals 2000:

Educate America Act (U. S. Congress, 1994). This Act established a National Skill Standards Board to promote the development of a national system of industry-based skill standards.

In establishing a grants program, Congress mandated that the grant recipients, using technical committees, would identify (a) standards that establish entry and career advancement criteria; (b) broadly-defined occupational categories that crosscut individual firms or industries; (c) methods for benchmarking standards to world-class levels and for maintaining the currency of the standards; (d) preferred training delivery mechanisms, competency-based assessment tools, and certification arrangements; (e) incentives for development and implementation of national skill standards; and (f) the relationship of skill standards to existing occupational licensing and civil rights concerns (U. S. Department of Labor, 1992).

Research Objectives

The purpose of the research was addressed through four main research objectives that required both quantitative and qualitative methodology. The research objectives of this study were developed to determine the perceptions of technical committee members regarding the adoption of national skill standards in vocational education programs at the secondary and post-secondary education levels. The following are specific research objectives of this study:

1. Identify the grant recipient technical committee members' demographic and occupational characteristics and perception of the process and results of the standard development project.

2. Determine the technical committee members' perceptions regarding vocational educators' use of skill standards in workforce preparation programs.

3. Determine technical committee members' perceptions of factors that would enhance or inhibit the adoption of skill standards by vocational educators.

4. Determine how technical committee members perceive skill standards will impact on the effectiveness of vocational education.

Research Procedures

The first phase of the study involved a survey that furnished a base of information for the second phase and principal focus of the study. For the second phase, qualitative methodology was used which allowed a holistic view involving understanding phenomena and situations as a whole with the assumption that the whole is greater than the sum of its parts (Patton, 1990). Patton (1990) noted that qualitative data consist of detailed descriptions of situations, events, people,

interactions, and observed behaviors; direct quotations from people about their experiences, attitudes, beliefs and thoughts; and excerpts or entire passages from documents, correspondence, records, and case histories.

By using survey and telephone interview methodology, the researcher was able to describe the technical committee members' perceptions of the adoption of skill standard development in vocational education. Technical committee members from the first thirteen grant recipients were the participants in the first stage of this study. All technical committee members who were identified by obtaining addresses from grant recipient administrators were surveyed using both closed and open-ended questions. To understand clearly the role that technical committees play in developing skill standards, the researcher developed a survey and interview questions that focused on the study objectives. The purpose of the survey was to determine the demographic and occupational characteristics of technical committee members as well as member involvement in developing skill standards. Returned surveys were reviewed and analyzed to provide criteria for selecting the subjects for the interviews. The open-ended portion of the survey was reviewed for length, depth, and variety of answers. The twenty interviewees were purposefully selected according to the group they represented on the committee and the answers they provided on the open-ended portion of the survey. The findings related to the first purpose, demographic and occupational characteristics and perceptions of the process and results of the standard development project, were obtained from the survey data. The findings related to the other three purposes were obtained from the telephone interviews.

Qualitative methodology was utilized to determine the technical committee members' perceptions regarding vocational educators' use of skill standards in workforce preparation programs, factors that would enhance or inhibit the adoption of skill standards by vocational educators, and how technical committee members perceive skill standards will impact on the effectiveness of vocational education.

Cross-case analysis was used to group together interviewees' answers for each question in the interview. The use of cross-case analysis is a way of ordering and grouping or quantifying data so that large sums of data become manageable. Patton (1990) suggests that cross-case analysis is best for open-ended interviews. All interview transcripts were analyzed to discover themes and patterns that would create a portrait of perceptions of technical committee participants of the adoption of skill standard development in vocational education. The next level of analysis was to search for relationships and interrelationships among the interviews. As these relationships and interrelationships, in the form of themes and patterns began to arise, the portrait of technical committee members' perceptions of the adoption of skill standard development by vocational educators emerged.

Findings

Research Objective One

Identify the grant recipient technical committee members' demographic and occupational characteristics and perception of the process and results of the standard development project.

Of the 100 surveys returned, the members from the grants funded by the U. S Departments of Education and Labor were represented almost equally. Technical committee members represented all but two of the twenty-four occupational groups which were identified on the survey. The groups not represented were paid employees and elected representatives from community-based organizations. The three groups which had the highest representation were service business or industries managers, industrial and manufacturing business or industry managers, and post-secondary educators. Ninety-one of the respondents were Caucasian and 99 had at least a high school education. Seventy-three had received a bachelor's degree or above. Fifty-eight respondents reported having at least moderate experience developing skill standards and 63 reported extensive experience in the field of education. Responses to items related to technical committee members' participation on the skill standards development committee indicated that 82 felt their role was that of advisor, 84 felt they had a clearly defined role, 92 indicated they helped establish relevant skill standards for evolving and generic skills, and 76 indicated they offered new insights to skill standard development.

The technical committee was a viable mechanism for developing effective skill standards in the perception of 94 respondents; 83 felt their committee addressed emerging labor needs and technical innovations; 93 indicated their committee included members with diverse opinions yet they reached common goals; and 88 believed their committee effectively accomplished its tasks.

A series of 24 statements was included in the survey. The respondents were asked to rate their agreement with the statements using a five-point, Likert-type scale. The statements pertained to views of the respondents about the skill standards developed by the technical committee they represented. Those rated highest by the participants in the section, "the skill standards developed by my committee," were: are appropriate to their related occupation, are appropriate and useful to business and industry, and are appropriate and useful to educators. Respondents rated "address technology skills" as being the item addressed most frequently by their technical committee and "address problem solving," had the second highest rating.

The third part of the survey included three questions related to the perceptions of technical committee participants regarding vocational educators' use of skill standards and factors which will enhance and inhibit the adoption of skill standards by vocational educators. A fourth question asked perceptions of how skill standards will impact the effectiveness

of vocational education. The respondents were given a list of statements related to each question and asked to check all that applied. They were also asked to list additional perceptions, enhancers, inhibitors, and impacts to vocational educators or vocational education. When asked about vocational educators' use of skill standards, 91 respondents felt that industry based skill standards would help vocational educators better understand the work preparation needs of business and industry; 89 indicated that industry-based skill standards would be effective for vocational educators if they include measurable performance criteria.

Eighty-four respondents felt better communication between business and industry and education would enhance the adoption of skill standards by vocational educators; 80 marked business and industry expecting workers to demonstrate the mastery of skill standards as an enhancement to their adoption. The main inhibitor indicated by respondents (86) was lack of communication between business and industry and vocational educators. When asked how they perceived skill standards will impact the effectiveness of vocational education, 95 technical committee members marked "make curriculum content more relevant to the needs of business and industry." Eighty-three marked "produce a better prepared entry-level worker and better placement rates for students."

Research Objective Two
Determine the technical committee members' perceptions regarding vocational educators' use of skill standards in workforce preparation program.

Five main themes emerged from the interviews which related to this question: (a) whether standards would be used to strengthen business/education partnerships; (b) whether standards would be used to develop performance measurement skills; (c) whether standards will be used to help vocational educators keep current as technology and standards change; (d) whether standards will be used to initiate individual and/or program certification; (e) and whether standards would be used to assist students in securing employment. Additionally, other themes emerged for use of standards by vocational educators.

Most respondents felt standards could be used by vocational educators in positive ways. However, they clarified their responses with cautions and limitations related to the standards as they now exist. Most also felt feel that adopting industry-based standards would create or improve education/business partnerships, strengthen advisory groups, meet the needs of the business community, and provide for vocational program acceptance by industry. Most respondents felt that the standards will create communication channels between business, industry, and education.

There was agreement among interviewees that developing performance measurements was vital to the adoption of national skill standards. However, most committees did not take their work to the stage where the standards were industry tested and performance measures were addressed or developed. Some felt their industry or association would take the standards to this point; others felt because of lack of funding, the standards as written would be all that will exist. Most agreed that performance measurements will need to be paper and pencil tests, simulations, and performance observations. Most respondents also felt that curriculum must be developed that include performance measurements and test banks.

The use of skill standards given most often related to vocational education was curriculum development: improve curriculum, examine the curriculum and review current practices, curriculum design, and develop a curriculum which includes the basics. Determining equipment needs was suggested related to developing curriculum as was the need to identify and build into the curriculum specific duties and competencies which result from skill standard development. Developing business partnerships, strengthening advisory committees, and training teachers in industry are further indicators of the ways interviewees felt vocational educators will be kept current in incorporating skill standards into their daily teaching activities.

There were a variety of opinions as to whether or not standards will be used to initiate individual and/or program certification. Some businesses and industries already have certification of individuals or programs in place and they felt that the work of their skill standard committee could strengthen those individual and program certification processes. Others acknowledged that their committee discussed the need for certification of programs or individuals and determined certification was not needed or that it was too far in the future to be a concern of their committee.

Interviewees thought that vocational educators would use skill standards to define the high performance worker, to give students portable skills, to determine graduation requirements, to build student portfolios, to strengthen the value of the vocational diploma, to define what students need to learn, and to get students into the workplace. The ultimate goal of national industry-based standards is to supply industry with better prepared entry-level workers. Therefore, a major result of the standards program should be to help employers identify individuals who possess the knowledge, skills, and abilities which are in line with the high performance workplace.

Research Objective Three

Determine technical committee members' perceptions of factors that would enhance or inhibit the adoption of skill standards by vocational educators.

A number of themes emerged related to enhancers: (a) industry acceptance of the adoption of national skill standards; (b) expansion of apprenticeships, internships, and cooperative education; (c) training opportunities business should provide for vocational educators; (d) higher expectations of entry-level workers in demonstrating skill mastery of standards; and (e) performance measurement and occupational specific testing.

Respondents felt it was very important that business and industry accept the standards. Some felt there should be national level acceptance while others felt that local acceptance and buy-in would enhance the adoption by local school systems. Most interviewees felt that business must accept the standards and relate their value and expectations to education by providing guidelines, materials, and equipment. Positive results for vocational education if standards are accepted at the local level would be stronger partnerships and better communication between educators and business and industry. Also, local advisory committees would be strengthened and give better direction and leadership to vocational programs. Business and industry acceptance would open the doors for practical on-the-job training that interviewees felt is necessary for vocational educators to teach the skill standards. By accepting the standards, business and industry are more likely to provide tools and equipment.

There was diverse thinking among those interviewed regarding expansion of apprenticeships, internships, and cooperative education. Most respondents felt that while these work-based experiences were important to vocational education, there were other issues more important to the enhancement of adopting national skill standards.

Interestingly, most interviewees responded that industry must be responsible for a work-based component of teacher training and preparation for teaching skill standards. This training needs to be continuous.

Most respondents addressed the issue of higher expectations of entry-level workers in demonstrating skill mastery of standards indirectly. Some felt that adoption of national skill standards by business and industry would result in higher expectations of entry-level workers in demonstrating skill mastery. However, these higher expectations would be a result of revised curricula, of defining what students need to learn, of performance-based testing and assessment, of the use of portfolios, of business and industry acceptance of the standards, of vocational educators helping students make a better connection between school and work, and of a strong skill standard component incorporated in vocational student organization activities.

The lack of performance testing and measurements seemed to be the weak link in the standards as they are presently developed and written. There was a great deal of agreement that the skill standards as written had not been taken far enough. The skill standards committees need to continue their work by determining performance measurements. This should be done by taking the standards into industries and testing them before developing the assessment criteria. Most

respondents acknowledge the difficulty of using only performance measurement and observation. Other enhancers included teacher/instructor acceptance, support at the state level, support by local administrators. and continued federal funding.

The list of inhibitors included the reverse of those things which were considered enhancers. For example, business and industry not accepting standards was recognized as an inhibitor. There were common themes among interviewees regarding inhibitors but there were also many differences of opinion. Common themes were: (a) business, industry and education acceptance; (b) development of performance-based curriculum; and (c) federal funding and legislation. Many agreed that educators will not use standards unless there are incentives to do so and unless vocational educators see some value to the skill standards.

All respondents expressed that an inhibitor would be a lack of acceptance by business, industry, and education. There must be a general vision by all concerned that the standards are important. An inhibitor related to acceptance by business, industry, and education was lack of communication. Education cannot just expect business and industry to have all the answers and solutions to the adoption of the standards. Education must have initiative to develop an understanding of national skill standards and workplace skills. Another inhibitor would be teachers not entering the workplace for training and retraining. A big inhibitor was leaving the standards as written--not testing them in industry and not providing teachers with curricula and performance measured standards.

Funding was seen by some to be an inhibitor while others felt that if the standards were important, industry would provide the funding. An important funding need seemed to be the expensive equipment to operate vocational education programs and the continuous updating and replacement of equipment.

Time was an inhibitor: time to develop curriculum, train educators, and develop an understanding by local and state administrators. Resistance to change by educators was another inhibitor as was acquiring the right kind of teaching/training staff. Parents' skepticism of vocational programs as important alternatives to the four-year college degree is yet another inhibitor.

Research Objective Four

Determine how technical committee members perceive skill standards will impact on the effectiveness of vocational education.

Themes which emerged from the interviews included those which have already been addressed in the first three objectives: improving the communication between business and industry and education, making the curriculum content more relevant, producing a better prepared entry-worker, graduating students who will be better able to make the connection

between school and work, adopting the standards which will improve the teaching and learning process, and making vocational educators more accountable. All respondents felt there would be a positive impact on the effectiveness of vocational education but some believed more work needed to be done to further develop the standards before their full potential would be reached. A positive impact which is occurring is that representatives from business and industry are communicating with each other. Most respondents felt that the skill standard projects have become an effective way to address the need for communication among business and industry and education.

There was an overall feeling that once the curriculum had been written or rewritten to meet the needs of business and industry, and teachers had an understanding of what was expected of them--with relevant training, then there would be the desired effectiveness. There was not complete agreement on whose responsibility it was to develop curriculum, business and industry or education. They did agree that the standards provide vocational educators with goals which are very relevant and which can help bring vocational education into today's technology. Respondents felt that in time, with additional work, skill standards could have an effective impact on vocational education by making the curriculum more relevant to the needs of business and industry, make vocational educators more accountable to the needs of business and industry, make students better prepared to enter the workforce, and make business and industry more efficient and productive.

Three Other Areas Addressed in the Interviews

Determine whether technical committees addressed the need to be more competitive internationally. Identify the process used by the technical committees to develop skill standards. Determine whether the technical committees include representatives from business, industry, labor and education.

One major focus of developing national industry-based skill standards is to make the U. S. more competitive in the global marketplace. Interviewees were asked whether or not their technical committee addressed this issue. Additionally, they were asked whether or not they agreed that national skill standards will help achieve global competitiveness for the U. S. All but four respondents indicated that being competitive in the global market was not a focus of their development of skill standards. The general reason they gave was that the nature of the standards being developed did not lend themselves to focusing on being internationally competitive. The standards the respondents developed were based on local issues and industries rather than international issues. While some committees did not focus on the need to be globally competitive, they did study what other countries were doing in preparing youth in their technical area.

The DACUM or modified DACUM process was the principal process used to develop standards. In addition, many committees used focus groups. Four interviewees reported that they already had standards in place so their task was to

review, revise, update, and prioritize. In addition, some committees worked with ACT and used the Workkeys process to determine supporting basic skills. Committee members found the process used by their committee to be very effective for the standard development goals of their committee.

Most committee members responded that their committee had a good mix of representatives from business and industry and education. However, all were not in agreement. There were indictors by some that their committees were not as representative in some areas as they should have been. The labor representative interviewed felt that labor was the missing link on many committees. Many respondents agreed that there were perhaps too many business representatives and not enough technicians and labor representatives.

Discussion

Based on the findings of this study, this section includes discussion of the adoption of the standards, international competitiveness, and broad representation on technical committees.

Adoption of Standards

The national industry-based skill standard projects provide the impetus to bring significant modifications in the types of knowledge and skills secondary and post-secondary vocational students need to become high performance workers. Labor Secretary Reich (U. S. Department of Labor, Office of Information, 1993) argues that the standards will provide a framework needed to ensure that noncollege bound students and workers have the portable skills needed by today's fast-changing, global economy. The standards have become a part of the broad education reform and can help bring vocational education more in line with the present and future workplace. Skill standards provide the link between business and industry and vocational education. A positive impact resulting from the work of skill standard technical committees is that representatives from business and industry and education are strengthening partnerships and communicating with each other. This communication provides an effective way for vocational educators to determine needed reforms they must make to effectively provide relevant curriculum and make students better prepared to enter the workforce. Skill standards technical committee members' perceptions of their work on the committees provide a significant opportunity to assess the skill standard projects and determine how vocational educators might adopt the standards.

The adoption of technologies in service and manufacturing businesses has led to increased skill requirements needed to perform a variety of tasks in the high performance workplace. Therefore, to prepare workers for the high performance workplace, vocational educators need a knowledge of what the workplace situation is today. Wooldridge (1992)

suggests that the move toward smarter jobs appears to have accelerated in the past ten years because of a rise in information technology. Indications of the need for vocational educators to prepare workers for entry-level jobs in high performance business and industry were confirmed in the interviews with many technical committee members. Adoption of the standards will give vocational educators tools needed to better provide business and industry with workers who possess the knowledge, skills, and abilities which are in line with the high performance workplace.

Flynn (1988) posited that failure to meet the requirements that the demands for new, highly skilled labor created by the adoption of new technologies could hamper productivity gains and economic growth. Flynn's research on how the structure of labor demands affected the skill requirements of business and industry is in agreement with the findings of this study. The findings provide evidence that vocational educators must adopt to the diverse and evolving technological changes and skills needed by providing relevant curriculum that helps students secure employment in high performance workplaces. Employers have a responsibility to articulate their needs to educators so that appropriate curriculum and training tools can be developed. Additionally, to facilitate adoption, business and industry must provide training opportunities for vocational educators.

Approximately one percent of the U. S. labor force hold certification for a specific occupation (Institute, 1992, Vol. III). Thus, no strong tradition of establishing worker certification exists. One focus of the technical committee was to address the development of certification for their industry. Interviewees described varying levels regarding the existence of certification standards in their industries. As technical committees address certification of workers in their industry, evidence in history and the array of voluntary and government entities that are already actively involved in certification standards provide starting points for certification regulations and development.

For skill standards to be adopted, there should be a national vision and national direction. Yet, the most relevant communication for vocation education should be at the state and local levels. Strengthening business and industry and education partnerships at all levels will take time. Strengthening partnerships at national, state, and local levels provides a mechanism for broad industry and education acceptance of the standards. Better communication avenues must be opened and dialogue within and among all partners must be strengthened. Additionally, in order for vocational education to adopt the standards, they must be field tested and performance measures developed. Therefore, one outcome of these interviews is the belief that more work should be done by business and industry to take the standards that have been developed to the applied stage--to prepare workers with the ability to demonstrate a variety of skills in an industry context.

International Competitiveness

Advocates for national skill standards posit that standards will improve the U. S. workforce and produce quality in the international market place by being measured to the best skill standard system in the world. Thus, it has become a common argument that for American firms to survive in the global marketplace and for the American economy to sustain high wages, we must pursue a high skill strategy. If the United States is to be competitive internationally, there is a need to develop comprehensive learning systems that are flexible and responsive to both industry and individual needs. One major use of the standards envisioned by the U. S. Departments of Labor and Education (U. S. Department of Labor, Employment and Training Administration & U. S. Department of Education, Office of Vocational and Adult Education, 1992) was to suggest means to identify and accommodate future skill standards at national and world-class levels. According to the technical committee interviews, the work of the committees was in contrast to the theme of developing standards in order to be competitive globally. Technical committee members generally indicated that the concern of their committees was not international competitiveness, but rather how to meet the needs of local issues and industries.

Broad Representation on Technical Committees

One guiding factor of the Perkins Act (U. S. Congress, 1990) was that the technical committees should have representation from business and industry, labor, education, training institutions, and government. While the development of national standards and certification is voluntary, the involvement of each of these groups on national technical committees was mandatory for those who accepted matching grants. The U. S. Departments of Education and Labor recognized the importance of using technical committees with representatives from business and industry, education and training, government, and labor as an effective way to provide input to the development of industry-based skill standards. The indication of several interviewees was that while labor played an important part in the initial stages of standard development, i.e. task list development and validation, labor was the missing link on many committees. For labor to be an effective link in standard development, however, front-line workers should be given a better understanding of all aspects of the industry, not just their narrowly defined work duties. This will enable labor to more effectively participate on technical committees.

Implications and Recommendations for Skill Standards Technical Committees

The skill standard projects were initiated in part to strengthen the education system and provide employers with high performance workers. This in turn would strengthen our economy and place the United States in a competitive position

in the global marketplace. The 22 national skill standard projects provided the mechanism for developing a skill standards system. Technical committees played a vital role in developing these standards. The perceptions of the interviewees regarding their work on the skill standards technical committees has provided this researcher with insights as to whether the goals of the U. S. Departments of Education and Labor were met. While much progress has been made to develop standards and have them accepted by business and industry and education, there is much which needs to be done.

In order to develop skill standards that will provide employers with high performance workers, the standards must be tested in industry and assessment tools must be developed. Further development of the standards provides an opportunity to foster additional dialogue among business and industry, education, labor, and government. The standards as developed have given business and industry a means to let vocational educators know their needs, but there is still a long way to go. Therefore, continued dialogue could provide occasions for labor representatives and business and industry to develop that common language and bring technicians and front-line workers into the communication process. In addition, continued communication provides the opportunity for industry to "sell" the standards to those employers who do not see the need to develop the high performance worker. Communication can also strengthen the support of local administrators and local advisory committee members.

One implication of this study is that the skill standards should be used to develop relevant curriculum for vocational programs at the secondary and post-secondary levels. Training programs need to be developed for worker retraining, updating of skills, and retraining teachers. This training could be provided by industry trainers, private training facilities, and community college continuing education programs. This is an area where employers and educators must work closely so that the curriculum provides the tools for teaching the skills. A result of appropriate curricula would be that students can acquire the skills for particular jobs or occupations. A relevant curriculum would mean that pertinent learning would take place because educators would know and focus on the needs of industry.

Improved dialogue and relevant curriculum could result from strengthening the partnerships between business and industry, labor, and education. Improved partnerships would also bring workers into the circle of participants in all aspects of standard development. If the work environment is to evolve into a high performance business or industry, workers must be allowed to have ownership in the evolution process.

The DACUM process of task analysis proved to be an effective method which is accepted by business and industry and education. While this process has been effective, this researcher questions whether or not the process goes far enough. Standards committees need to address the integration of these tasks with basic skills and skills such as those addressed by

the Secretary's Commission on Achieving Necessary Skills (1991) which include problem-solving, critical thinking, and employability skills.

Federal funding is an issue that has been of key significance in the advances made by the skill standards committees. Federal funding should continue so that the committees can complete the work of developing curriculum, establishing performance measurements, and planning how the standards will be updated. However, industry must take the lead in assuring that the standards committees continue their work and must ultimately provide the funding for updating the standards, providing education with the necessary equipment and tools, and fostering effective dialogue among all partners.

Recommendations for Further Research

Based on the findings of this study, the researcher offers the following recommendations for additional research:

1. Research for this study used the initial thirteen grant recipient skill standards committees. A similar study could be undertaken with the second round of grant recipients so that all twenty-two skill standard committee technical committees are surveyed and interviewed. This would strengthen the validity of the findings of this study.

2. This study focused on national skill standard technical committee members. Additional study could assess and survey the grant recipient administrators to determine their evaluation of the work of the skill standard committees.

3. Many states are beginning to take the skill standards and use them for curriculum development, to strengthen the partnerships among education and business and industry, and to investigate other ways the standards can be used. Additional research could focus on what the states are doing with the skill standards.

4. Additional research and study could relate to advisory committees and their effectiveness in strengthening employer and education relationships at the local level. This research could provide mechanisms for vocational educators to enhance employer partnerships for curriculum development, expanded cooperative and apprenticeship programs, teacher training and updating of skills, and seeking equipment and tools.

5. Additional research could focus on the changes that should take place in the workplace to provide workers with the skills to help employers develop high performance systems.

6. Additional research could investigate the kinds of processes that committees could use to develop standards beyond task lists so there is integration of basic and academic skills and so that the problem-solving , critical thinking, and employment skills are included in all the standards.

Summary

This study provides evidence that skill standard technical committees serve as viable mechanisms for establishing skill standards. Evidence also shows that improved communication and stronger partnerships between business and industry and education can help establish relevant vocational education curricula. Adopting industry-based standards would create or improve education/business partnerships, strengthen advisory groups, meet the needs of the business community, and provide for vocational program acceptance by industry. This research also suggests that the work of technical committees should continue so that developed standards are industry tested and performance measurements established. Additionally, mechanisms should be put in place by industry to address updating standards on an on-going basis.

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APPENDICES A - J

Appendix A

Script for Telephone Interview

This script was developed based on the guidelines in Lavrakas (1987) and the pilot study conducted for this research.

Hello, may I speak to

Dr., Mr. or Ms. _____

My name is Phyllis Bunn and I am the researcher with Virginia Tech in Blacksburg, Virginia who scheduled this interview with you. You may recall that the purpose of this study is to determine the perceptions of technical committee members regarding the adoption of national skill standards in vocational education programs at the secondary and post-secondary education levels. I appreciate your willingness to participate in this study. I remind you that your responses are being recorded for future transcription and that this interview should last approximately 30 to 45 minutes. None of the comments you make will be identified with you as an individual or with your specific skill standard project. Do you have any questions before we begin the interview?

Interview Instrument Mailed to Interviewees

1. What is your perception of how vocational educators will use national industry-based skill standards in their program?

2. What do you think is needed to enhance the adoption of skill standards by vocational educators?

3. What will inhibit the use of skill standards by vocational educators?

4. How do you perceive skill standards will impact the effectiveness of vocational education?

5. One major focus of developing national industry-based skill standards is to make the U.S. more competitive in the global market place. Did your technical committee address the need to be more competitive internationally? Do you agree that national skill standards will help achieve this?

6. What process (task analysis, V-TECS, DACUM) did your technical committee use to develop skill standards? Do you think the process was effective? If not how can it be improved?

7. Did your technical committee include representatives from business, industry, labor, and education? Were there areas which were not represented that should have been? Which areas and why?

Interview Questions Used for Telephone Interviews

1. What is your perception of how vocational education will use national industry based skill standards in their program?

   a. Do you think skill standards will strengthen business/education partnerships and advisory committees?

   b. In what ways will skill standards provide the objectives which vocational educators can use to develop performance measurements of skills?

   c. How can skill standards help vocational educators keep current as technology and standards change?

   d. Do you perceive certification and/or licensure of education programs and individuals an important outcome of skill standard development?

2. What do you think is needed to enhance the adoption of skill standards by vocational educators?

   a. How can clear evidence of use of standards by vocational educators be achieved?

   b. How do you think expansion of apprenticeship, internships, and cooperative education can enhance the adoption and effective use of skill standards?

   c. What kinds of training opportunities, if any, should business provide for vocational educators and will this help enhance adoption of the skill standards?

   d. Some have said that higher expectations of entry-level workers in demonstrating skill mastery of standards will enhance their adoption by vocational educators? Do you agree? Why or why not?

   e. How does skill occupation specific testing fit into adoption? How will it enhance adoption?

   f. What about large scale vocational education program certification (i.e. auto industry)? How will it enhance vocational education?

3. What will inhibit the use of skill standards by vocational educators?

   a. In what ways does lack of business/industry work related experience by vocational educators inhibit the use of skill standards?

   b. Do you think that business/industry at the national level need to have a real commitment across the industry in order for vocational educators to accept them? Why or why not?

   c.. Do you think vocational educators will show a willingness to change once they are educated regarding industry based skill standards? Why or why not?

d. How will the lack of funding inhibit adoption? How can this be overcome?

e. Are there ways standards are written that will inhibit their use? For example, are they too broad or too idealistic?

f. Will lack of performance measured standards inhibit their adoption? Why or why not?

g. One inhibitor which has been identified in the survey is poor communication by business in letting educators know about standards which have been developed. Will this inhibit the needed changes of vocational educators? Why or why not?

4. How do you perceive skill standards will impact the effectiveness of vocational education?

   a. How will skill standards make curriculum content more relevant?

   b. Do you think the use of skill standards will help vocational educators product better prepared entry-level skilled workers who meet industry needs? Why or why not?

   c. How can skill standards provide a structure for vocational education to better measure performance?

   d. Do you think skill standards can help vocational students make the important connection between skill and work, education and training, knowledge and application, and purpose and outcome?

   e. Can skill standards produce an improved teaching and learning process?

   f. How will skill standards set minimum standards for both teachers and learners?

   g. How will better involvement by business and industry make the vocational curriculum more relevant to business needs?

   h. Do you think skill standards make vocational educators more accountable? Why or why not?

5. One major focus of developing national industry-based skill standards is to make the U.S. more competitive in the global market place. Did your technical committee address the need to be more competitive internationally? Do you agree that national skill standards will help achieve this?

   a. How will a study of national standards of other countries help the US develop skill standards which make us competitive?

6. What process (task analysis, V-TECS, DACUM) did your technical committee use to develop skill standards and do you think the process was effective? If not how can it be improved?

7. Did your technical committee include representatives from business, industry, labor, and education. Were there areas which were not represented that should have been? Which areas and why?

Appendix B

Telephone Call Sheet

Respondent's Name: Respondent's Company: _____

Skill Standard Committee: _____

Group Representing: _____

Telephone Number: _____

Time Zone of Respondent: _____

Appointment Date and Time: _____

Gender of Respondent: _____

Reminded Respondent of Confidentiality: _____

       of Recording: _____

Time Interview Started: _____ Ended: _____

Comments and Special Notes:

Follow-up Appointment Date: _____

        Time: _____

Comments and Special Notes:

Letter to Grant Administrators

Date

Dear : _____

We are conducting a study to determine industry-based skill standard technical committee members' perceptions of the adoption of skill standards by vocational educators. The objectives of the study are as follows: (1) identify the grant recipient technical committee members' demographic and occupational characteristics and perceptions of the process and results of the standard development project; (2) determine the technical committee members' perceptions regarding vocational educators use of skill standards in workforce preparation programs; (3) determine technical committee members' perceptions of factors that would enhance or inhibit the adoption of skill standards by vocational educators; and (4) determine how technical committee members perceive skill standards will impact on the effectiveness of vocational education. The information gathered in this study should prove useful in helping to prepare youth for meeting the workforce needs of industry.

As the administrator of a 1992 *(name of grant recipient)* skill standards grant, we are seeking your help to assure that our survey items are stated clearly, address the purpose of the study, and are appropriate. Please review the enclosed survey and write directly on it your comments or suggestions that might help to improve it. We estimate that your review will take approximately 20 minutes. Please return the completed questionnaire in the enclosed self-addressed stamped envelope by _____. The completed questionnaire could also be faxed to 703-231-3292.

You furnished us with the names and addresses of your technical committee and they will be surveyed as part of this study. If you have additional suggestions or concerns, we can be reached at 703-231-5471. Thank you for your help in this study.

Sincerely,

Phyllis C. Bunn   Daisy L. Stewart
Doctoral Student   Director
Vocational and Technical Education   Vocational and Technical Education

tbp

Enclosures: Questionnaire
                   Return Envelope

Apendix D

Survey of Industry-Based Skill Standard Technical Committee Participants

Part One: Demographic Data

The following demographic data are requested to obtain a current profile of members of skill standard technical committees.

Present Job Title:_____

What group did you represent on the committee? Check only one:

Service business or industry
_____ Employee _____ Manager _____ Trainer
Industrial or manufacturing business or industry
_____ Employee _____ Manager _____ Trainer
Trade association
_____ Union representative _____ Nonunion representative
Professional association
_____ Paid employee _____ Elected representative _____ Volunteer
Education
_____ Secondary _____ Post-secondary
Government department/agency
_____ Education _____ Labor _____ Other, Specify _____
Community-based organization
_____ Paid employee _____ Elected representative _____ Volunteer

Ethnicity: _____ American Indian _____ Asian _____ Hispanic
_____ African-American _____ Caucasian _____ Other, specify _____

Years of employment in position related to standards you assisted in developing

_____ Years

Age: _____ Years   **Gender:** _____ Female _____ Male

Highest degree earned: _____ high school _____ associate
_____ bachelors _____ masters
_____ doctorate _____ other, specify _____
(for example, apprenticeship)

Your experience in developing skill standards prior to participation on this technical committee participation was (check one):

_____ extensive _____ limited _____ moderate _____ none

Your experience in education and/or training and development (check one):

_____ extensive _____ limited _____ moderate _____ none

Part Two:

Listed below are a series of statements regarding your participation on the skill standard development technical committee. Indicate your response by marking the YES or NO column.

My role in developing standards was that of

_____ YES _____ NO	1. advising.
_____ YES _____ NO	2. advocacy.
_____ YES _____ NO	3. specific action.
_____ YES _____ NO	4. recommending standards.
_____ YES _____ NO	5. reviewing standards.

Participants on my technical committee

_____ YES _____ NO   6. had a clearly defined role.

_____ YES _____ NO   7. helped establish relevant skill standards for evolving and generic
                                            skills.

_____ YES _____ NO   8. offered new insights to skill standard development.

The technical committee on which I served

_____ YES _____ NO   9. was a viable mechanism for developing effective skill standards.

_____ YES _____ NO   10. addressed emerging labor needs and technological innovations.

_____ YES _____ NO   11. included members with diverse opinions yet reached common goals.

_____ YES _____ NO   12. effectively accomplished its task.

Listed below are a series of statements regarding your views of the skill standards developed by your technical committee. Indicate your response in the space beside each item using the scale that follows:

1 - strongly disagree; 2 - disagree; 3 - neutral; 4 - agree; 5 - strongly agree

The skill standards developed by my technical committee

_____ 13. can be implemented by vocational educators.

_____ 14. are appropriate and useful to business and industry.

_____ 15. are appropriate and useful to educators.

_____ 16. are appropriate to their related occupation.

_____ 17. facilitate clearer goals and direction for students.

_____ 18. will allow for more consistent, targeted instruction and curriculum.

_____ 19. are too broad/general.

_____ 20. are too specific.

_____ 21. are durable.

_____ 22. provide for changes in technology.

_____ 23. demand greater accountability from schools, programs, teachers, and students.

_____ 24. increased technological demands of the workplace.

_____ 25. will enhance the understanding and relationship between education and business and industry.

_____ 26. can easily be adapted to education curriculum development.

_____ 27. will improve the quality of vocational education.

_____ 28. can make the U. S. more competitive in the world economy.

The skill standards developed by my technical committee address

_____29. academic competencies.
_____30. communication skills.
_____31. cultural diversity.
_____32. employability skills.
_____33. global perspectives.
_____34. problem solving and critical thinking skills.
_____35. technology skills.
_____36. leadership skills.

Part Three: *In part a of each of the next four questions, please check all that apply.*

I. What are your perceptions regarding vocational educators' use of skill standards in workforce preparation programs?

(a) Industry-based skill standards:

_____ would provide a base for curriculum development.
_____ would help vocational educators better understand the work preparation needs of business and industry.
_____ provide a solid foundation for work-based learning.
_____ will only be effective for vocational educators if they include measurable performance criteria.

(b) Please list additional perceptions:

2. What factors do you think would enhance the adoption of skill standards by vocational educators?

(a)

_____ Business and industry providing instructional aids to enhance the learning experiences of the students.
_____ Hands on experience, internships, apprenticeships and school to work programs.
_____ Better communication between business and industry and education.
_____ Having part of vocational education funding based on adoption and use of skill standards.
_____ Business and industry expectating workers to demonstrate the mastery of skill standards.

(b) Please list additional enhancers:

3. **What factors do you think would inhibit the adoption of skill standards by vocational educators?**

   (a)

   _____ Lack of communication between business and industry and vocational educators.
   _____ Business and industry not accepting the standards.
   _____ Business and industry not demanding better trained workers.
   _____ Lack of effective assessment and measurement tools.
   _____ Educators not willing to change.
   _____ Insufficient financial resources.

   (b) Please list additional inhibitors:

4. **How do you perceive skill standards will impact the effectiveness of vocational education?**

   (a)

   _____ Make curriculum content more relevant to the needs of business and industry.
   _____ Produce a better prepared entry-level worker and better placement rates for students.
   _____ Provide a structure to better measure skill attainment.
   _____ Produce students with portable credentials.
   _____ Make vocational education more accountable.

   (b) Please list additional impacts to vocational education:

Please return in the enclosed stamped self-addressed envelope. Thank you.

Appendix E

Letter Requesting Addresses

Date

Dear :

As a doctoral student at Virginia Tech, I have selected national voluntary industry-based skill standards as the area of my research for my dissertation. In particular, I am interested in the processes used and the work and influence of technical committees on the development of skill standards. My request of you is that you please provide me with an address list of your technical committee and a copy of the report published during the first phase of your grant reporting the skill standards developed (*name of grant recipient*).

I am developing an instrument to survey technical committee participants of grant recipients. You will be kept informed of my research data collection by receiving copies of all correspondence that I mail to committee participants. If you have questions or concerns regarding my request, you can reach me at 703 231-5471 between 8 a.m. and 5 p.m. eastern time. So that I could begin setting up my data base, the address list could also be faxed to 703 231-3292.

Thank you for providing the address list and report by _____, 1994. A self-addressed envelope is provided for mailing the material to me.

Sincerely,

Phyllis C. Bunn
Doctoral Student

tbp
Enclosure: Envelope

Letter to Technical Committee Members

Date

Dear _____

We are conducting a study to determine industry-based skill standard technical committee members' perceptions of the adoption of skill standards by vocational educators. The information gathered in this study should prove useful in helping to prepare youth for meeting the workforce needs of industry.

As a member of a skill standards technical committee, your input is vital to this study. Enclosed you will find a questionnaire which should take you no more than 15 to 20 minutes to complete. The second phase of this study will be a telephone interview to gather in-depth information based on the open-ended questions on the written survey. A consent form is enclosed so that you can provide information for participating in the telephone interview. After completing the questionnaire and consent form, please return them in the enclosed self-addressed stamped envelope by _____ or fax them to 703-231-3292.

If you have questions or need clarification, we can reached at 703-231-5471. Thank you for your help in this study.

Sincerely,

Phyllis C. Bunn   Daisy L. Stewart
Doctoral Student   Director
Vocational and Technical Education   Vocational and Technical Education

tbp

Enclosures: Questionnaire
                   Consent Form
                   Return Envelope

Appendix G

Consent Form

Please sign below to indicate your consent to participate in the interview phase of this study. The telephone interview will be scheduled at your convenience and should take between 30 and 45 minutes. If you are willing to participate, please return this consent form in the enclosed stamped self-addressed envelope with your survey. Your consent to participate in this telephone interview is very much appreciated.

If you have any questions, I may be reached at the above address or at 703-231-5471. Thank you.

Name _____

Address _____

_____

Telephone Number _____

Business or Organization You Represent _____

_____

_____
Signature indicating consent to a telephone interview

1992 Grant Awardees Providing Mailing Lists of Technical Committees and
a Selected Sample of Standards

Grant Awardees	Sample of Standard
Air Conditioning, Refrigeration and Power	Not available
Automotive, Auto Body and Truck Technicians	Autobody Program Standards Standard I -- Purpose, The autobody technician training program should have clearly stated program goals, related to the needs of the students and employers served. - Standard I.I - Employment Potential: The employment potential for for autobody technicians, trained to the level for the specialty or general areas outlined in the program goals, should exist in the geographic area
Biotechnical Sciences	Agricultural Biotechnology Technician Technical Skills - Follow protocol - Keep accurate records - Write technical summaries - Organize and present oral summaries - Locate and review reference materials - Comprehend a technical vocabulary
Computer Aided Drafting	CADD Skills Set, Drafting Skills - Use drawing media and related drafting materials (papers, vellum. mylar; plotter pens, toner cartridges) - Use basic measurement systems (fractions, decimals and metric measurements) - Add correct annotation to drawing - Identify line styles and weights - Prepare title blocks and other drafting formats - Apply metric and/or dual dimensioning drawing standards - Identify and use appropriate standard symbols - Reproduce originals using different methods (photocopy, plot, blueprint) - Create freehand technical sketches

Electrical Construction	Not available

Electronics (two associations developed separate standards)

Electronics Technician, Installation
- Install equipment per customer requirements
- Initialize equipment per specification
- Calibrate equipment per specification
- Provide operational instructions and training

Health Science and Technology

Core Standard (broad, across health services)
- Health care workers will know the academic subject matter required for proficiency within their area. They will use this knowledge as needed in their role. The following may be included:
    - read and write, including charts, reports, and manuals;
    - perform mathematical functions
    - use health care terminology
    - apply knowledge of life sciences, such as biology, chemistry, physics, and human growth and development
    - be aware of the history of health care

Industrial Launderers

Production Workers, Soil (receiving/sorting)
- Sort soiled goods by route/account number or code
- Sort soiled goods by size, color, and/or fabric type

Metalworking

Machining Skills--Level I, Job Planning and Management--Job Process Planning
- Duty: develop a process plan for a part requiring milling, drilling, turning, or grinding. Fill out an operation sheet detailing the process plan and required speeds and feeds

Retail Trade

Professional Sales Associate
- Provide personalized customer service
    - Initiate customer contact
    - Build customer relations

Tourism, Travel and Hospitality   Not available

Appendix I

Telephone Appointment Script

This script was developed based on the guidelines in Lavrakas (1987).

Hello, may I speak to--

Dr. Mr. or Ms. _____

My name is Phyllis Bunn and I am a researcher with Virginia Tech in Blacksburg, Virginia. I am calling to schedule a telephone interview with you as the second phase of a national study of the perceptions of technical committee members regarding the adoption of national skill standards in vocational education programs at the secondary and post-secondary education levels. You completed and returned the mailed survey and signed the consent form agreeing to participate in the telephone interview.

This interview will take approximately 30 to 45 minutes. What is a convenient date and time for me to call you back to conduct the interview?

Appendix I

Descriptive Perceptions Matrix: National Industry Based Skill Standards Technical Committees
Questions 1-3

Interviewee	Vocational Educators Use	Needed to Enhance Adoption	Inhibitors of Use by Vocational Educators
1	Program improvement, help business know what skills graduating student possess.	Industry acceptance, bring program to standards, instructor acceptance, instructor training by business, adopted by state administrators, cooperative work experience.	Time constraints; budgetary problems - not being able to buy the equipment, somebody who just doesn't want to do that; training. It's going to take the local vocational educator to do some public relations work with the local employers in order to explain to them what these standards are and how their program would be able to serve them better if they met the standards. lack of work experience by educators
2	Voc. education won't use them unless they have value. There are incentives. Teach the basics and they can provide students with relevant skills for business.	Business acceptance and relating value and expectations to education, performance measured certification of students, continual renewal of certification, local and state administration acceptance, industry provided training for educators, education asking what is needed by industry, 2-way communication, broad based skills.	They won't use them unless there's; won't go through the effort of doing something new just because it's new; if industry goes off and muddles and hires a lot of students that don't have that skill set, then the skill set as a standard has no value or punch to schools. The idea of a school's ability to have current, hardware to teach the classes that will be required. Instructor's ability to teach the programs. Good ole boys have a little more punch in the local situation and they choose not to want to change. The schools could come up with a wish list of how much money they want to spend on the hardware they see that they think they need to have.

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3	Very little-there are no chemical programs in secondary schools. For examining curriculum. Review current practices.	Performance based, assessment tools, guidelines from industry, material and equipment needed from industry, local alliance of business and educators planning and implementing curriculum, teacher work experience, expansion of cooperative education and apprenticeships.	Inadequate materials to lead to actual implementation of the standards. There's a substantial amount of specialized equipment that students should have some access to. That link between business and education. The employer community-- they have to be very much involved. Real understanding on the part of educational administrators that good technical education isn't cheap. The attitude of the current Congress to cut off the opportunity for the kinds of projects. Time. Acquiring the right kind of personnel. Leaving it with the standards statements and not providing curriculum.
4	Get students employed, develop curriculum, determine equipment needs, have program accepted by industry.	Additional funding if standards used, continuous updating of teachers, performance testing, employment of students, providing specifics including equipment, industry training of educators, higher expectations by industry, education accepting the standards, better communication between business and education, used by vocational clubs for national, contests.	The equipment could be cost prohibitive. If we adopt too strong a standards or require too much equipment, we could over-price the schools out of business.
5	Basis for training, to build student portfolios.	Get vocational education out of high school and into community college, industry advisory groups, cooperative effort (business and education), attract student in 9th grade, certify passing of duty performance standards, establish credentials, portable skills recognition, state supported and administered, communicate standards though national association and local chapters, budget for vocational programs, 2-years teacher training by industry, use of portfolios.	Not seeing a willingness for vocational educators to change. It's going to take some time. Good communication between business and industry and the school systems. Most people who would have the instructional capability for machining lab would not possess those educational credentials.
6	Curriculum design, create or improve	Demonstration of skills through tasks, incorporation	

	education/business partnerships, improve cooperative education, up-date teacher knowledge, better prepare students.	into national club competitions, provide working document for coop teachers and employers, business involvement--a joint effort, improved student creditability.	
7	Curriculum development to include the basics: math, science, communications and English. Strengthen advisory groups, meet needs of business community.	Legislation requirement to adopt, better connection between school and work, written curriculum models, student work component to make school to work connection, improved image of worker, parental involvement.	Curriculum integration is the big problem; to be able to implement you've got to have curriculum that's going to provide information on how the math, science, English are used in the business and in the classroom. Not having a strong advisory group that works with the schools. Skill standards would be a legislated goal or something that is a tool or a part of education. Non-acceptance by the school administration. Funding. The philosophy is not there. There's not going to be a program. Not a lot of communication taking place, from all the levels.
8	Update curriculum and make it more user friendly to educators.	Update, eliminate repetition, simplify, instructor buy-in, written at high school instructor level, cognizant of present-day issues and atmosphere in high schools, awareness of needs of industry, local and state administration understanding and leadership, industry-based teacher training.	It's a lot of work for teachers. It also tends to be more rigorous on the teacher as well as on the student. It relies on effort and the desire on the part of the instructor. Having the same standards for secondary and post-secondary schools. Unless it's funded.
9	Drive curriculum and give teachers better direction.	Federal funding, incorporate into national club contests, industry buy in, hands-on student experience, student portfolios, licensing or letter of achievement, use as measure of what students need to know.	Unless they get adapted by industry and used by industry, educators won't grab onto them. Trying to determine how to measure them. Going to have to be updated on a somewhat regular basis. If that Federal money dries up. Unless it's funded. Industrial support. "Why should we do this if industry isn't doing it? If industry is not using the standards, why should

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			...we teach these standards?"
10	Strengthen credentials (certification) and value of vocational diploma; strengthen relationship with business and industry; develop performance based test based on national standards; set up an interaction or communications process among employers, educators, and students.	Set the parameters for curriculum and instruction, reflect the real job requirements, really communicate to students what they have to know and do to work in this field; develop accreditation association or board; independent testing or assessment program; business has to take the lead to make sure that the certification standards are constantly updated and to make sure that the educators get the information that's needed; higher expectations of entry-level workers; advisory committees letting teachers know what the needs are; a national vision and model projects but local level administration; an incremental credentialing program.	Non-acceptance by employers. Not recognizing an obvious need. Business and industry not having a stake in the standards and providing funding so they take on a life of their own. Nobody buying into them. Not getting them institutionalized.
11	Define what students learn, curriculum design, working collaboratively with business community to improve learner goals, have consistent outcomes across states, consistent learner outcomes, assessment.	States providing framework for teachers, teacher involvement in validation, development of test banks, etc., business involvement.	If the skill standards are too narrowly defined. If our business community does not accept them. If employers don't accept them. If they're too narrowly constructed. The dollars are a key piece of this--the flow of dollars will affect the rate of implementation. Not implementation, per se.
12	Just theory at this point, build focused and more narrow curriculum.	Funding, ongoing national/federal support, continuous development, using and applying standards, accepted by employers and workers, worker testing to determine relevance, design of curriculum, healthy separation between business and industry, balanced input from education, unions, workers, business and government.	Inadequate funding. National and federal support for ongoing development. A vision that this is important. They have to be accepted by employers and by workers. The vocational programs really require some reorganization and redistribution of resources and, they have to be willing to make those changes as well. The public relations part of this was getting the word out. Have not been validated and tested. Have it be something educators can go out with and say these employers are interested in this.

| 13 | Vocational education will not adopt unless business and industry demands it - period; requiring instructors to work in the industry which they train in; schools are not going to reform because right now they don't know what kind of reforms need to take place. | Business and industry demanding adoption of skill standards; strong business and industry advisory boards; schools must be market-driven to place graduates in jobs; practical, work-based experience for students; determining what performance measures look like. State-wide movement to develop certification that would be a quality indicator for that school that they are training to business and industry standards. Making sure curricula are in compliance with the national standards. Industry being willing to fork out the dollars and is willing to see this bottom line improvement these skill standards can have on their business. Industry needs to sell industry. Certification of graduates; business and industry demanding higher expectations; the development of textbooks based on national skill standards; investment in curriculum development; business and industry is willing to fork out the money to develop curriculum; needs to be an industry-driven change; Federal changes in the Federal law with tax write-offs for businesses for training teachers, a sales job, largely of the large employers on smaller business, and helping them find some forms of capital to be able to do that, whether it comes through their trade association; some kind of creative structures for the investment in skills training. | Business and industry demands it - period. Not being accountable with job placements. Business and industry not demanding that public vocational schools become accountable for their outcomes. Budget cuts in Washington are also going to force that agenda. Business and industry not buying the concept that national skill standards can increase productivity on their bottom line. Educators don't do anything unless they are forced to change. Business and industry. not putting up the money. Educators not knowing where change needs to take place. Largely because they are not connected to employers. Educators not knowing what goes on in the workplace. E educators not knowing if what they're teaching is relevant. Educators are not going to reform unless there is pressure from business and industry. Not training technicians who are competent and skilled and trained in the latest technology. Lack of money. |
| 14 | Drive teacher training, give direction to administrators, determine equipment needs, design curriculum, identify competencies, | Connection between business and school, develop a curriculum, industry training of teachers, specific list of tools and equipment needed, national initiative by | A system that would train the teachers to make sure that they were brought up to speed in competencies necessary to train the students. Bottom line comes down to money to buy the |

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	give student portable skills.	business and industry which filters through state departments of education to local teachers, better prepared students, base funding at local level for using standards, on-the-job experience by teachers and students.	equipment and all the training; a national vision. Somebody takes and picks it up and does something with it and forces the issue on the state level, it will not be implemented.
15	Provide specific duties and competencies, evaluate and change present curriculum, help students pass competency tests, put creditability into program with better prepared student.	Support by government and business, funding for programs and equipment, teacher training and retraining by industry, national adoption of uniform standards, local advisory committees, change in perceptions people have of vocational trades, increased student employment, involvement of parents and community, better communication.	Lack of communication, or poor communication. The parents. If we don't change the image of some of the vocational education occupations, then it's tough to get the good students routed in those directions. Vocational educators not understanding them – understanding what their intent is. Not having the funding to change curriculum. Not even knowing that they're available. If we don't get government understanding of the purpose and the whole intent, then they're not going to be ready to fund the schools.
16	Limited use, list of what to teach but not how.	Keep curriculum current, state administered, associations communicating with states, industry providing national standardized curriculum, industry training of teachers, performance based simulated tests, assessment tools.	Objective of the document was not really clear; it's an instrument of what I need to teach students or what skills they need but not how I'm going to achieve it. What they've produced now will basically sit on the shelf unless industry takes it a step further and do provide the curriculum There needs to be a better connection between industry and the schools to provide that curriculum. The way it's actually written and what they see as useful to them.
17	Get students into the workplace, as a communication tool to know what business needs, to define the high performance worker.	Involvement of parents, validation of standards by business, business communicating their needs, continual communication between business and education, assessment and portfolios, begin in elementary school with concept that every child is a	Time. Teachers need to go enhance their education to understand what these things are about. Teachers going back into the workplace to work. Partnerships between business and education need to be strengthened. Trying to get different groups of people to talk to each other. State departments of

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	education need to take these standards and develop curriculum and get them into the system. Educators are kind of waiting to see if it works, and the business is trying to wait and see if it works; everything that's come out is sort of a matter of "well, let's wait and see if it works. The people who are trying to move it forward are really trying to help both groups communicate with each other. Different cultures.	vocational education student, take to curriculum, retraining and education of teachers, strengthening business/education partnerships, curriculum development by state administration, national vision.	
18	Performance measurements--here's no measurement tool or set of tools. There's no assessment program to determine whether or not these standards are being met. Academics play an important part in this, and in not all cases are those academics addressed in the industry standards - math, science, communication skills. To introduce licensing at this point. If there's no accepted and comprehensive assessment program to assess the standards. A real commitment on the part of business to adopt the standards and use the standards. Lack of funding from the Federal level	A clear idea of where these standards are going in terms of assessment. People working together to develop that measurement process. Skill standards have to be assimilated into an already-existing curriculum format. An additional effort by educators to understand and comprehend; acceptance of standards but also acceptance of a comprehensive measurement or assessment program.	Vocational education saying to industry, "Tell us exactly what you want and we'll be very happy to deliver." Strengthen advisory committees. Enhance communications with business and industry. Keep the standards current. The curriculum is representative of the standards as they exist right now.
19	If revisions get lost along the path down the road; people just sort of hang onto the material that they've already got in place. Certification or licensing might even inhibit what the goals of the standards are all about. Cost of it, in terms of definitive requirements for materials, equipment, and/or specific skill levels of expertise for instructors. Education and training organizations not reaching out to industry--they are the inter-party connection between students and the industry. When the Federal funds run out. It probably will not continue. People, once they have something that's reasonably well-developed - unless massive technological changes come along - I don't think they're real inclined to get back in and do a lot more with it; In	Monitoring and probably some follow-up feedback report from industry itself. Industry training of teachers. Cooperative education, whether it's externship, apprenticeship; a high level of commitment by industry at these early stages.	Help guide curriculum development. People will utilize them and they'll be beneficial. Produce a higher level worker. A continuation in terms of utilizing the standards and the materials that are produced. If they turn out to be functional.

			terms of maintaining this process and constantly upgrading them, I don't think that will happen.
20	A good directive in making things uniform so that when a person comes out of training, the employer will know what to expect of that person, or employee. Each individual item to be judged on a performance-based operational-type thing. It might be difficult, time-wise, to complete all that.	Communication between business and education; that industry and education have a common goal. Committee built in plans for updating. Industry requiring certain level of competency as the person comes into the workplace.. Be a joint effort of industry and the educational fields; higher expectations of the entry-level worker; business and industry putting funds out to help vocational education; Two-year programs train the people so that when they come into the job they're ready to go. Generally, the manufacturer who put up the money tends to also tell them what they expect out on the other end. A lot of pressure from the manufacturer or the industry to have a very specific employees come out the other end. Trying to set up a network of those kind of people for training people in the trucking industry who can conduct training at night.	The communication of the standards that needs to happen through the process. Broad or general: made a real attempt to keep those things in balance. The numbers of the heavy truck type programs that are in vocational schools are limited so traditionally we have had to hire out of agriculture vocational programs. Agricultural is downsizing and drying up so we do not have the people trained we need.

Descriptive Perceptions Matrix: National Industry Based Skill Standards Technical Committees

Questions 4-7

Interviewee	Impact on the Effectiveness of Vocational Education	Competitive in Global Market	Process Used	Committee Representativeness
1	Make it better as far as supplying a skilled workforce to industry. Make the curriculum content more relevant to the needs of business. Local school can determine what the performance level is going to be for those standards. Produce an improved teaching and learning process. Teachers will have to take additional training and get additional work experiences so they can effectively teach those skills. Instructor is need to be held accountable.	I don't remember us addressing that.	We had standards that were written previously. What we did was look at each one of those standards and decided several things. One, should it still be a standard? If so, was it written correctly and could it be changed in any way? And thirdly, we looked at a priority level as far as the standard is concerned.	Yes; I don't think there was any representation from a new car dealer.
2	As long as producing a better product is the stated goal of vocational education, then it would be darn effective. Students learning the skills and bringing them in their back pocket when they walk in the door and industry can shape them when they get in the door. You can probably expect	Not very thoroughly at all. No; as a committee we never really did anything in terms of overtly going out and evaluating what other countries have utilized to make themselves more...or any kind of skill standards they've used.	I don't know how the national thing got started. I was invited in a little later. But I do know that when I got there, what I saw was pretty much very similar to what we had done here in Idaho. Someone told me they used a lot of stuff we had done, at least as a taking off point. Then it evolved.	I think from a melting pot of different diverse things around the U.S. I think both the national committee as well as here in Idaho was fairly well representative of both educators, labor, as well as business.

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	that students will learn the spectrum of knowledge and be able to tie it together.			We have two principal committees--one we call the steering committee, the other the coordinating committee. The steering committee is 92% non-academic, which means very heavy on the industry side with some labor representation. The coordinating committee is about 65% non-academic. So we determined, right from the beginning, that this had to be an operation that was really dominated by the employers, not by the academicians.
3	New programs will develop and we need to make sure that they develop in a better direction than many of them have in the past. Improve communication.	We have not looked at this specifically in terms of international competition. Rather, we have looked at it in terms of needing to provide a very high level technician or operator compared to what the average is today. We have certainly been giving attention to the standards that have been developed in other countries. We have exchanged standards now.	We did several things. The principal activity that led to identification of specific standards really applied a modified DACUM process. We used the DACUM process in almost a traditional sense for the first data collection activity we had. Then we took the product of that first meeting and put it into a context where that became the starting point for the next data collection activity; we essentially modified the DACUM process to allow us to really get to the depth that we needed.	
4	The student is going to come out more employable. They're going to be able to develop a curriculum that's going to be more relevant to what's needed in the work areas. Students will be able to take that knowledge and apply it; then you're going to have an improved teacher and an improved learning process. The standards will help make that connection, with vocational education and with what industry needs.	I don't think we actually talked about that. There's no competition, actually, in my business.	We had an old set of skill standards. We were changing priorities on these skill standards. We had to go through and we changed the way we wanted them taught--as far as a priority or what had to be taught, what was optional.	Union representation, I don't think it was actually. People from schools; Ford Motor Company--a training engineer, so he was actually involved with industry training from NAVISTAR; from the Department of Education.; from for-pay, for-profit schools; from high school level, from community college level; from General Motors that was head of their service technology group; from Ryder - rental truck people.

5	They have to make sure that their math skills and their drafting interpretation skills and their reading skills are really commensurate with what you want to do.	The standards were written and publicized and approved by the national skill standards board. We sat down as a group and talked about the actual tasks the person perform. Used a group consensus to determine what tasks were most important for that particular occupation.	Yeah. These were people that were selected by the National Tooling and Machining Association.
6	The standards will help make the connection with vocational education and with what industry needs.	Professional selling is not really a global entity. It's not a factor I don't think, in terms of the global marketplace--we're not manufacturing a product--we didn't address it. Several made a trip to Britain because they have an apprenticeship program and we spent quite a bit of time talking about that within the committee. We looked at it primarily to look at a method and one means of certification, and how one country does it and what they do and how it works.	We did do task analysis. We also used DACUM in the early stages--did some work with us on the task analysis. We worked with ACT and used Work Keys for some of the knowledge pieces It's a very tedious process but effective.	It was very well-balanced actually.
7	Make the curriculum and the connections more relevant to the needs of business and industry. Make the connection between school and work. Also provide a better structure for measurement. They help the	The answer to both questions is yes, it was done. The committee actually studied what's done as far as standards and certification. The primary reason for doing this was because of international	Basically took what was in place and just revised and made changes and made additions. At least, from my perspective, what I added was those things which are more relevant to today's standards and less of the older information.	They all were represented. The only areas that were not represented, in my opinion, was we didn't have enough of the real nuts and bolts type people on that committee. There were too many corporate types, too many suits, if you know what I mean;

				there were no technicians.
	accountability. Skill standards will help to develop more appropriate or relevant curriculum that will meet the needs of business and industry. Students become a fully competent and contributing and self-motivating and self-fulfilling member of society. Make that connection between the teaching and learning process and whatever your standards are. Developing curriculum that.matches the standards, then having a business partner where you can apply it so that the student can see that meaning taking place.	competition. I don't think we're all real, real bad, either--my own personal opinion--but it needs a little bit of fixing. We did need to compete more internationally, and that was the main reason, because we were falling behind.		
8	Improve the overall effectiveness of vocational education, because vocational education , for years, has had somewhat of a bad rap--that it's the place to put the kids that don't achieve and so on. They streamlined a lot of stuff.	I don't think that our committee brought that up.	We just took the documents that existed-- had been written 10 or 15 years earlier and began to go through it. Some of the work we did in a big group. Others of it we found was better done in teams.	
9	Vocational education has got a target to shoot at which is very relevant. Set minimum standards, and it sounds like	We did talk about the fact that the world out there is communicating electronically, and rapidly, and	We did a live Delphi study and twisted arms--face to face.	It was diverse. It was a majority of males, because obviously the engineering field has been dominated by males over the

That's right. We had the business sector-- both from the major manufacturers' side, the dealerships as well as independent repair shops. We saw guys from the big shops, the guys from the small shops. We saw the manufacturers representative-- mainly from the training area, like General Motors and Ford. We saw high school educators. We saw community college educators. A very small minority of women; ethnic make-up--probably about as lean as the male-female ration.

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				years, but there were a number of females in there.
	even bring them into today's technology. It will help the teacher be able to place the kid, because he can show the industry what the kid knows how to do. It gives vocational education and business and industry a common ground to talk about. A teacher becomes more responsive to the needs of industry. Industry and educators work together to identify what the learner needs to know. It gives the student a degree of mobility as well. It may change curriculum-- what teachers are teaching.	quickly, and CAD is a way of doing it; but we didn't talk about--in the very early stages of this we discussed some of the stuff that had been done in Australia; but I don't think we spent much time with it.		
10	Improve it, if it works at this ideal level; think improving the curriculum, improving the students they graduate; earning becomes more practical to students; to be able to demonstrate to the students that this is what they must be able to do in order to work in this skilled field; result in some reappropriation of current resources-- using funds more appropriately.	Not really, they're selling products. They're not in the manufacturing sales end. I don't think it gives that as much attention.	DACUM, we also took a look at the supporting generic skills that are required. They used the ACT process with focus groups. We went right into industry and found out firsthand what the tasks were. What they did was to be sure that the job-specific skills associated with a sales associate were supported at an adequate level by generic skills.	They did from employers and major retailers. I think there was some union representatives; and education; there was a pretty good mix of men and women, and ethnic as well--they did a nice job on it.
11	It will stretch us all. It requires our teachers to look at what they do differently. It requires our teachers to get back into the real world and find out how things have changed--to look	EDC did that in a couple of ways. And bio-science is global economy. They made that very clear from the forefront. They talked about high-performance organizations. They	DACUM; it was very interesting because what occurred was they did three groups across the country in hi-tech areas and they brought the results in. We were doing one in Maryland at the very same	Yes. Definitely minorities. A nicely mixed group.

	at the high-performance workplace; for helping teachers develop the new knowledge and the new skills that they'll need in order to be able to raise the bar for their students. Offers us is this concept of high expectations for all of us, and the accountability that we all have.	enlisted support, as members of the technical committee, from high-performance organizations in the bio-science field as we looked at pharmaceuticals, at bio-manufacturing, at research, at all cutting-edge kinds of issues. Global competitiveness relates to high-performance workplaces because that's the only way that we're going to be able to compete. ISO-9000 standards entered into the discussion on the national level on the technical committee, and also has here in the state.	time in the same area--bio-science. I brought mine to the table, and they all said the same thing. It allowed for efficient input from a large number of people and yet an ability to be able to synthesize everything that came in into one cohesive set of expectations that could then be developed into standards.	
12	They do have the potential to make it a much more effective part of education. Educational offerings--students can make better decisions about the kinds of career opportunities and they can be more flexible.	We did not really discuss competition, and I think it's just because of the way people look at the healthcare industry. There certainly are global and international corporations in the healthcare sector but it's health, healthcare employers; hospitals are not necessarily competing in a national market.	One of them used a DACUM method. The other really used task analysis but they looked at all of the like job descriptions, regulations, curriculum, for a broad range of entry level healthcare jobs, and then sort of poled those down into basic groups of skills standards.	It did, but I was the only labor representative on the committee. So it was heavily dominated by employers and educators. I think there were relatively few workers from these industries--people who do these jobs; not innovative in terms of really broadening it to include not only more labor but people actually doing the job in the workplace.
13	If business and industry demands that education change, I think it will have a drastic impact on the schools. Bring about curriculum reform. Bring about	It's part of the sales presentation to the business members on the committees that in the long run skill standards can help them keep more	DACUM and we used task analysis on two other committees. Breaking apart a certain job title or skills cluster to define what exactly is needed.	Everyone included business and industry. Everyone included education, both secondary and post-secondary. They all had a traditional labor sign-off on it or

	far more of a linkage between education and business, with educators understanding what businesses in their local communities need. Students will be able to make a better connection between the skills that they're being trained for. .	in global markets. It can because the connections between school-to-work in Japan and in Europe are far stronger than they are in the United States. Whether it's on history or whether it's on technical skills, they've got our American educational system beat hands down. In the technical world, they have such strong linkages between business and industry defining curriculum and playing an active role by inviting internships, cooperatives, learning arrangements; their state social policies encourage the investment of business and industry in training workers. Global competitiveness--I think that's a lot of political rhetoric and cutting-edge company rhetoric that are promoting that agenda.		someone was supposed to come to the meetings. In different industries you are going to see far more labor involvement in the skill standards committees than other. People who actually perform the jobs was probably the weakest point of all of it, was having the voice of the actual worker, rather than the person that represented the worker or the person that educated the future worker. There was not a balance of women-- Usually the only other woman representative there was of education. As far as minorities--non-existent.
14	Move vocational education to stay current with what's going on today. A better-prepared workforce. Educators will to have on-the-job experience and understand the field.	I don't think they addressed it so much in auto body to be competitive worldwide, because that's more of a local town, city type of an initiative.		
15	Giving educators a blueprint of what the industry is expecting them to produce; duties that are laid out in	I don't remember that, exactly. I felt there was more talk about how good the European training system was	DACUM process was used; I also took hands-on people into some of those subgroups, that actually do the work.	I thought it was very well represented.

	such a way that it should make them a more effective instructor. Skill standards will help vocational students make the connection between the skill they're learning--how to use that lathe and how to adapt the use of that lathe to the actual work experience. Higher wages and be more portable credentials for graduates.	and how they prepare their people so much better than what our education system does for vocation.		
16	Follow through with the entire package, not just a list of skills, but an entire package--I think--is very effective. Until you have a curriculum for educators to adopt, you're saying the skill standards aren't going to be as effective as they need to be. Not only do we need to identify those skills, we also need to identify the method to attain those skills.	Yes, we did; we all identified that there are more skills than what they're teaching now that were identified that they need to have--so, in that respect, yes.	It was strictly a task analysis-type of thing.	I think it was a pretty good mix of people. The only thing I was remiss of was that they didn't have more people from the training and management side from our industry. The only other thing was it was a little bit heavy in its surveys and its responses to consumer electronics because the consumer electronics groups.
17	If people will really take a look at them and try to figure out how to understand them, it will make the whole system more effective. I think there's nothing that makes a school system, an educational system of any kind, more effective than getting the teachers to understand what needs to be done. Students will be able to make the connection between the skills and	The committee had people who went all over the world. Our facilitator crowd were from all over the world. So we absolutely were taking a look at how things worked in other places and how our kids were doing relative to other places. We pretty well agreed that if we were going to compete globally we were going to have to strengthen that huge portion	Task analysis is probably about right; what they did was a work analysis. The way they went about doing that is the first thing they did was to do focus groups with people in that job in high-performance companies. They asked them what they felt was important for their jobs. They went from focus group to focus group. They came to a core set of things that people felt were really important.	Yes; many more people from business; the people from labor were kind of late to the game because the high-tech group does not have very much labor employment. We really had to go out to look for somebody to bring in to work with us from a labor perspective. The education people were with us the entire time.

relate them to work.	of our population. If we did that the right way we would strengthen everybody. That got to be a political problem. In fact, I think some of the funded groups were asked to leave that out of their rhetoric...	They went to a management group and looked at the same kind of thing. Then they came back and they tried to define what all that stuff was and put it together in some sort of coordinated picture. Then they went back and validated that with different people from the same organizations.		
18	It shows another way that a marriage can occur between business, industry, and education. The standards themselves will give educators a feeling that they're actually providing what industry wants. Produce the better entry-level worker. Students are going to be better prepared to take up entry-level positions. Provides tools to allow that teacher to carry the educational program further than if those standards didn't exist. Effect the quality of the program--standards have a real positive impact	Probably not as much as some of the other industries, because retailing, just by the nature of retailing, contributes to the local economy and local stores for local shoppers, that kind of thing. Yes, the folks developing the retail standards did look at this, did discuss this. Some of the members of the committee and the staff helping to develop this have traveled abroad--to England, for instance--to look at the certification program that they have over there and to try to really tie it together with what we're doing here to make sure we're not too far afield from working on issues that will affect the global market.	The DACUM system, which was effective. Many of the marketing educators have been utilizing the DACUM system for a number of years. Now the fact that the retail industry has recognized this as a worthwhile effort and used it themselves probably will even better strengthen the impact and the reception of these standards by educators.	For the most part, yes, there was a good cross-section of educators--both from the secondary and the post-secondary areas. And then industry itself had people from the labor portion of it representing unions and human resources from a broad selection, really, of retail establishments around the country. Men and women were represented well on the committee. If anything, there might have been a shortage of minority representation..
19	A strong motivator for students because of the relevance. The overall quality will improve; to the extent	Don't believe there's much of an international market in this industry. Don't recall the subject	They went out and got a third-party organization in to do the actual survey instruments and to work with industry	The committee had representatives from business, industry, labor and education. It was well balanced. It may not have

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	there's a stronger linkage between business and education. It would be natural to have more teacher involvement in interacting with the industry--such that they would have more relevant skills developed. Taking industry people and bringing them in for a portion of the teaching require some re-thinking of teacher credentials.	really coming up. I don't recall our looking at standards from other countries.	representatives to go over and develop the instruments and to test them out. So they had expertise outside who could really do the training and we utilized the opportunity at advisory meetings to sort of bounce ideas around and show some of the materials, and then allow for opportunity for discussion and debate; it seemed to be effective.	been balanced from some perspectives because I think it was all male.
20	A big improvement. Allows the trade or the industry that's active in the business right now to communicate to the schools or the training agencies what's happening in the field today as opposed to a lot of times the training had been what had happened five years ago. Bring about more effective uses of apprenticeships and internships and cooperative education; less in-house training apprenticeship program in conjunction with the union and the company. Help the students make the connection between the skills they're hopefully learning in school and what the requirements are when they get on the job--their duties at work. It's going to cause the instructors to have to try and keep up also. Will make	I don't think that our group had much international concern. We probably would be more local community. In the repair industry, I don't think you could say we're competing internationally. I don't believe we looked at standards from other countries. I would think we're probably way ahead on these particular items.	Used more or less a round-table format, and brought forward ideas, kicked them around, and then used kind of group consensus. Already have some standards in place so it was more of a matter of revising and determining which ones were still needed and which ones to eliminate.	There was a pretty good balance of representation from business industry, labor and education. There were women on the committee but it was heavy with men. We had a very good balance of industry and education in the skills group that was trying to pull this all together, and then go out and do the job of looking at the educational institutions to evaluate if they were meeting the standards that we were setting.

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		vocational education more accountable to the needs of business and industry. It was a very good experience and I think it allowed the communication to take place that needed to take place between industry and vocational education.

VITA

Phyllis Carolyn Bunn was born in Newport News, Virginia where she graduated from Warwick High School. She received her B. S. degree in business education from Campbell University, Buies Creek, North Carolina. After graduating she taught business subjects in the Newport News for seven years. She worked in support positions at Virginia Polytechnic Institute and State University, Blacksburg, Virginia for twenty years. Fourteen of those years were in the Division of Vocational and Technical Education. Both the M. S. and Ph. D. degrees were earned at Virginia Tech in the College of Education, Vocational and Technical Education. Phyllis completed the degree requirements for a Ph.D. in the spring of 1996. The emphasis for both the master's and doctoral degrees was management, with the option of the master's degree being training and development. In 1993, Phyllis completed a field study at the Institute for Educational Research, University of Jyvaskyla, Jyvaskyla, Finland. She was invited and returned to Finland in 1996 and gave four workshops for teachers and students of the Vocational Education Teachers College. These workshops were related to the educational system, vocational education, teacher education, publishing, presenting, and networking in the United States. In 1994 she received the Delta Pi Epsilon Beta Gamma Chapter scholarship to participate in the DPE National Research Conference research training workshop in Philadelphia, Pennsylvania.

The major focus of her research has been skill competencies and standards. She has delivered more than thirty presentations at international, national, state, and local conferences, workshops, and seminars on the following topics: skill standards and certification, vocational competence and certification, the information highway, mentoring, SCANS competencies, train the trainer, gender equity, time management, and AIDS in the workplace. She delivered two presentations at an International Conference in Jyvaskyla, Finland with the theme Vocational Certification of Youth and Adults. Presentations have also been given at American Vocational Association annual conferences in the business, technical, international, and family and consumer sciences divisions; American Educational Research Association Annual Conference, business division; and the National Business Education Association annual conference, National Association of Business Teacher Educators division. Phyllis has eighteen publications in international, national, regional, and state professional publications on the following topics: national industry-based skill standards, the information highway, certifying skilled workers, office administration, and SCANS competencies.

Membership and active participation in professional organizations has also been an important focus for Phyllis. She was inducted into Phi Kappa Phi, Phi Delta Kappa (PDK), Delta Pi Epsilon (DPE) and Omicron Tau Theta (OTT) at Virginia Tech. She held several offices and committee chairs in OTT, IOTA Chapter, including president, and served two terms as secretary of PDK, Virginia Tech/Montgomery County chapter. She is presently national historian of OTT and serves on the national publications committee of DPE.

Phyllis C. Bunn

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