Analysis of The Integration Of Skill Standards into Community College Curriculum

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ANALYSIS OF THE INTEGRATION OF SKILL STANDARDS INTO COMMUNITY COLLEGE CURRICULUM

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EXECUTIVE SUMMARY

The utilization of skill standards in the curriculum development process has become an increasingly prominent aspect of the reform movement in career and technical education over the past 10 years. Standards are seen as a way to achieve better accountability within CTE systems, and improve their quality as well as their alignment with workplace requirements. While they are increasingly in use in both secondary and postsecondary CTE programs, little research has been conducted regarding the extent to which skill standards are currently used by community colleges as a key component of curriculum development, delivery, and assessment. Current literature available on skill standards, however, describes their purpose, initial development, and evolution. Much of the information available is intended for secondary, rather than postsecondary, CTE. The purpose of this study was to examine the extent to which various industry- and state-based skill standards are integrated into CTE community college curricula.

Using a descriptive survey design, a nationally represented sample of community college career and technical deans were asked to complete a questionnaire that assessed awareness and implementation of industry-based skill standards. For those institutions implementing industry-based skill standards, the questionnaire sought additional information on assessment and credentialing practices. Data were collected across 10 CTE program areas including agriculture; construction/trade; automotive, commercial mechanic, and commercial driver's license; family and consumer sciences; graphic arts; health occupations; hospitality and hotel management; manufacturing; industrial; and business, administrative, and information technology. Key findings include the following:

- Three quarters (75.7%) of the reporting institutions use skill standards within postsecondary CTE curricula;
- The program areas in which respondents reported the highest level of awareness of national industry-based skill standards included manufacturing, construction, automotive, and health occupations;
- While colleges are implementing both national industry-based and similar state-level standards, more institutions implement the national standards;
- The program areas in which the highest numbers of community colleges were implementing skill standards included construction (77%), automotive/mechanical (95%), and health occupations (99%);
- The majority of the community colleges are implementing standards for the purpose of developing curriculum. The purpose least used for implementing skill standards is that of selecting CTE faculty members;
- For those community colleges that assess students' achievement of skill standards, the split is fairly equal between the use of traditional knowledge-based assessments, such as paper-and-pencil or computer-based tools, and performance-based/authentic assessments;

- The percentages of colleges offering some form of certification/credentialing ranged from 53% in manufacturing to 83% in health occupations. The remaining program areas showed an average of 70% of the colleges offering certificates/credentials;

- The main method of certification/credentialing is the awarding of a college degree or diploma.

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Skill Standards Defined

Industry-based skill standards are seen by many as the way to empower individuals entering or returning to the workforce, while positioning United States business and industry to regain a competitive edge in a changing marketplace. According to the former National Skill Standards Board (NSSB) Web site (www.nssb.org), "Skill standards identify what people need to know and be able to do to successfully perform work-related functions within an industry sector. Specifically, standards define the work to be performed, how well the work must be done, and the level of knowledge and skill required." Skill standards, therefore, as used in this study, refer to worker performance specifications that have been developed or are being developed by business and industry-based organizations, educational organizations, individual states, or a combination of these.

Skill standards consist of two components: (1) a description of the responsibilities needed for competent performance, and (2) a description of knowledge and skills necessary to carry out these responsibilities (National Skill Standards Board, 2000). In educational settings, skill standards define a facet of student performance that is measurable and built on the skills learned as students progress through the educational system and into the workplace (Rahn, O'Driscoll, & Hudecki, 1999). In industrial settings, skill standards help those involved prepare for changes in both work and the economy (Wills, 1995).

Standards function as a quality-warranty, a goal-indicator, and a change-promoter (Silvan, 1993). In the context of education, standards clarify expectations of student performance (Rahn, O'Driscoll, & Hudecki, 1999). According to Silvan (1993), the greatest implication of skill standards has been the evaluation of student performance. Advocates believe that skill standards have the potential to (1) improve the United States workforce, (2) provide uniform measures for the international marketplace, (3) provide portability of employment for United States workers, (4) increase accountability, and (5) meet the needs of business and industry (Bunn & Stewart, 1998).

Skill standards have emerged from a belief that technology and market shifts have caused major changes in the skills and behaviors needed by the workforce (Bailey & Merritt, 1995). In 1997, the Center for Occupational Research and Development identified several issues accelerating evolution of the workplace, including (a) rapid advances in technology and their uses by business and industry, (b) the globalization of markets and emergence of internationally competitive workforces, (c) the emergence of high-performance companies, (d) the development of national and international skill standards, and (e) the occupational classification system (p. 1). These occurrences have led to broad reform within education, involving changes not only in pedagogy and curriculum but also in closer alignment to the needs of the workplace. Changes in the workforce and economy have affected both employer and employee commitments to skill development, as those preparing to enter the workforce now need to prepare for emerging technologies and the possibility of multiple career changes over the course of their working lifespan. Likewise, employers are finding that a better understanding of workplace skills supports

potential employees' preparation for the necessary changes in requirements (Wills, 1995). Industry-based skill standards have become a critical component of educational reform. According to Bailey and Merritt, this reform movement has been in response to a growing need for an educational system that (1) meets the needs of learners, workers, and employers; (2) facilitates transitions from school to work; and (3) strengthens the economic position of the United States.

Skill Standards Movement

Skill standards systems have a long history in the United States, although the impression is pervasive that they emerged only recently (Wills, 1995). The earlier forms of skill standards systems are found in the examples of competency-based learning and certification systems in certain industries and occupations such as construction (Wills, 1993). Those skill standards were mostly self-developed and self-regulated by individual industries or occupations (Wills, 1993). However, the recent skill standards movement continues to progress at the national level and is driven by the leadership of federal government, though the concept has historical roots in apprenticeship programs.

Many apprenticeship programs continue to use skill standards, which are created by employee associations, employers, or employer groups working together in order to develop training standards for each occupational area. Apprenticeship programs are a form of career preparation that mix on-the-job and classroom learning (Crosby, 2002: Packert, 1996), designed to provide trained, skilled, and valuable employees. They are characterized by the sponsorship by an employer training program, the skills obtained by the specifically tailored training program, and the validity of the knowledge, skills, and abilities learned (Packert). Most formal apprenticeship programs are registered with the U.S. Department of Labor (Crosby). This registration means that standards of fairness, safety, and training have been established that students of the program must meet in order to graduate. Apprenticeship programs garnered much attention in the late 1980s and early 1990s (Hamilton, 1990), but are only one of many work-based learning opportunities for students (Stone & Aliaga, 2003).

During the 1990s, the need for improved academic and vocational curriculum and instruction came to the forefront of education policy at the federal, state, and local levels. The economy had slipped into a recession, bringing attention to politicians of the need to strengthen the relationship between school and work (Dykman, 1996). Legislation focusing on academic and career and technical education (CTE), including the Carl D. Perkins legislation and the School-to-Work Opportunities Act (STWOA), required states to focus on standards to a higher degree. STWOA criteria served as the impetus for state- and publicly funded education institutions to adopt nationally validated skill standards for developing integrated curriculum, constructing career pathways, engaging business and industry, and issuing certification of competencies (Wills, 1997). Other significant legislative initiatives helping to lay the groundwork for a national skill standards movement included (1) the National Advisory Commission on Work-Based Learning, (2) the *High Skills, Competitive Work Force Act* of 1991 mandating formation of the National Board for Professional and Technical Standards, and (3) the *Job Training Partnership Act* (Wills, 1995).

The report *America's Choice: High Skills or Low Wages!* (1990) issued by the Commission on the Skills of the American Workforce, brought significant attention to the need for changes in the educational system in order to better prepare students for the emergence of a new workforce. The Commission believed it was essential for the United States to establish processes, systems, and structures that would involve industries in the development and provision of education and training for large segments of the workforce. In summary, the report identified the lack of a clear standard for achievement and lack of motivated students as two barriers against producing a strong workforce. Students who entered the workforce immediately following school often lacked motivation to perform job responsibilities rigorously. During school, they had failed to see the relationships among school performance, job attainment, and subsequent work performance.

The report discussed the fact that countries other than the United States had standards and training structures in place. By age 16, students in these countries are required to meet strict performance requirements that have a direct impact on their employability. Other countries were found to have national systems in place that involved business and industry in the development and implementation of education or training for the workforce. Among the major industrial countries, only the United States lacked such a system (Wills, 1993). Improving the quality of federally sponsored training programs led the U.S. Department of Labor to conclude that without industry-driven skill standards, it would be impossible to measure the effectiveness of programs and evaluate the impact of investments in education and training (Wills, 1995).

During 1992, the U.S. Department of Education and U.S. Department of Labor jointly supported demonstration projects to develop a process for establishing voluntary skill standards. This effort resulted in 6 national skill standard pilot projects sponsored by the U.S. Department of Labor and 16 sponsored by the U.S. Department of Education. Total support exceeded more than $8 million dollars. A range of organizations were given responsibility to organize stakeholder groups to help determine the potential of developing a national voluntary skill standards system. The pilot projects would continue to evolve, as presented in the next section.

National Skill Standards Board (NSSB)

A central component of the reform agenda established under the *National Skill Standards Act* as part of the *Goals 2000: Educate America Act of 1994* was the National Skill Standards Board (NSSB), funded from 1994 through 2003. As a result of the belief that skill standards could make a significant contribution to improving both education and work, the NSSB was established to promote the development of a national system of voluntary industry-based skill standards (Bailey & Merritt, 1995).

According to the former NSSB Web site (www.nssb.org), the Board was formed as an alliance of leaders from business, labor, employee, education, and community and civil rights organizations to build a voluntary national system of skill standards, assessment and certification systems to enhance the ability of the United States workforce to compete effectively in a global economy. These skills were identified by industry in full partnership with labor, civil rights and community-based organizations. The standards are based on high performance work and will be portable across industry sectors.

The purpose of the Board was to strengthen relationships between educators and employers in the development and implementation of skill standards. The NSSB was expected to have multiple functions, including facilitating skill standards development, identifying clusters and facilitating partnerships, revising and updating the existing skill standards, endorsing the qualified skill standards, promoting the use of skill standards, evaluating implementation of skill standards, and supporting the skill standards through research (U.S. Department of Labor, 1995).

Today, the NSSB still identifies users such as labor organizations, training providers, community groups, and state and local governments in order to accomplish its goals. Members from each industry sector join together to form "voluntary partnerships." These voluntary partnerships are the endorsers of national standards under the NSSB umbrella (Losh, 2000); the NSSB does not develop or endorse standards independently. Under the guidance of the NSSB and convening groups, these voluntary partnerships are responsible for developing skill standards, assessments, and certification for their respective industry sectors. According to its 2000–2001 annual report (p. 6), recent goals of the NSSB are to:

1. Assist workers in acquiring the skills they need to succeed in today's dynamic workplace;

2. Help businesses succeed and compete with global competitors by increasing the pool of skilled and productive workers;

3. Become the cornerstone of a national strategy to improve workers' skills and broaden the availability of training to our nation's workers; and

4. Link with vocational–technical education and job training programs to deliver relevant education to the nation's current and future workforce.

Legislation required the NSSB to first establish broad occupational clusters for skill standard development. States could not receive School-to-Work (STW) implementation grants unless strategies for establishing career clusters and programs of study were undertaken (Wills, 1997). The NSSB first met in April 1995 with the mission to create clusters of occupations and develop goals that were common among skill standards in the career clusters (Dykman, 1996). The NSSB set out to develop, with the cooperation of business and industry, a system to classify jobs and occupational areas. An important assumption was that some form of clustering of occupations and industries was a prerequisite for standards to becoming powerful tools in educational reform and for improving the development of the workforce. The NSSB divided the economy into 15 sectors designed to reflect employment patterns that would be logical to employers, unions, workers, students, and educators. These industry sectors reflected broad industry categories for use by business and industry representatives for the development of voluntary partnerships and industry-based skill standards.

Upon its establishment, the NSSB provided leadership and direction for the 22 skill standards development projects sponsored by the U.S. Department of Education and the U.S. Department of Labor (Boesel, Rahn, & Diech, 1994). The NSSB required projects to focus on national skill standards that could be used to measure the knowledge and skill of students in specific occupational areas. The projects sought to identify materials (i.e., skill standards or related

measurable performance-based outcomes) that were readily available across the nation (Losh, 1995). Furthermore, each project was responsible for developing relationships among stakeholders and exploring how the skill standards systems would develop and operate (Bailey & Merritt, 1995). Each project focused on a sizeable industry not requiring a baccalaureate degree, and the project attempted to involve all relevant parties (e.g., employers, employees, educators, union, and community leaders). Most development projects were completed by 1995.

In 1996, the NSSB supported nine 1-year grants to 12 industry and research groups to develop national skill standards. These projects differed from those supported by the U.S. Department of Education and the U.S. Department of Labor. The NSSB was challenged to find common ground among similar jobs in different industries and develop curriculum and evaluations based on the skill groups (Dykman, 1996). These projects were initiated as real-world examples of a national voluntary skill standards system, and produced standards for each industry area.

During the summer of 2003, a successor structure was created to promote the functions related to the mission of the NSSB (www.nssb.org/history.cfm). This new structure was organized to carry out national functions, extend the work to other industry sectors, and promote the value of the Board's work for specific enterprise, regional, or sub-industry applications. This new structure is divided into two elements. The first is the National Skill Standards Board Institute (NSSBI) which is responsible for representing "communities of interest related to the development and use of industry skills requirements, skills assessment for learning or selection, and certifications." The NSSB Education and Research Institute is responsible for "information storage and dissemination around issues of quality assurance and system integrity."

Current Perspectives on Skill Standards

For many, industry-based skill standards promise advantages for our economy, business and industry, policy makers, educators, and those preparing to enter or make a career change in the workforce. Bailey and Merritt (1995) presented sound arguments for improving the system of skill standards and certification. These include employer identification of qualified workers, reduced application screening costs, recruitment support, and overall improved public perception of credentialing organizations. An improved set of skill standards would provide students with a benchmark of relevant knowledge and skills, and the motivation for attaining them. Other advantages of a national system for graduates include better access to a national labor market and promotion of geographic mobility. Students, employers, and the general public are better able to evaluate education and training providers. Advocates for skill standards put forth the idea that skill standards will improve the United States workforce and produce quality in the international marketplace by defining the best skill standards system in the world. These standards improve the outcomes of CTE programs by providing portable employment credentials for United States workers (Bunn & Stewart, 1998). Increased accountability of workers and meeting the needs of business and industry are also believed to result from the implementation of skill standards.

The use of national skill standards connects secondary and postsecondary instruction with the needs of the working world. Students can demonstrate their skills to potential employers with certificates and credentials, regardless of where the training took place. Not only is geographic

mobility a possibility, but movement between occupations is possible because of overlaps in skill standards areas (Boesel et al., 1994). The curriculum can be aligned with national goals set in the skill standards; employers do not have to be concerned with gaps in training (Raynor & Hudson, 1995). The skill standards also lead to more internal promotion by building career ladders within companies by using skill standards levels (Boesel et al., 1994). Relating work and learning improves learning, providing learners with a real-world context for new skills, rather than an abstract context for learning academic subjects (Bailey, 1997). Students are able to see concrete relationships between what they are learning in school with jobs, prompting some lower achievers to concentrate on their schoolwork (Boesel et al.).

Faulkner (2002) describes skill standards as meritorious in articulating skills and knowledge required by front-line workers in high-performance environments and serving as benchmarks that employees and employers can use to sustain a competitive edge. An advocate of skill standards and active member in the national skill standards movement, Spill (2002) identifies multiple benefits to multiple stakeholders. Benefits for employers include enhancing the ability to communicate knowledge and skill performance requirements to new and incumbent employees; determining proficiency levels; reducing costs and risks associated with hiring new workers; and promoting existing employees. Individual employees and students benefit by being able to make informed decisions about spending resources for education and training. They can better communicate their skills and knowledge to current and potential employers. Providers of education and training benefit because they can adapt course content to prepare graduates with the most current knowledge and skills necessary to meet the performance requirements of employers. Additionally, education providers that adopt skill standards and certifications should expect to see enrollment increases, as their graduates' success becomes known. Finally, state and local education agencies can benefit because they have a framework for organizing successful internal operations with clear guidance for improved customer satisfaction and enhanced workforce preparedness.

Existing Empirical Evidence

While the implementation of national skill standards has promised much, there has been little research on the process or outcomes of such implementation (Hoachlander & Rahn, 1994; Raynor & Hudson, 1995). Several studies show that the use of skill standards varies from state to state, but there is limited knowledge of CTE faculty awareness of skill standards and faculty attitudes toward them.

A study by the Institute for Educational Leadership investigated skill standards development and use in the United States (Wills, 1993). The report indicated that most states used skill standards for curriculum development, program/course guidelines, course syllabi development, and assessment of skill acquisition. It also indicated that more than half of all states used skill standards to certify program mastery. However, the study also found that only about one third of all states used the skill standards for assessment of student mastery. The development and use of the skill standards were limited to the state level, rather than national level.

Belcher and McCaslin (1997) surveyed Ohio secondary school vocational teachers' knowledge of, and attitudes toward, the national skill standards. A little more than one third (35%) of the teachers surveyed were familiar with the skill standards for their vocational programs. Slightly over half of the teachers believed that national skill standards would help school-to-work transition, measure individual ability and workforce productivity, and reduce employers' recruiting costs. In addition, about 40% of the teachers believed that national skill standards would help enhance vocational education programs. Finally, 70% of the teachers reported they used employability skills for student ability assessment for the areas in which they taught. While this study explored expectations, it did not examine actual outcomes.

Models for Implementation

Wills (1995) suggested that an ideal standards system should focus on the needs of the target populations. Specifically proposed: such systems should be (1) accessible, (2) flexible, (3) explicit, (4) progressive, (5) applicable to a wide range of career paths, (6) competency-based, and (7) should include assessment and certification by a third party. Advocates suggest that national skill standards should (1) be unified, industry-based, and nationally endorsed measures of skills, (2) result in a credential that is portable across regions and states, and (3) be recognized by all companies. A scant amount of literature has been written on these components, offering guidelines for design and implementation.

Accountability. Accountability ensures quality because workers are held responsible for competence and productivity (WestEd, 1998). One method of increasing accountability is through the development and use of performance standards following national skill standards. Performance standards define criteria for proficient skill acquisition.

Assessment. Several assessment procedure options are available to educators. While the use of standardized tests (multiple-choice and short-answer) is common for most licensing and certification, they are not the best measures of most national skill standards achievement because they do not demonstrate higher-order thinking skills or problem-solving skills. Those standardized tests that do measure those aspects of the national skill standards are very difficult to develop, and time-consuming for both the educator and the learner. Alternatives that better measure competency in national skill standards include: journals, demonstrations, checklists, and portfolios. These performance measures require a learner to *create* an answer, rather than remember or list one. Alternative performance measures that involve real-world applications allow a student to showcase higher-order thinking skills and problem-solving abilities (Center for Occupational Research and Development, 1997).

In case studies by Haimson and Husley (1999), two different assessment procedures were used to measure the competency in the national skill standards. To evaluate students, teachers completed checklists, and external assessments were administered by external skill-standards organizations. The checklists covered skills that were difficult to evaluate using standardized tests and offered flexibility because students could demonstrate skill competency in various situations. Validity was a concern because people external to that particular education process would not know the individual teacher's criteria for skill mastery. Employers had trouble putting much weight on an internal checklist evaluation system because they did not know how stringent

each teacher had been in evaluation. External assessments were credible for most employers because the assessment criteria were clearly defined, and the evaluators were independent from the school. Although the external assessments were more credible than internal checklists, employers may place even more weight on the personal recommendation of a student's or graduate's prior employer than on an exam (Haimson & Hulsey). Employers prefer concise assessments, and do not want to wade through the portfolios of prospective employees (WestEd, 1998).

Certification and Credentialing. Certification and credentialing are sometimes used interchangeably, but they represent different concepts. Certification is very focused on job relevance and is generally assessed with a criterion-referenced performance assessment. Credentialing is more generic and reflects an accumulation of certificates (Carter, 2000). Community colleges need a credentialing system that is compatible with global and local initiatives. The credentialing system needs to be reliable—reflecting market needs, meeting standardized performance objectives, and continuously reviewed and developed. It also needs to be portable, meaning it needs national, statewide, or local acceptance, and needs to be based on high performance skills. Flexibility is also required in a credentialing system because it needs to respond to the industry in a timely manner. A credentialing system would not be complete unless it were comprehensive, with clear performance indicators. A complete credentialing system would need to include all of these aspects in order to be accepted by industry. A changing educational environment is requiring traditional credentialing systems to be restructured. The number of people seeking higher education is increasing, but adults want education that will result in long-term employment and are not necessarily concerned about pursuing an associate's degree.

Skills are also shifting in business and industry. Employers have been questioning the relevance of a transcript or degree as a guarantee of skill mastery (Carter, 2000). Dynamic industries are having serious reservations about the timeliness of a degree program because traditional programs are having problems: They lag behind the field, lack industry standards, and do not reflect real-world conditions. Community college certificates and credentials need to accurately reflect a student's mastery of specific skills. Colleges also need to be concerned with responding to industry changes in a timely manner. Credentialing systems should be kept current and accepted at least locally to be valued.

The Role of the Community College in Skill Standards Implementation

Career and technical education (formerly known as vocational–technical education) has been a part of the mission of community colleges since their inception. According to Cohen and Brawer (2003) vocational–technical education has been a component of most states' curriculum plans from the earliest days. Vocational education in the community college was designed to teach more complicated skills than high school vocational classes—with the intention of "serving students by preparing them for employment and serving industries by supplying them with trained workers" (Cohen & Brawer, p. 233). Community college personnel work with employers to analyze local employment trends and design programs of study.

Carter (2000) reported that the technical complexity in the workplace will rise, which means that people who fill the jobs will be required to have specialized, current skills. United States employers are no longer looking for applicants who simply have computer knowledge, but now seek individuals with specific skills for a specialized field of work. Degrees are becoming less important to many areas of work, with specialized skills coming to the forefront. Community colleges are challenged to examine their programs and determine if these programs are capable of this type of professional development. If not, the colleges must decide what is necessary for students to learn, and overhaul programs to deliver the required outcomes. Course development becomes critical and the time in which to do it is shortened.

With the increasing importance of national skill standards and student certification, institutions must focus on building a reputation for developing students for relevant jobs (Boesel et al., 1994). Current and future students would then be able to make educational choices based on the performance of an institution and the placement of its graduates. These placement rates, in turn, serve as clear indicators of successful CTE programs.

Statement of the Problem and Purpose

Skill standards are not new to education reform. Many groups (e.g., occupational groups, educational agencies, and local schools) have approached the task of developing skill standards. However, as Sherman commented, "If everyone thinks their state program is good enough, there will be no portability across state lines. You need national standards to level the playing field" (quoted in Dykman, 1996, p. 30). To develop consistency among skill standards, voluntary nationwide skill standards across career areas have been developed (Stern, Bailey, & Merritt, 1996). These have a chance for national acceptance and portability within the United States, and should be of interest to community college faculty. Current literature on skill standards, however, describes the initial development of skill standards, along with discussion of their purpose, as evolving (Dykman; Rahn, O'Driscoll, & Hudecki, 1999). And much of the information available is intended for secondary, rather than postsecondary, CTE.

The utilization of skill standards in curriculum development has become an increasingly prominent aspect of the CTE reform movement over the past 10 years. Standards are seen as a way to achieve better accountability within CTE systems, improving their quality as well as their alignment with workplace requirements. While standards are used increasingly in both secondary and postsecondary CTE programs, little research has been conducted regarding the extent to which they are used by community colleges as a key component of curriculum development, delivery, and assessment. If CTE policy makers, education leaders, and community college faculty are to make informed decisions about the best approaches toward the integration of skill standards into CTE programs, more information is needed about current practice.

Purpose and Research Questions

The purpose of this study was to examine the extent to which various industry- and state-based skill standards are integrated into CTE community college curricula. This study was guided by the following research questions:

1. To what extent have industry-based skill standards become part of the community college CTE curricula?

2. To what extent are industry-based skill standards part of the assessment process in community college CTE?

3. To what extent do credentials, certificates, and diplomas issued by CTE community college programs reflect industry-based skill standards?

This research builds on previous National Center work in skill standards (Bailey, 1997; Bailey & Merritt, 1995; Hoachlander, 1999; Holmes & Rahn, 1998; Merritt, 1996; Rahn, O'Driscoll, & Hudecki, 1999; Stern, Bailey, & Merritt, 1996). Past studies have focused on the integration of academic and industry standards (Bailey; Bailey & Merritt; Hoachlander), setting standards in relation to accountability (Rahn, O'Driscoll, & Hudecki), developing CTE skill standards resources for CTE teachers (Holmes & Rahn), reporting findings from promising states that are setting skill standards (Rahn, O'Driscoll, & Hudecki, 1999), and sharing skill standards (National Dissemination Center for Career and Technical Education, 2001). This project will develop a more extensive and specific view of the extent to which skill standards are implemented in community college CTE programs.

METHOD

This study utilized a descriptive survey design to analyze the status of industry-based skill standards implementation in postsecondary CTE programs. A nationally represented sample of community colleges was asked to answer questions addressing the prevalence of skill standards in postsecondary CTE.

Participants

Target Population

The target population for this study was defined as postsecondary colleges and technical institutes that are members of the American Association of Community Colleges (AACC). These institutions are typically referred to as community colleges, technical institutes, or junior colleges. The population provided a national representation of institutions, and included all types, sizes, geographic locations, and settings (i.e., urban, suburban, or large town, rural). The population included all institutions that were classified as single-campus colleges, variations of multi-campus colleges (i.e., district offices, multi-college districts, institutional systems), and colleges that were on the campus of a university and had either a separate or shared accreditation with their host institution. The sampling frame for the population was obtained from AACC, and contained a list of 1,019 member institutions. After removing duplicate references in the database, the final target population contained 1,015 member institutions. The frame was cross-referenced with the membership directory of the National Council for Workforce Education (NCWE) to verify contact information. Any conflicts found in the contact information were verified for accuracy through phone contact or Web page phone directories.

Participant Selection

Based on discussions with AACC researchers, it was determined that their membership, in terms of institutional characteristics, was heterogeneous across states and homogenous within states. Therefore, a proportionally representative sample was obtained using a stratified random sampling technique. Using each state in the nation as a stratum ensured a representative sample at the state level.

Cochran's (1977) sample size formula was used to determine the delivered sample size needed to make estimates on skill standards from the target population of 1,015 community institutions. To determine the delivered sample size needed, alpha was set at .05, acceptable margin of error was set at 5%, and variance was conservatively estimated at .25. The required delivered sample (n = 384) was then adjusted for exceeding 5% of the target population (Cochran). The desired delivered sample for the project was 285 after the adjustment. Adjusting for a response rate of just over 50%, the drawn sample included 552 community colleges. The number of institutions selected from each state represented the overall total proportion of community colleges in each state within the United States.

Instrumentation

A thorough review of the literature on national industry-based skill standards implementation within CTE program areas was conducted. Additionally, community college CTE curricula were reviewed to establish specific skill standards for program areas. Based on these two inquiries, a list of 64 industry-based skill standards was created (see Appendix A). These 64 standards cover 11 program areas, including: agriculture; automotive; construction/trade; commercial mechanic and commercial driver's license; family and consumer sciences; graphic arts; health occupations; hospitality and hotel management; manufacturing; industrial; and business, administrative, and information technology.

In addition, questionnaire development involved working closely with contacts at several professional associations to (1) gain insight into related studies they had completed, (2) seek their advice on increasing response rates, and (3) identify the critical questions that needed to be included. Based on these interactions, the research was formally endorsed by AACC, the National Council for Occupational Education (NCOE; now known as the National Council for Workforce Education), and the National Skill Standards Board (NSSB). A statement highlighting the endorsement of these associations was incorporated into the questionnaire cover letter.

Experts from universities and community colleges in the areas of measurement, skill standards, and survey research design reviewed the instrument for content validity and format. After the review, items were modified, changed, and deleted. A pilot test of the instrument was conducted with CTE administrators who were not part of the sampling frame. Feedback from the experts and the pilot test was used to revise items for the final instrument. Cronbach's alpha was used where appropriate to assess the internal consistency of the instrument.

The questionnaire was organized around each of the 11 CTE program areas and their applicable skill standards. However, due to the overlap in skill standards, the program areas of automotive, commercial mechanic, and commercial driver's license were collapsed into a single category resulting in 10 CTE program areas addressed by the survey. The estimated amount of time needed to complete the questionnaire varied depending on the number of skill standards the institution had implemented. The questionnaire first asked respondents to identify whether a particular CTE program was offered at their respective institutions. If the program was offered at the institution, the questionnaire then directed respondents to answer a series of questions related to each of the applicable skill standards. For each of the 64 standards, nine questions were asked. The nine items on the questionnaire were built around the following five categories:

1. *Skill Standard Awareness (Item 1):* This item asked respondents if they were aware of the stated skill standard.

2. *Implementation of Skill Standard (Items 2, 3):* These items asked respondents if their respective institutions were implementing the stated skill standard or a similar state-level skill standard.

3. *Approaches to Implementation (Item 4):* This item solicited the ways the institution was implementing the stated skill standard. Respondents could select one or more of the following: (a) developing curriculum, (b) modifying instructional practices, (c) marketing the program to business and industry, (d) assessing program, (e) assessing students, (f) developing learning objectives, (g) marketing program to students, (h) selecting faculty, and (i) other.

4. *Approaches to Assessment (Items 5, 6):* These items were developed to identify the methods the institution used to assess student achievement of the stated skill standard and to identify if the assessments were developed by the skill standard organization. Respondents could select one or more of the following: (a) traditional knowledge-based assessment (paper-and-pencil or computer-based), (b) performance-based/authentic assessment, (c) no student achievement assessment of the skill standard, and (d) other.

5. *Certification/Credentialing (Items 7, 8, 9):* These items addressed certification/ credentialing activities associated with the stated skill standard. Item 7 asked respondents to identify any certificates/credentials awarded to students for achievement of the stated skill standard. Requirements for awarding certificates/credentials were then solicited through item 8. Participants could choose from the following list: (a) completing a degree/diploma, (b) completing courses with passing a certification exam, (c) completing courses without passing a certification exam, (d) passing certification exam with no course requirements, and (e) other. Item 9 focused specifically on any certification/credentialing exams used at the institution. Choices included: Exam is (a) a traditional knowledge-based assessment (paper-and-pencil or computer-based), (b) performance-based/authentic assessment, (c) developed by the skill standard agency, and (d) administered by an outside agency.

Data Collection Procedures

This study involved mailing a questionnaire to the career and technical education deans of each of the postsecondary institutions identified in the sample. The AACC provided a list of mailing addresses for the career and technical deans of institutions in the sample. The documentation required to gain human subject approval for this research was submitted to the University of Illinois Institutional Review Board (IRB), and formal approval to engage human subjects in this research was granted.

Data Gathering Process

A four-round data collection process based on Dillman's (1978) Total Design Method was used to obtain responses to the questionnaire. Questionnaires were coded and logged into a computerized database to track responses. In round one (the initial mailing), a questionnaire was sent to the career and technical education deans of the 552 institutions in the sample. Round two involved a postcard mailing to career and technical education deans at those institutions that had not responded to the round-one solicitation. Round three involved a second mailing of the questionnaire to those individuals who had not responded to the first two solicitations. Round four utilized e-mail and phone contact. The multiple rounds of data collection were designed to

increase the response rate. They also allowed for a comparison of the responses from early and late respondents. Each of the data collection rounds is described in greater detail below.

Round 1: Direct mailing. The questionnaire was mailed to the career and technical education deans at each of the institutions in the sample. The mailing contained a cover letter that described the study, the 36-page questionnaire, and a self-addressed stamped return envelope. The career and technical deans were asked to complete the questionnaire themselves or to forward it to the person(s) at their institution most knowledgeable about the implementation of industry-based skill standards and/or directly involved with providing CTE courses at their institutions.

Round 2: Postcard mailing. The second phase of the data collection process involved a second mailing to the career and technical education deans of each institution that had not yet responded to the first solicitation. The nonrespondents received a postcard emphasizing the importance of the study and reminding them to complete the questionnaire.

Round 3: Direct mailing. The third phase of the data collection process involved a third mailing to the career and technical deans of each institution who had not yet responded to the first two solicitations. Nonrespondents received a package containing the same materials as the first mailing, with the exception of a cover letter that indicated that this was a third request. The survey codes were recorded to allow tracking of the returned questionnaires.

Round 4: Direct e-mail and telephone calls. During the fourth round, those career and technical education deans who had not responded to the previous solicitations were contacted via e-mail. If the participants did not respond to the e-mail, a telephone call was placed. When contact was made at an institution, either through e-mail or phone, the purpose of the study was described to the career and technical education dean or their administrative assistant. They were then asked who might have received the questionnaire. Contact information for that individual was then requested (i.e., telephone number or e-mail address) and attempts were made to contact that person directly.

When no contact could be made with a person at an institution, a voicemail message that described the study was left for the career and technical education dean. When contact was made with the appropriate person at the institution, the purpose of the study was described and an offer made to send them a copy of the questionnaire via mail or e-mail. In most cases, the individual expressed an interest in the study and offered to complete the questionnaire. In other cases, the individual stated they were not allowed to participate in unsolicited surveys, did not have time to participate, or simply elected to “opt out” of the study—all of which were appropriate options according to the IRB guidelines for involving human subjects in survey research of this type.

Response Rates

Of the 552 institutions surveyed, 204 returned surveys—resulting in a 37% response rate. The response rate on this survey compared favorably with a study conducted by AACC, which sent their questionnaire to chief academic officers at more than 1,100 community colleges, and 205 responded, for a 19% response rate (Nock & Shults, 2001).

Strategies to increase response rates. Several strategies were used to increase the response rate (Bourque & Fielder, 1995; Fowler, 1993). First, prior to the distribution of the questionnaires, community college career and technical education organizations were contacted for sponsorship to gain support for the project. The names of these organizations were included in the cover letter that accompanied the questionnaire.

Second, each cover letter was personalized to include the name and title of the career and technical education dean in the mailing address and salutation. Personalization of mailed questionnaires has been shown to improve response rates (Bourque & Fielder, 1995; Fowler, 1993). Third, a $50 gift certificate to a national bookstore chain was offered to those respondents who returned useable questionnaires. Fourth, multiple rounds of follow-ups were conducted with nonrespondents.

Representativeness of the respondents to the nonresponding population. An important consideration in survey research is the degree to which the survey respondents are representative of the target population. Ensuring that the respondents are representative of the population allows for generalizability of the results. A basic assumption about response rates is that probability sampling such as that used in this study, coupled with a high response rate, will provide a sample that is a near-perfect representation of the population. However, it is not necessarily true that a representative sample increases as the response rate increases. According to Visser, Krosnick, Marquette, and Curtin (1996), surveys with very low response rates can provide more accurate information than surveys with much higher response rates. As Krosnick (1999) found, the more researchers work to increase response rates, the less representative the sample becomes. In addition, the research by Traugott, Groves, and Lepkowski (1987) shows that the substantive findings from survey research change little as response rates improve. As Krosnick states, "When probability sampling methods are used, it is no longer sensible to presume that lower response rates necessarily signal lower representativeness" (¶ 12).

In this study, with a response rate of 37%, the respondent pool had a strong resemblance to the larger population. Two hundred and four (204) community colleges completed the questionnaire. Table 1 shows the distribution of those 204 respondents by region, locale, and enrollment is comparable to the distributions for the entire sample of 552 community colleges and the full population of 1,015 community colleges.

To verify the representativeness of the respondents to the population, several statistical comparisons were performed. The demographic characteristics of the respondents who provided useable data were compared to the characteristics of the nonrespondents within the sample. These comparisons included the institutions' United States geographic region (e.g., New England, Great Lakes, Southwest), local setting (i.e., urban, suburban or large town, rural), campus type (e.g., single-campus or multi-campus), and institutional size (i.e., total fall enrollment).

Comparisons for geographic region, local setting, campus type, and institution size involved running Crosstabs in version 11 of the *Statistical Package for the Social Sciences* (SPSS) and calculating Pearson's chi-square. Except for "campus type," no differences were found between the respondents and nonrespondents within the sample for the demographic comparisons (see Table 2). The comparison between the respondents and the target population also revealed no statistical differences between those two groups on the demographic indicators (see Table 3). Comparisons were also made to determine if the nonrespondents were different from the target population in general. As shown in Table 4, there were no differences between the nonrespondents within the sample and the target population.

It must also be determined if the respondents differ in some way. One common method is to compare those who responded quickly to those who responded only after several attempts to solicit their responses. The comparison of the early and late respondents, as shown in Table 5, revealed no significant differences between the demographic characteristics of the two groups except within campus type.

These comparisons provide an analysis of the degree to which the respondents and nonrespondents are similar to the target population. These analyses suggest that the respondents are representative of the target population in general in terms of institution size, institution locale, and region.

Data Coding Procedures

The data coding procedures involved entering the data into an SPSS data file, converting the data into usable form (i.e., converting nonnumeric data into numeric form). Fixed-choice items on the questionnaire were converted to a numerical code during data entry. For example, checkboxes were converted to 1 if checked and 0 if not checked. The applicable institutional demographic data provided by AACC was converted into numeric form using Microsoft Excel™ commands and then imported into the SPSS data file containing the survey data. Because the institutions in the SPSS file retained their identification number from the AACC database, sort commands in both programs allowed for accuracy in importing data between the two files. Data entries were verified for accuracy.

Data Analysis

The status of national industry-based skill standards integration into community college CTE programs was assessed by measuring the characteristics of a nationally representative sample of community colleges at one point in time. Prespecified variables were used to describe prevalence, or frequencies, as well as the various ways in which industry-based skill standards impact community college curricula. In accordance with the research questions, the examined variables reflect the extent to which industry-based skill standards have become integrated into the community college CTE curricula, assessment processes, and diplomas, credentials, and certificates.

Groupings were used to organize the data and to describe the differences in characteristics among the sampled colleges. Grouping included consolidation of the colleges by region, locale, and student enrollment figures (hereafter referred to as institution size). These are similar groups

to those used by AACC for their analysis of community college data. Groupings by college region included three groups:

1. East—composed of the New England, Mid-east, and South-east states.
2. Midwest—composed of the Great Lakes and Plains states.
3. West—composed of the South-west, Rocky Mountain, and Far-west states.

Groupings by college locale also included three groups:

1. Urban—composed of large cities (≥ 250,000) and midsize cities (< 250,000).
2. Suburban and large town—composed of fringes of large cities, fringes of midsize cities, and large towns (≥ 25,000).
3. Rural—composed of small towns (250–25,000) and rural areas (< 2,500).

The following institution sizes were used:

1. ≤ 1,000 students.
2. 1,001–3,000 students.
3. 3,001–10,000 students.
4. 10,000 students.

The frequency distributions for each program area were calculated for those institutions reporting use of industry-based skill standards (n = 153). The following parameters were established for reporting data associated with awareness, implementation, assessment, and certification/credentialing.

Parameter 1: Awareness. Awareness of skill standards was based on those institutions reporting offerings in a particular program area. For example, frequency distributions for awareness of manufacturing skill standards were calculated only for those institutions that reported offering manufacturing programs. This parameter was applied to the remaining 9 program areas.

It was recognized that respondents could have awareness of a particular set of skill standards even though the program was not currently offered at their institution. However, the parameter remained as stated above because the questionnaire was designed to direct respondents to the items associated with the next program area if the current program area under investigation was not offered at their institution. For example, if the institution did not offer a manufacturing program, the questionnaire directed participants to move to the subsequent program area (industrial—non-manufacturing). These guidelines were applied to the remaining sections of the questionnaire by program area.

Parameter 2: Implementation/implementation purposes. Overall, implementation was based on those institutions that reported an awareness of skill standards (parameter 1) for a particular program area. This parameter assumed that institutions could not be implementing a set of standards for which organizational members had no awareness. The specific ways that an institution was implementing skill standards (purposes) were based on those institutions that reported the implementation of skill standards for a particular program area.

Parameter 3: Assessment. Frequency distributions associated with assessment of student achievement and the specific type of assessment methods used were based on those institutions reporting implementation of skill standards for a program area (parameter 2). This parameter assumed that institutions could not assess students on skill standards unless the standards were first being implemented.

Parameter 4: Certification/credentialing. Frequency distributions associated with certification and credentialing were based on those institutions reporting the assessment of student achievement (parameter 3). This parameter assumed that institutions could not offer certifications/credentials without assessment processes in place.

Item 9 asked specifically about the characteristics of any certification/credentialing exams used by the institution. Frequency distributions associated with this item were based on those institutions that reported use of an exam as part the certification/credentialing process.

RESULTS

Institutional Participation in Use of Skill Standards

Out of the 202 institutions responding to the survey, a total of 153 (75.7%) reported the use of skill standards within postsecondary CTE curricula, while 49 (24.3%) indicated skill standards were not currently being used. Table 6 shows the distribution of institutions using skill standards by region, locale, and enrollment. The percentage of institutions (based on n = 153) offering each of the 10 CTE program areas is as follows: business, administrative, and information technology (87%), health occupations (82%), automotive/mechanical (73%), construction/trade (67%), manufacturing (67%), family and consumer sciences/childcare (59%), graphic arts (50%), industrial (47%), hospitality/hotel management (46%), and agriculture (37%).

Awareness of Skill Standards

For those institutions that offered specific CTE programs, their representatives were requested to identify their level of awareness of the applicable skill standards. Respondents' awareness of applicable skill standards varied across the 10 program areas. For three of the program areas (manufacturing, construction/trade, health occupations), approximately 72% of the respondents indicated they were aware of the applicable skill standards. For automotive/ mechanical, approximately 80% of the respondents were aware of the applicable skill standards for this field, while only 30% were aware of the standards for the field of agriculture (30%). Out of the remaining five program areas, the percentage of respondents aware of the applicable skill standards ranged from 38% (graphic arts) to 62% (family and consumer sciences/childcare).

Implementation of Skill Standards

Respondents were then asked if the applicable industry skill standards or a similar state-level skill standards were being implemented by the community college. The data revealed that health occupations (99.2%) and automotive/mechanical (94.6%) were the two programs areas in which the largest number of institutions were implementing national skill standards or similar state-level standards. For trades/construction, 76.7% of the respondents indicated their institutions were implementing standards in this program area, with 64.9% of the institutions reporting implementation within the family and consumer science/childcare area. The data revealed that only 16% of the institutions were implementing standards associated with agriculture, while 19.8% reported implementation of graphic arts standards. For the remaining program areas, the number of institutions implementing applicable national- or state-level skill standards ranged from 33.3% (industrial) to 50.9% (manufacturing).

(The results discussed for the remaining subsections of the survey are associated with Tables 7–16.)

Approaches to Implementation

The survey was designed to solicit the various ways institutions were implementing skill standards into the various CTE curricula areas. Those respondents who stated through an earlier survey item that their institutions were implementing skill standards into a specific program area were offered eight ways/descriptions of implementation from which to select. Respondents were guided to select as many means of implementation as applicable for a particular program area. While respondents reported that the applicable skill standards were being implemented in all of the eight ways listed, particular skills were implemented more extensively by community colleges in comparison to other types of postsecondary CTE institutions.

Both automotive/mechanical and health occupations had the highest percentage of institutions implementing skill standards across the eight ways. For those institutions that implement automotive/mechanical skill standards, approximately 73% of those institutions implemented them in all eight ways listed on the survey. Implementation for the purpose of developing curriculum was reported by 81.3% of the institutions, while 59.3% of the institutions used these same skill standards for selecting CTE faculty. Roughly 76% used these skill standards for assessing student performance. All of the above numbers look similar for the health occupations skill standards. For those institutions that implement health occupations skill standards, approximately 74% of those institutions implemented them in all eight ways. Implementation for the purpose of developing curriculum was reported by 83.3% of the institutions, while 64.6% of the institutions used these same skill standards for selecting CTE faculty. The percentage of institutions using the standards for assessment purposes was 81%.

The program areas of graphic arts, agriculture, and business, administrative, and information technology had the lowest percentages of institutions implementing applicable skill standards across the eight ways. Less that one fourth (23%) of the institutions implemented skill standards in all of the eight ways. Specifically, 31% of the institutions reported implementing skill standards for the purpose of curriculum development, and 13.8% of the institutions implemented them for the purpose of selecting new CTE faculty members. Twenty-four percent (24%) of the institutions reported using skill standards for student assessment. The data reveal a similar pattern for the agriculture program area. On average, 26% of the institutions implemented agriculture skill standards for all eight purposes listed. Thirty-five percent (35.3%) of those institutions implemented agriculture skill standards for the purpose of curriculum development, while 17.6% used them for selecting faculty. The data show that 29.4% of the community colleges used these standards for the purpose of student assessment. Finally, for the program area of business, administrative, and information technology, an average of 30% of the institutions reported implementing the applicable skill standards across all eight ways. The percentage of institutions implementing the standards for the purpose of curriculum development was 39.5%, while the percentage of institutions implementing the standards for the purpose of selecting CTE faculty members was 19.7%. A total of 34.2% of the responding institutions used the business, administrative, and information technology skill standards for student assessment purposes.

Of the remaining five CTE program areas, the percentages of community colleges implementing the applicable standards in all of the eight ways were as follows: manufacturing, 35%; industrial, 32%; construction/trade, 51%; family and consumer sciences/childcare, 44%; and hospitality/hotel management, 42%. Across all 10 program areas, the largest percentage of community colleges were implementing standards for the purpose of curriculum development, while the smallest percentage of community colleges were implementing standards for the purpose of faculty selection.

Approaches to Assessment

Respondents who reported student assessment as a purpose for implementing applicable program skill standards were presented with a follow-up question about specific types of methods used. Two options were provided: traditional knowledge-based, which involves paper-and-pencil, and/or computer-based methods or performance-based/authentic assessment methods. Traditional knowledge-based methods were most frequently reported over performance-based/authentic methods by community colleges in the program areas of industrial (86% vs. 67%); family and consumer science/childcare (80% vs. 65%); business, administrative, and information technology (77% vs. 67%); and hospitality/hotel management (90% vs. 70%). Many institutions reported equal use of each type of assessment method for all program areas offered. This included manufacturing (76%), trades/construction (84%), automotive/mechanical (89%), agriculture (86%), and health occupations (89%). The one program area for which community college respondents reported higher use of performance-based/authentic assessment over traditional knowledge-based assessment was graphic arts. For this program area, 83% of the community colleges reported using performance-based/authentic assessment, while 67% reported using traditional knowledge-based assessment.

Certification/Credentialing

For each of the 10 program areas, certificates/credentials were found to be part of the skill standards assessment process. Thirty-three percent (33%) of the institutions that had assessment activities within the graphic arts program awarded some type of certificate/credential. For health occupations programs, 83% of the institutions that had assessment activities awarded some type of certificate/credential.

Across all 10 program areas, community college respondents identified degree/diploma completion as the most common means for awarding certificates/credentials for program skill standards. While the majority of community colleges did not offer a certification exam without coursework, some colleges indicated this was an option. A limited percentage of community colleges offered this option for the program areas of trades/construction (5%), automotive/mechanical (6%), family and consumer science/childcare (6%), and health occupations (4%).

Coursework with a certification exam was the second most common option offered by community colleges in the program areas of graphic arts (40%), health occupations (54%), and hospitality/hotel management (40%). Coursework without a certification exam was the second most common option offered by community colleges in the program areas of manufacturing

(38%), industrial (44%), automotive/mechanical (46%), agriculture (50%), family and consumer science/childcare (47%), and business, administrative, and information technology (46%). Community college respondents reported equal offering of coursework with and without a certification exam (48%).

Finally, for those institutions in which the respondents stated their community colleges were using some form of certification/credential exam, the specific nature of the examination was solicited. In addition to the options of traditional knowledge-based and performance-based/authentic, respondents could choose from two other characteristics describing the examination process. These included “developed by skill standards agency” and “administered by outside agency.”

With the exception of graphic arts and agriculture, all of the respondents described the examination procedures at their respective community colleges as using all four options described in the previous paragraph. This means that many community colleges obtain their certification/credentialing exams from a skill standards agency. These data also suggest that many community colleges rely on an outside agency to administer these certification/ credentialing exams.

CONCLUSIONS AND DISCUSSION

The purpose of this study was to identify the extent to which national industry-based skill standards were being implemented in community college CTE curricula in 10 program areas. It is important to keep in mind that while the survey was designed to focus primarily on national industry-based skill standards, respondents were also asked about similar state-level skill standards. Therefore it is possible that a respondent would be aware of a state-level standard, but not a national-level standard. With this in mind, the following conclusions can be drawn from this study.

Awareness of National Industry-Based Skill Standards. The awareness level of national industry-based skill standards, without a doubt, varies across individuals in various CTE programs and community colleges. While respondents had some awareness of the applicable skill standards for a particular program area, this awareness varied. The program areas in which respondents reported the highest level of awareness correspond to those same fields that can have very rigorous credentialing and certification requirements for employment—including manufacturing, construction, automotive, and health occupations. Given some of these rigorous credentialing and certification requirements, it is logical that individuals would be more keenly aware of the standards that impact these fields in order to keep program content and course work up to date. On the other hand, those areas in which awareness of national skill standards was lower, such as graphic arts and agriculture, are also areas of study that do not require rigorous credentialing and certification requirements in order to enter the job market. While this was not part of the study, it is logical that a relationship exists between the level of national skill standards awareness on the part of the respondent and the level of credentialing and certification required in order to secure a job in a particular program area.

Implementation of Skill Standards. Colleges are implementing both national industry-based and similar state-level standards; however, more institutions implement the national standards. It is apparent from the data that the level of implementation of skill standards varies across the 10 CTE program areas. However, as with the level of awareness, it does appear that the level of implementation of both national- and state-level skill standards has a direct relationship to the type of certification/credentialing requirements for a particular area of work and whether these certification/credentialing requirements must be met in order to enter the job market.

Those program areas in which the highest numbers of community colleges were implementing skill standards included construction (77%), automotive/mechanical (95%), and health occupations (99%). In fact, nearly all of the respondents who reported awareness of the applicable national- and state-level skill standards for these program areas also indicated that their respective institutions were implementing them. As a whole, each of the jobs associated with these three program areas require certification and credentialing requirements be met prior to job entry. Therefore, offering strong CTE programs that have adequately prepared students to achieve certification/credentialing requirements is to the community college's best interest and fits into the mission of the institution.

It is important to keep in mind that these findings do not imply that other CTE program areas lack certification/credentialing requirements. However, these other program areas, as a whole, do not require that certification/credentialing requirements be met prior to entering the field. In addition, many of these other areas require certification/credentialing associated with tools and tasks unique to a specific organization; therefore, this certification/credentialing process would occur after an individual begins work.

Finally, it is important to recognize that state-level standards play a major role in skill standards implementation in postsecondary CTE programs. As noted earlier, all program areas were implementing a combination of both the national- and state-level standards. While the purpose of the study was not to determine the decision-making process surrounding which standards are implemented, the findings suggest that postsecondary CTE programs may have obligations to meet at least state-level standards in order to adequately prepare students for work.

Approaches to Implementation. Community colleges that are currently implementing either national industry-based or state-level skill standards are doing so for all eight purposes listed on the survey. The majority of community colleges are implementing standards for the purpose of developing curriculum. The purpose least selected for implementing skill standards is that of selecting CTE faculty members. From the distribution of the data in each of the 10 program areas, it is clear that those community colleges that implement skill standards allow them to influence many areas of the instructional process, including curriculum development and student assessment. In addition, skill standards implementation is playing a role in terms of marketing the program to both business/industry and students.

Approaches to Assessment. As noted in the previous section, many respondents report that their respective community colleges are assessing students' achievement of skill standards. Program areas in which student assessment occurs are split about equally between the use of traditional knowledge-based assessments such as paper-and-pencil or computer-based tools, and performance-based/authentic assessments. Because this section of the survey focused on assessment methods other than those linked directly to certification/credentialing, it is not clear from these survey data what factors cause a program area to utilize one method of assessment over the other. It is logical to conclude that this decision is based on the ease of design and implementation, and resources available for assessment purposes. However, more in-depth study would need to occur to confirm this hypothesis.

Certification/Credentialing. All respondents who reported assessment activities at their community colleges also indicated that some type of certification/credential was offered. Again, the frequency with which a certification/credential was offered by the colleges in the sample varied across CTE program areas. With the exception of agriculture, the percentages of colleges offering some form of certification/credential ranged from 53% in manufacturing to 83% in health occupations, with the remaining programs showing, on average, 70% of the colleges offering certificates/credentials in at least one CTE area. While the reasons are not clear for variations in the percentage of certifications/credentials offered across program areas, as discussed in previous sections, it may be due to the entry-level job requirements associated with

a particular area of work. The more rigorous job requirements are, the more likely the college is to offer a certification/credential in that program area.

The main method of certification/credentialing is through the awarding of a degree or diploma offered through the community college. This is not an unexpected finding, as this method is the main means by which community colleges currently certify/credential their students. It is logical that a community college would build in CTE certification into its existing certification/credentialing process. However, it is also important to keep in mind that course work both with and without a certification exam are common methods for certifying/ credentialing students. Because community colleges do report that they certify/credential with course work alone (no exam involved), questions for future investigation would include "What means of assessment are involved with this model?" and "How is/are standardization of knowledge, skills, and abilities ensured in a particular program area?" The fact that a limited number of community college CTE programs offer certification exams without course work suggests that the community college may be serving as a testing center for administering exams.

Finally, the results of the study allow the conclusion to be drawn that the certification/credentialing exams take on different characteristics across CTE program areas. These exams take on both traditional knowledge-based and performance-based/authentic formats. With the exception of graphic arts and agriculture, colleges are using exams developed by skill standards agencies as well as using outside agencies to administer the exams.

SUMMARY

The purpose of this study was to create a national overview of the extent to which skill standards (industry, professional, education, and other) have become part of the community college CTE curriculum, as well as the institutions' assessment and credentialing/certification processes. While this study was purely descriptive in nature, it does bring insight to the field of postsecondary career and technical education by illuminating the current levels of awareness, implementation, assessment, and certification/credentialing activities that exist within community college CTE settings. While this study does not explain why certain activities are occurring or why particular decisions are being made at community colleges, it does provide some perspective for additional questions to be asked and additional research studies to be implemented. As Gall, Gall, and Borg (2003) state, descriptive research involves making careful descriptions of educational phenomena for the purposes of generating a basis for explanation and change, and building the foundation for discovering cause-and-effect through the use of experimental research designs.

The field of career and technical education is constantly changing. New pieces of legislation, the elimination of olds ones, and more demands from business and industry to produce a strong workforce will continue to impact the shape of the field. This study reveals that community colleges across the nation are responding to these forces by working with business and industry and national organizations to become aware of and integrate skill standards that will help ensure job success and mobility for their students.

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Table 1
Distribution of Community Colleges Responding to the Survey

Institutional characteristic	Population % (*n*)	Sample % (*n*)	Respondents % (*n*)
Region			
East	41.1 (417)	41.1 (227)	38.7 (79)
Midwest	26.2 (266)	26.1 (144)	29.9 (61)
West	32.7 (332)	32.8 (181)	31.4 (64)
Institution locale			
Rural	36.2 (368)	36.1 (199)	39.7 (81)
Suburban & large town	30.0 (304)	29.3 (162)	29.9 (61)
Urban	33.8 (343)	34.6 (191)	30.4 (62)
Institution size			
≤ 1,000	8.5 (86)	9.2 (51)	8.3 (17)
1,001–3,000	32.8 (333)	33.7 (186)	34.8 (71)
3,001–10,000	40.3 (409)	38.6 (213)	41.2 (84)
> 10,000	13.7 (139)	14.7 (81)	12.3 (25)
Unknown	4.7 (48)	2.1 (21)	3.4 (7)
All institutions	*N* = 1,015	*n* = 552	*n* = 204

Note. Percentages are computed within each classification variable.

Table 2
Comparison of Respondents to Nonrespondents

Sample χ Campus type (single-campus/multi-campus)

	Campus type[a]									
Sample	CCD	CMC	DIS	MCM	SNG	UAU	UCA	UCP	Unknown	Total
Respondents	13	14	2	48	115	0	11	0	1	204
Nonrespondents	47	21	1	71	187	1	2	11	7	348
Total	60	35	3	119	302	1	13	11	8	552

Note. $\chi^2(8, n = 552) = 29.805$, $p = .000$
[a]Campus type codes: CCD = college of multi-college district; CMC = campus of multi-campus system; DIS = district office of multi-college district; MCM = main campus of multi-campus college; SNG = single-campus college; UAU = administrative unit of university system; UCA = 2-year campus of university, separate accreditation; UCP = 2-year campus of university, sharing accreditation.

Sample χ Institution size

	Institution size				
Sample	≤ 1000	1,001–3,000	3,001–10,000	> 10,000	Total
Respondents	17	71	84	25	204
Nonrespondents	34	115	129	56	348
Total	51	186	213	81	552

Note. $\chi^2(3, n = 552) = 2.250$, p = .522.

Sample χ Location type

	Institution locale			
Sample	Urban	Suburban	Rural	Total
Respondents	62	61	81	204
Nonrespondents	129	101	118	348
Total	191	162	199	552

Note. $\chi^2(2, n = 552) = 2.890$, $p = .236$.

Sample χ Region

	Region								
Sample	New England	Mid-east	Great Lakes	Plains	South-east	South-west	Rocky Mtns.	Far-west	Total
Respondents	7	18	31	30	54	29	7	28	204
Nonrespondents	16	39	47	36	93	38	15	64	348
Total	23	57	78	66	147	67	22	92	552

Note. $\chi^2(7, n = 552) = 6.516$, $p = .481$.

Table 3
Comparison of Respondents to Target Population

Target population χ Campus type (single-campus/multi-campus)

	Campus type[a]									
Target population	CCD	CMC	DIS	MCM	SNG	UAU	UCA	UCP	Unknown	Total
Respondents	13	14	2	48	115	0	11	0	1	204
Population	48	34	1	94	264	0	11	5	6	463
Total	61	48	3	142	379	0	22	5	7	667

Note. $\chi^2(7, n = 667) = 12.044, p = .099$.
[a]Campus type codes: CCD = college of multi-college district; CMC = campus of multi-campus system; DIS = district office of multi-college district; MCM = main campus of multi-campus college; SNG = single-campus college; UAU = administrative unit of university system; UCA = 2-year campus of university, separate accreditation; UCP = 2-year campus of university, sharing accreditation.

Target population χ Institution size

	Institution size				
Target population	≤ 1000	1,001–3,000	3,001–10,000	> 10,000	Total[b]
Respondents	17	71	84	25	197
Population	35	147	196	58	436
Total	52	218	280	83	633

Note. $\chi^2(3, n = 633) = .476, p = .924$.
[b]Data is missing for seven institutions in Respondents.

Target population χ Location type

	Institution locale			
Target population	Urban	Suburban	Rural	Total[c]
Respondents	62	61	81	204
Population	152	141	167	460
Total	214	202	248	664

Note. $\chi^2(2, n = 664) = .772, p = .680$.
[c]Data is missing for three institutions in Population.

Target population χ Region

	Region								
Target population	New England	Mid-east	Great Lakes	Plains	South-east	South-west	Rocky Mtns.	Far-west	Total
Respondents	7	18	31	30	54	29	7	28	204
Population	18	47	67	55	125	54	19	78	463
Total	25	65	98	85	179	83	26	106	667

Note. $\chi^2(7, n = 667) = 3.062, p = .879$.

Table 4
Comparison of Nonrespondents to Target Population

Nonrespondents χ Campus type (single-campus/multi-campus)

	Campus type[a]									
	CCD	CMC	DIS	MCM	SNG	UAU	UCA	UCP	Unknown	Total
Nonrespondents	47	21	1	71	187	1	2	11	7	348
Population	48	34	1	94	264	0	11	5	6	463
Total	95	55	2	165	451	1	13	16	13	811

Note. $\chi^2(8, n = 811) = 12.947$, $p = .114$.
[a]Campus type codes: CCD = college of multi-college district; CMC = campus of multi-campus system; DIS = district office of multi-college district; MCM = main campus of multi-campus college; SNG = single-campus college; UAU = administrative unit of university system; UCA = 2-year campus of university, separate accreditation; UCP = 2-year campus of university, sharing accreditation.

Nonrespondents χ Institution size

	Institution size				
	≤ 1000	1,001–3,000	3,001–10,000	> 10,000	Total[b]
Nonrespondents	34	115	129	56	334
Population	35	147	196	58	436
Total	69	262	325	114	770

Note. $\chi^2(3, n = 770) = 4.335$, $p = .228$.
[b]Data is missing for 14 institutions in Nonrespondents and 27 in Population.

Nonrespondents χ Location type

	Institution locale			
	Urban	Suburban	Rural	Total[v]
Nonrespondents	129	101	118	348
Population	152	141	167	460
Total	281	242	285	808

Note. $\chi^2(2, n = 808) = 1.421$, $p = .491$.
[c]Data is missing for three institutions in Population.

Nonrespondents χ Region

	Region								
	New England	Mid-east	Great Lakes	Plains	South-east	South-west	Rocky Mtns.	Far-west	Total
Nonrespondents	16	39	47	36	93	38	15	64	348
Population	18	47	67	55	125	54	19	78	463
Total	34	86	114	91	218	92	34	142	811

Note. $\chi^2(7, n = 811) = 1.389$, $p = .986$.

Table 5
Comparison of Early to Late Respondents

Response time χ Campus type (single-campus/multi-campus)

	Campus type[a]									
Response time	CCD	CMC	DIS	MCM	SNG	UAU	UCA	UCP	UNKNOWN	Total
Early response	4	5	1	29	55	0	10	0	2	106
Late response	11	7	1	18	56	0	1	0	2	96
Total	15	12	2	74	111	0	11	0	4	202

Note. $\chi^2(6, n = 202) = 13.084$, $p = .042$.
[a]Campus type codes: CCD = college of multi-college district; CMC = campus of multi-campus system; DIS = district office of multi-college district; MCM = main campus of multi-campus college; SNG = single-campus college; UAU = administrative unit of university system; UCA = 2-year campus of university, separate accreditation; UCP = 2-year campus of university, sharing accreditation.

Response time χ Institution size

	Institution size				
Response Time	≤ 1000	1,001–3,000	3,001–10,000	> 10,000	Total
Early response	11	39	43	8	106
Late response	5	31	37	18	96
Total	16	70	80	26	202

Note. $\chi^2(3, n = 192) = 6.958$, $p = .073$.

Response time χ Location type

	Institution locale			
Response time	Urban	Suburban	Rural	Total
Early response	35	33	36	106
Late response	26	25	43	96
Total	61	58	79	202

Note. $\chi^2(2, n = 198) = 2.553$, $p = .279$.

Response time χ Region

	Region								
Response time	New England	Mid-east	Great Lakes	Plains	South-east	South-west	Rocky Mtns.	Far-west	Total
Early response	6	7	16	19	27	15	2	12	104
Late response	1	9	16	10	26	12	5	15	94
Total	7	16	32	29	53	27	7	27	198

Note. $\chi^2(7, n = 198) = 8.101$, $p = .324$.

Table 6
Distribution of Community Colleges Using Skill Standards (SS)

Institutional characteristic	*N*	Institutions using SS % (*n*)	Institutions not using SS % (*n*)
All respondents	202	75.7 (153)	24.3 (49)
Regions			
East	76	65.8	34.2
Midwest	61	78.7	21.3
West	61	85.2	14.8
Institution locale			
Rural	79	70.9	29.1
Suburban or Large Town	58	79.3	20.7
Urban	61	78.7	21.3
Institution size			
≤ 1,000	16	81.3	18.8
1,001–3,000	70	68.6	31.4
3,001–10,000	80	77.5	22.5
> 10,000	26	84.6	15.4

Note. Percentages are computed within each classification variable.

Table 7
Use of Industry-Based Skill Standards—Manufacturing

		Region			Locale			Institution size			
	Overall	East	Midwest	West	Rural	Suburban/ large towns	Urban	≤ 1000	1,001–3,000	3,001–10,000	> 10,000
Institutions offering manufacturing programs *(n)*	102	32	41	26	30	31	38	8	29	41	19
Awareness & implementation[a]											
• Awareness of industry-based skill standards	71.6	56.3	78.0	80.8	66.7	83.9	65.8	87.5	69.0	68.3	73.7
• Implementation of industry-based skill standards	33.3	21.9	39.0	42.3	40.0	25.8	36.8	62.5	31.0	31.7	31.6
• Implementation of similar state-level skill standards	17.6	18.8	14.6	19.2	13.3	19.4	18.4	12.5	13.8	24.4	10.5
Implementation purposes[b]											
• Develop curriculum	50.6	47.4	55.9	45.5	63.6	33.3	57.7	71.4	55.0	48.4	42.9
• Modify instructional practices	40.3	36.8	41.2	40.9	54.5	25.9	42.3	57.1	50.0	35.5	28.6
• Market program to B & I	31.2	26.3	35.3	31.8	31.8	18.5	46.2	57.1	10.0	41.9	28.6
• Assess program	36.4	42.1	35.3	36.4	50.0	25.9	38.5	71.4	25.0	45.2	21.4
• Assess students	36.4	36.8	41.2	31.8	45.5	25.9	42.3	42.9	35.0	21.4	20.0
• Develop learning objectives	41.6	31.6	47.1	40.9	50.0	33.3	42.3	71.4	45.0	38.7	28.6
• Market program to students	28.6	21.1	38.2	22.7	31.8	18.5	38.5	42.9	10.0	35.5	35.7
• Select faculty	18.2	10.5	14.7	31.8	18.2	11.1	26.9	42.9	10.0	19.4	21.4
• Other	3.9	5.3	2.9	4.5	4.5	3.7	3.8	14.3	0.0	3.2	7.1
Assessment methods[c]											
• Traditional knowledge-based	75.0	63.6	84.2	69.2	80.0	61.5	80.0	100.0	66.7	73.7	66.7
• Performance-based/authentic	77.3	63.6	94.7	69.2	86.7	61.5	86.7	80.0	83.3	73.7	83.3
• Other	4.5	0.0	5.3	7.7	0.0	7.7	6.7	100.0	0.0	5.3	16.7
Certificates/credentials[d]											
• Awarded	52.5	66.7	47.4	54.5	46.7	70.0	50.0	80.0	50.0	56.3	40.0
Certification/credentialing methods[e]											
• Degree/diploma completion	65.0	88.9	52.6	72.7	53.3	80.0	71.4	80.0	66.7	75.0	40.0
• Coursework w/cert. exam	20.0	22.2	21.1	18.2	6.7	30.0	28.6	0.0	8.3	31.3	40.0
• Coursework w/o cert. exam	37.5	22.2	36,8	54.5	26.7	20.0	64.3	80.0	25.0	31.3	60.0
• Cert. exam w/o coursework	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 7 (cont.)

		Region			Locale			Institution size			
	Overall	East	Midwest	West	Rural	Suburban/ Large Towns	Urban	≤ 1000	1,001–3,000	3,001–10,000	> 10,000
Certification/credentialing exam[f]											
• Traditional knowledge-based	62.5	100.0	50.0	50.0	0.0	66.7	75.0	0.0	0.0	60.0	100.0
• Performance-based/authentic	50.0	50.0	50.0	50.0	0.0	66.7	50.0	0.0	0.0	40.0	100.0
• Developed by skill standards agency	37.5	0.0	50.0	50.0	0.0	66.7	25.0	0.0	100.0	66.7	100.0
• Administered by outside agency	50.0	0.0	75.0	50.0	100.0	66.7	25.0	0.0	100.0	40.0	50.0

Note. Percentages are computed within each classification variable. *n* represents the actual number of the responding community colleges overall and within each classification group by colleges' fall enrollments, region, or locale.

[a]Based on those institutions offering a program in this area. [b]Based on those institutions reporting implementation of industry-based skill standards. [c]Based on those institutions reporting implementation of industry-based skill standards. [d]Based on those institutions reporting assessment of industry-based skill standards. [e]Based on those institutions that award certificates/credentials. [f]Based on those certification/ credentialing methods that involve use of an exam.

Table 8
Use of Industry-Based Skill Standards—Industrial

		Region			Locale			Institution size			
	Overall	East	Midwest	West	Rural	Suburban/ large towns	Urban	≤ 1000	1,001–3,000	3,001–10,000	> 10,000
Institutions offering industrial programs *(n)*	72	25	25	20	21	23	26	6	20	30	12
Awareness & implementation[a]											
• Awareness of industry-based skill standards	45.8	44.0	44.0	45.0	42.9	47.8	42.3	33.3	50.0	46.7	41.7
• Implementation of industry-based skill standards	19.4	16.0	16.0	25.0	19.0	13.0	23.1	16.7	15.0	20.0	25.0
• Implementation of similar state-level skill standards	13.9	12.0	8.0	20.0	14.3	13.0	11.5	0.0	10.0	13.3	25.0
Implementation purposes[b]											
• Develop curriculum	47.1	41.7	36.4	55.6	44.4	33.3	54.5	50.0	45.5	35.7	60.0
• Modify instructional practices	35.3	33.3	18.2	44.4	22.2	33.3	36.4	0.0	36.4	28.6	40.0
• Market program to B & I	32.4	25.0	36.4	33.3	44.4	25.0	27.3	50.0	45.5	14.3	40.0
• Assess program	38.2	25.0	27.3	55.6	44.4	16.7	45.5	0.0	36.4	28.6	60.0
• Assess students	35.3	33.3	27.3	44.4	33.3	25.0	45.5	0.0	45.5	21.4	60.0
• Develop learning objectives	44.1	33.3	36.4	55.6	55.6	25.0	45.5	50.0	45.5	28.6	60.0
• Market program to students	26.5	16.7	36.4	22.2	33.3	8.3	36.4	50.0	18.2	14.3	60.0
• Select faculty	17.6	8.3	27.3	11.1	22.2	8.3	18.2	50.0	18.2	7.1	20.0
• Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Assessment methods[c]											
• Traditional knowledge-based	85.7	75.0	100.0	85.7	100.0	71.4	85.7	100.0	100.0	77.8	75.0
• Performance-based/authentic	66.7	50.0	100.0	71.4	100.0	42.9	71.4	100.0	80.0	55.6	75.0
• Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Certificates/credentials[d]											
• Awarded	72.2	83.3	50.0	100.0	60.0	80.0	100.0	0.0	80.0	85.7	100.0
Certification/credentialing methods[e]											
• Degree/diploma completion	83.3	100.0	75.0	83.3	60.0	100.0	100.0	100.0	80.0	85.7	100.0
• Coursework w/cert. exam	38.9	33.0	25.0	50.0	60.0	20.0	33.3	0.0	60.0	28.6	33.3
• Coursework w/o cert. exam	44.4	83.3	0.0	33.3	20.0	20.0	33.3	0.0	80.0	28.6	33.3
• Cert. exam w/o coursework	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 8 (cont.)

		Region			Locale			Institution size			
	Overall	East	Midwest	West	Rural	Suburban/ large towns	Urban	≤1 000	1,001–3,000	3,001–10,000	> 10,000
Certification/credentialing exam[f]											
• Traditional knowledge-based	85.7	100.0	100.0	66.7	66.7	100.0	100.0	0.0	66.7	100.0	100.0
• Performance-based/authentic	42.9	0.0	100.0	66.7	66.7	0.0	50.0	0.0	50.0	33.3	100.0
• Developed by skill standard agency	14.3	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0
• Administered by outside agency	14.3	0.0	0.0	33.3	33.3	0.0	0.0	0.0	33.3	0.0	0.0

Note. Percentages are computed within each classification variable. *n* represents the actual number of the responding community colleges overall and within each classification group by colleges' fall enrollments, region, or locale.

[a]Based on those institutions offering a program in this area. [b]Based on those institutions reporting implementation of industry-based skill standards. [c]Based on those institutions reporting implementation of industry-based skill standards. [d]Based on those institutions reporting assessment of industry-based skill standards. [e]Based on those institutions that award certificates/credentials. [f]Based on those certification/ credentialing methods that involve use of an exam.

Table 9
Use of Industry-Based Skill Standards—Construction/Trade

		Region			Locale			Institution size			
	Overall	East	Midwest	West	Rural	Suburban/ large towns	Urban	≤ 1000	1,001–3,000	3,001–10,000	> 10,000
Institutions offering trades/ construction programs *(n)*	103	27	37	37	38	28	35	7	30	43	17
Awareness & implementation[a]											
• Awareness of industry-based skill standards	72.8	51.9	81.1	78.4	65.9	82.1	71.4	57.1	73.3	69.8	76.5
• Implementation of industry-based skill standards	47.6	25.9	40.5	67.6	39.5	50.0	51.4	42.9	50,0	48.8	47.1
• Implementation of similar state-level skill standards	29.1	33.3	18.9	35.1	23.7	35.7	28.6	14.3	26.7	39.5	17.6
Implementation purposes[b]											
• Develop curriculum	62.0	56.3	54.8	70.0	52.0	54.2	75.0	75.0	59.1	70.6	53.8
• Modify instructional practices	54.4	56.3	41.9	63.3	44.0	54.2	60.7	25.0	54.5	64.7	46.2
• Market program to B & I	51.9	56.3	35.5	63.3	48.0	45.8	57.1	50.0	45.5	61.8	46.2
• Assess program	53.2	50.0	41.9	66.7	48.0	54.2	57.1	25.0	50.0	64.7	53.8
• Assess students	57.0	56.3	41.9	70.0	48.0	58.3	60.7	50.0	54.5	64.7	53.8
• Develop learning objectives	54.4	50.0	45.2	63.3	52.0	37.5	67.9	75.0	50.0	58.8	53.8
• Market program to students	49.4	50.0	32.3	63.3	48.0	37.5	57.1	50.0	40.9	55.9	53.8
• Select faculty	39.2	37.5	19.4	56.7	24.0	41.7	46.4	0.0	31.8	44.1	53.8
• Other	6.3	6.3	3.2	10.0	8.0	8.3	3.6	0.0	9.1	5.9	7.7
Assessment methods[c]											
• Traditional knowledge-based	84.7	83.3	88.2	82.1	83.3	76.5	90.9	100.0	76.5	82.8	100.0
• Performance-based/authentic	83.1	75.0	82.4	89.3	83.3	88.2	81.8	100.0	82.4	79.3	100.0
• Other	3.4	0.0	0.0	7.1	0.0	0.0	9.1	0.0	0.0	3.4	12.5
Certificates/credentials[d]											
• Awarded	73.2	81.8	56.3	77.8	77.8	80.0	61.9	66.7	82.4	65.4	75.0
Certification/credentialing methods[e]											
• Degree/diploma completion	78.6	81.8	68.8	81.5	77.8	93.3	66.7	100.0	76.5	84.6	50.0
• Coursework w/cert. exam	48.2	63.6	18.8	55.6	44.4	60.0	38.1	0.0	47.1	46.2	62.5
• Coursework w/o cert. exam	48.2	36.4	43.8	59.3	50.0	60.0	42.9	66.7	64.7	38.5	50.0
• Cert. exam w/o coursework	5.4	9.1	0.0	7.4	5.6	13.3	0.0	0.0	5.9	0.0	25.0

Table 9 (cont.)

		Region			Locale			Institution size			
	Overall	East	Midwest	West	Rural	Suburban/ large towns	Urgan	≤ 1000	1,001–3,000	3,001–10,000	> 10,000
Certification/credentialing exam[f]											
• Traditional knowledge-based	57.1	85.7	25.0	53.3	50.0	66.7	55.6	0.0	62.5	38.5	100.0
• Performance-based/authentic	67.9	71.4	25.0	73.3	50.0	77.8	66.7	0.0	62.5	53.8	100.0
• Developed by skill standard agency	42.9	57.1	0.0	46.7	50.0	55.6	22.2	0.0	75.0	23.1	40.0
• Administered by outside agency	21.4	14.3	25.0	26.7	37.5	22.2	11.1	0.0	25.0	23.1	20.0

Note. Percentages are computed within each classification variable. *n* represents the actual number of the responding community colleges overall and within each classification group by colleges' fall enrollments, region, or locale.

[a]Based on those institutions offering a program in this area. [b]Based on those institutions reporting implementation of industry-based skill standards. [c]Based on those institutions reporting implementation of industry-based skill standards. [d]Based on those institutions reporting assessment of industry-based skill standards. [e]Based on those institutions that award certificates/credentials. [f]Based on those certification/ credentialing methods that involve use of an exam.

Table 10
Use of Industry-Based Skill Standards—Automotive/Mechanical

		Region			Locale			Institution size			
	Overall	East	Midwest	West	Rural	Suburban/ large towns	Urban	≤ 1000	1,001–3,000	3,001–10,000	> 10,000
Institutions offering automotive/ mechanical programs *(n)*	111	31	38	40	41	35	33	7	34	48	15
Awareness & implementation[a]											
• Awareness of industry-based skill standards	80.2	64.5	86.8	85.0	70.7	85.7	84.8	71.4	76.5	85.4	80.0
• Implementation of industry-based skill standards	68.5	48.4	81.6	70.0	58.5	74.3	72.7	71.4	64.7	68.8	73.3
• Implementation of similar state-level skill standards	26.1	16.1	26.3	30.0	22.0	34.3	18.2	28.6	26.5	29.2	6.7
Implementation purposes[b]											
• Develop curriculum	81.3	76.2	91.2	73.5	76.7	83.9	82.1	100.0	73.1	81.0	83.3
• Modify instructional practices	73.6	71.4	73.5	73.5	73.3	74.2	71.4	66.7	69.2	73.8	83.3
• Market program to B & I	70.3	71.4	73.5	64.7	66.7	67.7	75.0	83.3	69.2	71.4	50.0
• Assess program	74.7	66.7	85.3	67.6	70.0	74.2	78.6	100.0	65.4	73.8	75.0
• Assess students	75.8	66.7	88.2	67.6	73.3	74.2	78.6	100.0	69.2	73.8	75.0
• Develop learning objectives	78.0	66.7	88.2	73.5	73.3	83.9	75.0	100.0	73.1	71.4	91.7
• Market program to students	71.4	66.7	79.4	64.7	70.0	71.0	71.4	83.3	76.9	64.3	66.7
• Select faculty	59.3	66.7	52.9	58.8	56.7	61.3	57.1	50.0	61.5	59.5	58.3
• Other	9.9	4.8	8.8	14.7	16.7	3.2	10.7	33.3	11.5	7.1	8.3
Assessment methods[c]											
• Traditional knowledge-based	89.2	83.3	90.9	90.0	92.3	83.9	91.7	100.0	87.0	86.8	90.9
• Performance-based/authentic	89.2	83.3	87.9	93.3	92.3	80.6	95.8	100.0	87.0	89.5	90.9
• Other	4.8	5.6	3.0	6.7	3.8	3.2	8.3	0.0	4.3	5.3	9.1
Certificates/credentials[d]											
• Awarded	69.2	76.5	58.1	78.6	72.0	59.3	79.2	66.7	85.7	68.6	63.6
Certification/credentialing methods[e]											
• Degree/diploma completion	79.5	94.1	71.0	78.6	72.0	77.8	87.5	83.3	76.2	88.6	54.5
• Coursework w/cert. exam	34.6	35.3	19.4	50.0	44.0	29.6	29.2	50.0	38.1	34.3	27.3
• Coursework w/o cert. exam	46.2	29.4	38.7	64.3	56.0	37.0	45.8	66.7	61.9	37.1	45.5
• Cert. exam w/o coursework	6.4	0.0	3.2	14.3	8.0	7.4	4.2	0.0	14.3	5.7	0.0

Table 10 (cont.)

		Region			Locale			Institution size			
	Overall	East	Midwest	West	Rural	Suburban/ large towns	Urban	≤ 1000	1,001–3,000	3,001–10,000	> 10,000
Certification/credentialing exam[f]											
• Traditional knowledge-based	62.1	50.0	50.0	71.4	54.5	77.8	50.0	66.7	44.4	69.2	66.7
• Performance-based/authentic	65.5	66.7	37.5	78.6	72.7	77.8	37.5	100.0	66.7	53.8	66.7
• Developed by skill standard agency	37.9	33.3	37.5	42.9	45.5	33.3	37.5	66.7	44.4	30.8	33.3
• Administered by outside agency	37.9	33.3	37.5	42.9	54.5	22.2	37.5	100.0	22.2	38.5	33.3

Note. Percentages are computed within each classification variable. *n* represents the actual number of the responding community colleges overall and within each classification group by colleges' fall enrollments, region, or locale.

[a]Based on those institutions offering a program in this area. [b]Based on those institutions reporting implementation of industry-based skill standards. [c]Based on those institutions reporting implementation of industry-based skill standards. [d]Based on those institutions reporting assessment of industry-based skill standards. [e]Based on those institutions that award certificates/credentials. [f]Based on those certification/ credentialing methods that involve use of an exam.

Table 11
Use of Industry-Based Skill Standards—Graphic Arts

		Region			Locale			Institution size			
	Overall	East	Midwest	West	Rural	Suburban/ large towns	Urban	≤ 1000	1,001–3,000	3,001–10,000	> 10,000
Institutions offering graphic arts programs *(n)*	76	24	25	25	18	28	28	2	18	38	13
Awareness & implementation[a]											
• Awareness of industry-based skill standards	38.2	25.0	40.0	44.0	38.9	39.3	32.1	0.0	55.6	31.6	23.1
• Implementation of industry-based skill standards	13.2	4.2	12.0	24.0	16.7	14.3	10.7	0.0	16.7	10.5	15.4
• Implementation of similar state-level skill standards	6.6	4.2	4.0	12.0	11.1	3.6	7.1	0.0	5.6	5.3	15.4
Implementation purposes[b]											
• Develop curriculum	31.0	16.7	30.0	45.5	42.9	27.3	33.3	0.0	30.0	25.0	66.7
• Modify instructional practices	27.6	16.7	20.0	45.5	28.6	36.4	22.2	0.0	30.0	25.0	33.3
• Market program to B & I	20.7	0.0	20.0	36.4	42.9	27.3	0.0	0.0	20.0	16.7	33.3
• Assess program	17.2	0.0	20.0	27.3	42.9	18.2	0.0	0.0	20.0	16.7	0.0
• Assess students	24.1	0.0	20.0	45.5	42.9	27.3	11.1	0.0	20.0	25.0	33.3
• Develop learning objectives	31.0	0.0	30.0	54.5	42.9	36.4	22.2	0.0	30.0	25.0	66.7
• Market program to students	17.2	0.0	20.0	27.3	42.9	18.2	0.0	0.0	10.0	16.7	33.3
• Select faculty	13.8	0.0	10.0	27.3	28.6	18.2	0.0	0.0	10.0	16.7	0.0
• Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Assessment methods[c]											
• Traditional knowledge-based	66.7	50.0	66.7	71.4	100.0	75.0	40.0	0.0	66.7	75.0	50.0
• Performance-based/authentic	83.3	50.0	66.7	100.0	100.0	100.0	60.0	0.0	66.7	100.0	75.0
• Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Certificates/credentials[d]											
• Awarded	60.0	100.0	0.0	71.4	33.3	50.0	100.0	0.0	100.0	25.0	100.0
Certification/credentialing methods[e]											
• Degree/diploma completion	70.0	100.0	50.0	71.4	66.7	50.0	100.0	0.0	100.0	50.0	66.7
• Coursework w/cert. exam	40.0	100.0	0.0	42.9	33.3	50.0	33.3	0.0	100.0	25.0	33.3
• Coursework w/o cert. exam	20.0	0.0	0.0	28.6	33.3	25.0	0.0	0.0	100.0	0.0	0.0
• Cert. exam w/o coursework	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 11 (cont.)

		Region			Locale			Institution size			
	Overall	East	Midwest	West	Rural	Suburban/ large towns	Urban	≤ 1000	1,001–3,000	3,001–10,000	> 10,000
Certification/credentialing exam[f]											
• Traditional knowledge-based	100.0	100.0	0.0	100.0	100.0	100.0	100.0	0.0	100.0	100.0	100.0
• Performance-based/authentic	75.0	0.0	0.0	100.0	100.0	100.0	0.0	0.0	100.0	0.0	100.0
• Developed by skill standard agency	25.0	0.0	0.0	33.3	0.0	50.0	0.0	0.0	0.0	0.0	100.0
• Administered by outside agency	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Note. Percentages are computed within each classification variable. *n* represents the actual number of the responding community colleges overall and within each classification group by colleges' fall enrollments, region, or locale.

[a]Based on those institutions offering a program in this area. [b]Based on those institutions reporting implementation of industry-based skill standards. [c]Based on those institutions reporting implementation of industry-based skill standards. [d]Based on those institutions reporting assessment of industry-based skill standards. [e]Based on those institutions that award certificates/credentials. [f]Based on those certification/ credentialing methods that involve use of an exam.

Table 12
Use of Industry-Based Skill Standards—Agriculture

		Region			Locale			Institution size			
	Overall	East	Midwest	West	Rural	Suburban/ large towns	Urban	≤ 1000	1,001–3,000	3,001–10,000	> 10,000
Institutions offering agricultural programs *(n)*	56	16	23	16	25	13	17	5	17	26	5
Awareness & implementation[a]											
• Awareness of industry-based skill standards	30.4	25.0	39.1	25.0	32.0	30.8	29.4	20.0	35.3	30.8	20.0
• Implementation of industry-based skill standards	8.9	6.3	8.7	12.5	16.0	7.7	0.0	0.0	11.8	7.7	0.0
• Implementation of similar state-level skill standards	7.1	6.3	8.7	6.3	12.0	7.7	0.0	20.0	5.9	7.7	0.0
Implementation purposes[b]											
• Develop curriculum	35.3	25.0	33.3	50.0	62.5	25.0	0.0	100.0	33.3	25.0	0.0
• Modify instructional practices	23.5	25.0	22.2	25.0	50.0	0.0	0.0	100.0	16.7	12.5	0.0
• Market program to B & I	23.5	25.0	11.1	50.0	37.5	25.0	0.0	0.0	16.7	25.0	0.0
• Assess program	23.5	25.0	22.2	25.0	50.0	0.0	0.0	100.0	16.7	12.5	0.0
• Assess students	29.4	25.0	22.2	50.0	50.0	25.0	0.0	0.0	33.3	25.0	0.0
• Develop learning objectives	29.4	25.0	22.2	50.0	50.0	25.0	0.0	100.0	16.7	25.0	0.0
• Market program to students	23.5	25.0	11.1	50.0	37.5	25.0	0.0	0.0	16.7	25.0	0.0
• Select faculty	17.6	0.0	22.2	25.0	37.5	0.0	0.0	100.0	16.7	0.0	0.0
• Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Assessment methods[c]											
• Traditional knowledge-based	85.7	100.0	100.0	66.7	100.0	50.0	0.0	100.0	100.0	66.7	0.0
• Performance-based/authentic	85.7	100.0	100.0	66.7	100.0	50.0	0.0	100.0	100.0	66.7	0.0
• Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Certificates/credentials[d]											
• Awarded	33.3	100.0	0.0	50.0	40.0	0.0	0.0	0.0	50.0	50.0	0.0
Certification/credentialing methods[e]											
• Degree/diploma completion	83.3	100.0	100.0	50.0	100.0	0.0	0.0	100.0	100.0	50.0	0.0
• Coursework w/cert. exam	16.7	0.0	0.0	50.0	20.0	0.0	0.0	0.0	50.0	0.0	0.0
• Coursework w/o cert. exam	50.0	0.0	66.7	50.0	60.0	0.0	0.0	100.0	100.0	0.0	0.0
• Cert. exam w/o coursework	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 12 (cont.)

		Region			Locale			Institution size			
	Overall	East	Midwest	West	Rural	Suburban/ large towns	Urban	≤ 1000	1,001–3,000	3,001–10,000	> 10,000
Certification/credentialing exam[f]											
• Traditional knowledge-based	100.0	0.0	0.0	100.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0
• Performance-based/authentic	100.0	0.0	0.0	100.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0
• Developed by skill standard agency	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
• Administered by outside agency	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Note. Percentages are computed within each classification variable. *n* represents the actual number of the responding community colleges overall and within each classification group by colleges' fall enrollments, region, or locale.

[a]Based on those institutions offering a program in this area. [b]Based on those institutions reporting implementation of industry-based skill standards. [c]Based on those institutions reporting implementation of industry-based skill standards. [d]Based on those institutions reporting assessment of industry-based skill standards. [e]Based on those institutions that award certificates/credentials. [f]Based on those certification/ credentialing methods that involve use of an exam.

Table 13
Use of Industry-Based Skill Standards—Family & Consumer Sciences/Childcare

		Region			Locale			Institution size			
	Overall	East	Midwest	West	Rural	Suburban/ large towns	Urban	≤ 1000	1,001–3,000	3,001–10,000	> 10,000
Institutions offering family & consumer science/childcare programs *(n)*	91	29	26	35	35	28	27	5	28	41	13
Awareness & implementation[a]											
• Awareness of industry-based skill standards	61.5	44.8	61.5	74.3	60.0	53.6	70.4	20.0	75.0	56.1	76.9
• Implementation of industry-based skill standards	35.2	27.6	26.9	48.6	37.1	32.1	37.0	20.0	42.9	31.7	46.2
• Implementation of similar state-level skill standards	29.7	17.2	23.1	45.7	37.1	32.1	18.5	20.0	35.7	34.1	15.4
Implementation purposes[b]											
• Develop curriculum	60.3	50.0	56.3	70.4	61.9	56.3	65.0	100.0	54.5	66.7	60.0
• Modify instructional practices	53.4	50.0	50.0	59.3	57.1	50.0	55.0	100.0	54.5	58.3	40.0
• Market program to B & I	31.0	42.9	31.3	25.9	33.3	25.0	35.0	0.0	31.8	33.3	30.0
• Assess program	48.3	50.0	56.3	44.4	57.1	50.0	40.0	100.0	50.0	50.0	40.0
• Assess students	50.0	42.9	43.8	59.3	47.6	43.8	60.0	100.0	40.9	54.2	60.0
• Develop learning objectives	56.9	57.1	56.3	59.3	57.1	56.3	60.0	100.0	50.0	62.5	60.0
• Market program to students	43.1	50.0	43.8	40.7	42.9	31.3	55.0	0.0	45.5	45.8	40.0
• Select faculty	27.6	35,7	18.8	29.6	23.8	18.8	40.0	0.0	22.7	37.5	20.0
• Other	3.4	7.1	0.0	3.7	0.0	0.0	10.0	0.0	4.5	0.0	10.0
Assessment methods[c]											
• Traditional knowledge-based	80.0	88.9	87.5	73.9	87.5	54.5	92.3	100.0	86.7	72.2	83.3
• Performance-based/authentic	65.0	55.6	75.0	65.2	62.5	63.6	69.2	100.0	53.3	77.8	50.0
• Other	2.5	0.0	12.5	0.0	0.0	9.1	0.0	0.0	6.7	0.0	0.0
Certificates/credentials[d]											
• Awarded	63.9	62.5	77.8	57.9	64.3	66.7	61.5	100.0	71.4	53.3	66.7
Certification/credentialing methods[e]											
• Degree/diploma completion	72.2	75.0	88.9	63.2	78.6	66.7	69.2	100.0	92.9	60.0	50.0
• Coursework w/cert. exam	30.6	37.5	22.2	31.6	57.1	22.2	7.7	100.0	42.9	26.7	0.0
• Coursework w/o cert. exam	47.2	50.0	44.4	47.4	50.0	33.3	53.8	0.0	64.3	40.0	33.3
• Cert. exam w/o coursework	5.6	0.0	11.1	5.3	7.1	0.0	7.7	0.0	7.1	6.7	0.0

Table 13 (cont.)

		Region			Locale			Institution size			
	Overall	East	Midwest	West	Rural	Suburban/ large towns	Urban	≤ 1000	1,001–3,000	3,001–10,000	> 10,000
Certification/credentialing exam[f]											
• Traditional knowledge-based	50.0	66.7	0.0	66.7	62.5	0.0	50.0	100.0	50.0	40.0	0.0
• Performance-based/authentic	33.3	33.3	0.0	50.0	37.5	0.0	50.0	100.0	16.7	40.0	0.0
• Developed by skill standard agency	8.3	33.3	0.0	0.0	12.5	0.0	0.0	0.0	16.7	0.0	0.0
• Administered by outside agency	16.7	0.0	33.3	16.7	25.0	0.0	0.0	0.0	33.3	0.0	0.0

Note. Percentages are computed within each classification variable. *n* represents the actual number of the responding community colleges overall and within each classification group by colleges' fall enrollments, region, or locale.

[a]Based on those institutions offering a program in this area. [b]Based on those institutions reporting implementation of industry-based skill standards. [c]Based on those institutions reporting implementation of industry-based skill standards. [d]Based on those institutions reporting assessment of industry-based skill standards. [e]Based on those institutions that award certificates/credentials. [f]Based on those certification/ credentialing methods that involve use of an exam.

Table 14
Use of Industry-Based Skill Standards—Health Occupations

		Region			Locale			Institution size			
	Overall	East	Midwest	West	Rural	Suburban/ large towns	Urban	≤ 1000	1,001–3,000	3,001–10,000	> 10,000
Institutions offering health occupations programs *(n)*	126	41	40	42	45	37	41	8	40	53	19
Awareness & implementation[a]											
• Awareness of industry-based skill standards	72.2	74.6	65.0	73.8	71.1	70.3	73.2	50.0	77.5	67.9	84.2
• Implementation of industry-based skill standards	61.9	61.0	57.5	64.3	60.0	62.2	61.0	50.0	65.0	54.7	78.9
• Implementation of similar state-level skill standards	37.3	36.6	30.0	45.2	37.8	45.9	29.3	25.0	40.0	35.8	47.4
Implementation purposes[b]											
• Develop curriculum	83.3	80.0	92.6	80.6	75.8	89.7	87.1	80.0	84.4	79.5	93.8
• Modify instructional practices	74.0	65.7	81.5	77.4	60.6	82.8	80.6	60.0	65.6	76.9	87.5
• Market program to B & I	62.5	57.1	66.7	64.5	57.6	62.1	67.7	60.0	71.9	59.0	50.0
• Assess program	78.1	77.1	88.9	71.0	69.7	82.8	83.9	80.0	78.1	74.4	87.5
• Assess students	81.3	74.3	88.9	80.6	78.8	79.3	83.9	80.0	84.4	74.4	87.5
• Develop learning objectives	82.3	80.0	88.9	80.6	72.7	89.7	87.1	80.0	81.3	79.5	93.8
• Market program to students	68.8	62.9	77.8	64.5	60.6	72.4	71.0	80.0	68.8	64.1	68.8
• Select faculty	64.6	65.7	63.0	61.3	63.6	65.5	61.3	60.0	62.5	59.0	75.0
• Other	11.5	11.4	11.1	9.7	15.2	6.9	9.7	0.0	15.6	10.3	0.0
Assessment methods[c]											
• Traditional knowledge-based	90.6	96.4	88.0	86.2	89.3	82.1	100.0	100.0	89.7	87.9	93.3
• Performance-based/authentic	88.2	89.3	88.0	86.2	96.4	71.4	96.2	100.0	93.1	78.8	93.3
• Other	3.5	3.6	0.0	6.9	0.0	3.6	7.7	25.0	0.0	3.0	6.7
Certificates/credentials[d]											
• Awarded	82.7	75.9	87.0	84.6	78.6	78.3	88.9	50.0	78.6	80.6	100.0
Certification/credentialing methods[e]											
• Degree/diploma completion	87.7	86.2	95.7	84.6	85.7	82.6	96.3	75.0	96.4	77.4	100.0
• Coursework w/cert. exam	54.3	51.7	43.5	69.2	50.0	60.9	55.6	50.0	50.0	64.5	50.0
• Coursework w/o cert. exam	39.4	24.1	30.4	65.4	39.3	26.1	51.9	50.0	42.9	35.5	42.9
• Cert. exam w/o coursework	3.7	0.0	4.3	7.7	3.6	4.3	3.7	0.0	3.6	6.5	0.0

Table 14 (cont.)

		Region			Locale			Institution size			
	Overall	East	Midwest	West	Rural	Suburban/ large towns	Urban	≤ 1000	1,001–3,000	3,001–10,000	> 10,000
Certification/credentialing exam[f]											
• Traditional knowledge-based	71.1	73.3	63.6	77.8	64.3	78.6	75.0	100.0	57.1	76.2	85.7
• Performance-based/authentic	53.3	46.7	54.5	61.1	50.0	64.3	50.0	100.0	42.9	47.6	85.7
• Developed by skill standard agency	44.4	53.3	27.3	50.0	35.7	35.7	62.5	0.0	21.4	57.1	71.4
• Administered by outside agency	57.8	73.3	27.3	61.1	71.4	50.0	50.0	0.0	64.3	47.6	85.7

Note. Percentages are computed within each classification variable. *n* represents the actual number of the responding community colleges overall and within each classification group by colleges' fall enrollments, region, or locale.

[a]Based on those institutions offering a program in this area. [b]Based on those institutions reporting implementation of industry-based skill standards. [c]Based on those institutions reporting implementation of industry-based skill standards. [d]Based on those institutions reporting assessment of industry-based skill standards. [e]Based on those institutions that award certificates/credentials. [f]Based on those certification/ credentialing methods that involve use of an exam.

Table 15
Use of Industry-Based Skill Standards—Business, Administrative, & Information Technology

		Region			Locale			Institution size			
	Overall	East	Midwest	West	Rural	Suburban/ large towns	Urban	≤ 1000	1,001–3,000	3,001–10,000	> 10,000
Institutions offering business, administrative, & information technology programs *(n)*	133	40	43	47	49	40	41	12	43	52	20
Awareness & implementation[a]											
• Awareness of industry-based skill standards	56.4	50.0	62.8	57.4	55.1	57.5	58.5	50.0	58.1	51.9	75.0
• Implementation of industry-based skill standards	22.6	27.5	16.3	25.5	24.5	15.0	29.3	8.3	27.9	23.1	25.0
• Implementation of similar state-level skill standards	12.0	12.5	11.6	12.8	14.3	15.0	7.3	8.3	16.3	11.5	10.0
Implementation purposes[b]											
• Develop curriculum	39.5	57.1	25.9	40.7	37.0	33.3	50.0	16.7	42.3	48.1	33.3
• Modify instructional practices	30.3	47.6	14.8	33.3	22.2	33.3	37.5	16.7	30.8	40.7	20.0
• Market program to B & I	28.9	38.1	18.5	33.3	33.3	25.0	29.2	16.7	38.5	29.6	20.0
• Assess program	32.9	42.9	22.2	37.0	33.3	29.2	37.5	16.7	38.5	37.0	26.7
• Assess students	34.2	38.1	25.9	40.7	40.7	29.2	33.3	33.3	42.3	33.3	26.7
• Develop learning objectives	32.9	42.9	22.2	37.0	29.6	33.3	37.5	16.7	34.6	40.7	26.7
• Market program to students	30.3	42.9	18.5	33.3	33.3	29.2	29.2	16.7	38.5	29.6	26.7
• Select faculty	19.7	23.8	11.1	25.9	22.2	20.8	16.7	16.7	30.8	11.1	20.0
• Other	2.6	0.0	0.0	7.4	3.7	0.0	4.2	0.0	0.0	3.7	6.7
Assessment methods[c]											
• Traditional knowledge-based	76.9	78.6	80.0	73.3	78.6	63.6	85.7	100.0	75.0	80.0	71.4
• Performance-based/authentic	66.7	57.1	70.0	73.3	78.6	54.5	64.3	100.0	68.8	66.7	57.1
• Other	2.6	0.0	10.0	0.0	7.1	0.0	0.0	0.0	6.3	0.0	0.0
Certificates/credentials[d]											
• Awarded	69.7	75.0	55.6	75.0	69.2	57.1	76.9	50.0	76.9	69.2	60.0
Certification/credentialing methods[e]											
• Degree/diploma completion	81.8	100.0	44.4	91.7	84.6	85.7	76.9	50.0	100.0	76.9	60.0
• Coursework w/cert. exam	27.3	41.7	0.0	33.3	38.5	42.9	7.7	0.0	46.2	23.1	0.0
• Coursework w/o cert. exam	45.5	41.7	44.4	50.0	53.8	14.3	53.8	50.0	61.5	38.5	20.0
• Cert. exam w/o coursework	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 15 (cont.)

		Region			Locale			Institution size			
	Overall	East	Midwest	West	Rural	Suburban/ large towns	Urban	≤ 1000	1,001–3,000	3,001–10,000	> 10,000
Certification/credentialing exam[f]											
• Traditional knowledge-based	77.8	60.0	0.0	100.0	80.0	66.7	100.0	0.0	66.7	100.0	0.0
• Performance-based/authentic	55.6	20.0	0.0	100.0	60.0	66.7	0.0	0.0	50.0	66.7	0.0
• Developed by skill standard agency	22.2	40.0	0.0	0.0	40.0	0.0	0.0	0.0	33.3	0.0	0.0
• Administered by outside agency	44.4	40.0	0.0	50.0	06.0	33.3	0.0	0.0	50.0	33.3	0.0

Note. Percentages are computed within each classification variable. *n* represents the actual number of the responding community colleges overall and within each classification group by colleges' fall enrollments, region, or locale.

[a]Based on those institutions offering a program in this area. [b]Based on those institutions reporting implementation of industry-based skill standards. [c]Based on those institutions reporting implementation of industry-based skill standards. [d]Based on those institutions reporting assessment of industry-based skill standards. [e]Based on those institutions that award certificates/credentials. [f]Based on those certification/ credentialing methods that involve use of an exam.

Table 16
Use of Industry-Based Skill Standards—Hospitality/Hotel Management

		Region			Locale			Institution size			
	Overall	East	Midwest	West	Rural	Suburban/ large towns	Urban	≤ 1000	1,001–3,000	3,001–10,000	> 10,000
Institutions offering hospitality/ hotel management programs *(n)*	71	25	26	19	21	22	27	6	17	32	13
Awareness & implementation[a]											
• Awareness of industry-based skill standards	50.7	48.0	57.7	42.1	28.6	59.1	59.3	33.3	35.3	50.0	76.9
• Implementation of industry-based skill standards	25.4	32.0	19.2	26.3	19.0	18.2	37.0	33.3	11.8	31.3	30.8
• Implementation of similar state-level skill standards	14.1	24.0	7.7	10.5	9.5	9.1	22.2	16.7	5.9	15.6	23.1
Implementation purposes[b]											
• Develop curriculum	51.4	76.9	26.7	62.5	66.7	35.7	62.5	100.0	42.9	56.3	50.0
• Modify instructional practices	45.9	69.2	26.7	50.0	66.7	28.6	56.3	100.0	42.9	50.0	40.0
• Market program to B & I	40.5	61.5	33.3	25.0	66.7	28.6	43.8	100.0	42.9	50.0	20.0
• Assess program	35.1	61.5	20.0	25.0	66.7	28.6	31.3	50.0	42.9	31.3	40.0
• Assess students	45.9	69.2	26.7	50.0	66.7	28.6	56.3	100.0	42.9	43.8	50.0
• Develop learning objectives	45.9	61.5	26.7	62.5	66.7	35.7	50.0	100.0	42.9	50.0	40.0
• Market program to students	32.4	38.5	33.3	25.0	50.0	28.6	31.3	50.0	28.6	43.8	20.0
• Select faculty	32.4	38.5	26.7	37.5	33.3	28.6	37.5	100.0	14.3	37.5	30.0
• Other	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Assessment methods[c]											
• Traditional knowledge-based	90.0	100.0	100.0	50.0	100.0	50.0	100.0	100.0	100.0	80.0	100.0
• Performance-based/authentic	70.0	83.3	100.0	0.0	100.0	50.0	66.7	100.0	100.0	60.0	66.7
• Other	10.0	16.7	0.0	0.0	0.0	0.0	16.7	0.0	0.0	0.0	33.3
Certificates/credentials[d]											
• Awarded	75.0	80.0	80.0	60.0	75.0	80.0	72.7	100.0	66.7	80.0	60.0
Certification/credentialing methods[e]											
• Degree/diploma completion	75.0	80.0	80.0	60.0	75.0	60.0	81.8	100.0	66.7	70.0	80.0
• Coursework w/cert. exam	40.0	50.0	60.0	0.0	50.0	40.0	36.4	50.0	33.3	50.0	20.0
• Coursework w/o cert. exam	25.0	30.0	20.0	20.0	25.0	0.0	36.4	50.0	33.3	20.0	20.0
• Cert. exam w/o coursework	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Table 16 (cont.)

		Region			Locale			Institution Size			
	Overall	East	Midwest	West	Rural	Suburban/ large towns	Urban	≤ 1000	1,001–3,000	3,001–10,000	> 10,000
Certification/credentialing exam[f]											
• Traditional knowledge-based	50.0	80.0	0.0	0.0	100.0	0.0	50.0	100.0	0.0	40.0	100.0
• Performance-based/authentic	37.5	40.0	33.3	0.0	100.0	0.0	25.0	100.0	0.0	40.0	0.0
• Developed by skill standard agency	50.0	60.0	33.3	0.0	100.0	0.0	50.0	100.0	0.0	40.0	100.0
• Administered by outside agency	37.5	40.0	33.3	0.0	50.0	100.0	0.0	0.0	100.0	40.0	0.0

Note. Percentages are computed within each classification variable. *n* represents the actual number of the responding community colleges overall and within each classification group by colleges' fall enrollments, region, or locale.

[a]Based on those institutions offering a program in this area. [b]Based on those institutions reporting implementation of industry-based skill standards. [c]Based on those institutions reporting implementation of industry-based skill standards. [d]Based on those institutions reporting assessment of industry-based skill standards. [e]Based on those institutions that award certificates/credentials. [f]Based on those certification/ credentialing methods that involve use of an exam.

APPENDIX A
NATIONAL INDUSTRY-BASED SKILL STANDARDS, CONTACTS, AND PROGRAM AREAS

Title of Standard	Contact	Program Area
Certified Forester	Society of American Foresters Phone: (301) 897-8720 Web: www.safnet.org	Agriculture
National Voluntary Occupational Skill Standards: Agricultural Biotechnology Technician	National FFA Foundation Phone: (800) 772-0939 Web: http://www.teamaged.org/	Agriculture
Skill Standards for Bioscience Industry	Education Development Center Phone: (617) 969-7100 Web: www.edc.org	Agriculture
Automotive Technician	National Automotive Technicians Education Foundation Phone: (703) 669-6650 Web: www.natef.org	Automotive, Commercial Mechanic, and CDL
Collision Repair and Refinish Technician	National Automotive Technicians Education Foundation Phone: (703) 669-6650 Web: www.natef.org	Automotive, Commercial Mechanic, and CDL
Medium/Heavy Truck Technician	National Automotive Technicians Education Foundation Phone: (703) 669-6650 Web: www.natef.org	Automotive, Commercial Mechanic, and CDL
Skill Standards for Professional Solo Tractor-Trailer Drivers	Professional Truck Driver Institute, Inc. Phone: (703) 838-8842 Web: www.ptdi.org	Automotive, Commercial Mechanic, and CDL
Administrative Support Occupations Skill Standards	V-TECS Phone: (800) 248-7701 Web: www.v-tecs.org Professional Secretaries International	Business, Administrative, and Information Technology
Business Finance Occupations Skill Standards	V-TECS Phone: (800) 248-7701 Web: www.v-tecs.org	Business, Administrative, and Information Technology
Business Management Skill Standards	V-TECS Phone: (800) 248-7701 Web: www.v-tecs.org	Business, Administrative, and Information Technology
Certified Banker	Institute of Certified Bankers Phone: (800) 226-5377 Web: www.aba.com	Business, Administrative, and Information Technology

Customer Service and Sales Skill Standards	The Sales & Service Voluntary Partnership Inc.; National Retail Federation Phone: (800) 673-4692 Web: www.nrf.com/nri/	Business, Administrative, and Information Technology
Information Technology Skill Standards	NorthWest Center for Emerging Technologies Phone: (425) 564-4215 Web: www.nwcet.org	Business, Administrative, and Information Technology
Guidelines for the Preparation of Early Childhood Professionals	Association for the Education of Young Children (NAEYC) Phone: (800) 424-2460 Web: www.naeyc.org	Family and Consumer Science
National Standards for Family and Consumer Sciences Education	National Association of State Administrators for Family and Consumer Sciences (NASAFACS) Web: www.facse.org V-TECS Phone: (800) 248-7701 Web: www.v-tecs.org	Family and Consumer Science
Skill Standards for the Graphic Communications Industry: Finishing and Distribution	Graphic Arts Technical Foundation Phone: (207) 985-9898 Web: www.ncssgc.org	Graphic Arts
Skill Standards for the Graphic Communications Industry: Prepress/Imaging Operators	Graphic Arts Technical Foundation Phone: (207) 985-9898 Web: www.ncssgc.org	Graphic Arts
Skill Standards for the Graphic Communications Industry: Press (Sheetfed and Web Offset Press Operators)	Graphic Arts Technical Foundation Phone: (207) 985-9898 Web: www.ncssgc.org	Graphic Arts
Administrator/Technician	Commission on Accreditation of Allied Health Education Programs Phone: (312) 553-9355 Web: www.caahep.org	Health Occupation
Cardiovascular Technologist	Commission on Accreditation of Allied Health Education Programs Phone: (312) 553-9355 Web: www.caahep.org	Health Occupation
Community Support Skill Standards for Direct Human Service Workers in the Human Services	Human Services Research Institute Phone: (617) 876-0426 Web: www.hsri.org	Health Occupation
Diagnostic Medical Sonographer	Commission on Accreditation of Allied Health Education Programs Phone: (312) 553-9355 Web: www.caahep.org	Health Occupation
Electroneurodiagnostic Technologist	Commission on Accreditation of Allied Health Education Programs Phone: (312) 553-9355 Web: www.caahep.org	Health Occupation

Emergency Medical Technician	Commission on Accreditation of Allied Health Education Programs Phone: (312) 553-9355 Web: www.caahep.org	Health Occupation
Health Information Commission	Commission on Accreditation of Allied Health Education Programs Phone: (312) 553-9355 Web: www.caahep.org	Health Occupation
Medical Assistant	Commission on Accreditation of Allied Health Education Programs Phone: (312) 553-9355 Web: www.caahep.org	Health Occupation
National Health Care Skill Standards	National Consortium on Health Science and Technology Phone: (517) 347-3332 Web: www.nchste.org/ West ED Regional Research Laboratory Phone: (415) 565.3000 Web: www.wested.org/	Health Occupation
Ophthalmic Medical Commission	Commission on Accreditation of Allied Health Education Programs Phone: (312) 553-9355 Web: www.caahep.org	Health Occupation
Respiratory Therapist	Commission on Accreditation of Allied Health Education Programs Phone: (312) 553-9355 Web: www.caahep.org	Health Occupation
Specialist in Blood Bank Technology	Commission on Accreditation of Allied Health Education Programs Phone: (312) 553-9355 Web: www.caahep.org	Health Occupation
Surgical Technologist	Commission on Accreditation of Allied Health Education Programs Phone: (312) 553-9355 Web: www.caahep.org	Health Occupation
Technician/Technologist	Commission on Accreditation of Allied Health Education Programs Phone: (312) 553-9355 Web: www.caahep.org	Health Occupation
Therapeutic Recreation Skill Standards	American Therapeutic Recreation Association Phone: (703) 683-9420 Web: www.atra-tr.org	Health Occupation
Chef/Cook Skill Standards	American Culinary Federation, Inc Phone: (800) 624-9458 Web: www.acfchefs.org	Hospitality and Hotel Management

Performance Criteria in Lodging and Foodservice Industries	Council on Hotel, Restaurant and Institutional Education (CHRIE) Phone: (804) 346-4800 Web: www.chrie.org	Hospitality and Hotel Management
Characteristics of Competency: Measurement Criteria for Entry-Level Electronics Technician Skills	Electronic Industries Association Phone: (703) 907-7500 Web: www.eia.org Electronic Industry Foundation Phone: (703) 907-7400 Web: www.eifcentral.org/	Industrial
Construction Laborer Skill Standards: Concrete Worker	Laborers-AGC Education and Training Fund Phone: (860) 974-1455 Web: www.laborers-agc.org	Industrial
Construction Laborer Skill Standards: Lead Abatement Worker	Laborers-AGC Education and Training Fund Phone: (860) 974-1455 Web: www.laborers-agc.org	Industrial
Construction Laborer Skill Standards: Open Cut Pipe Laying	Laborers-AGC Education and Training Fund Phone: (860) 974-1455 Web: www.laborers-agc.org	Industrial
Construction Laborer Skill Standards: Petrochemical Remediation	Laborers-AGC Education and Training Fund Phone: (860) 974-1455 Web: www.laborers-agc.org	Industrial
Interim Job Descriptions and KSA Lists for Electrical Construction Worker	National Electrical Contractors Association (NECA) Phone: (301) 657-3110 Web: www.necanet.org	Industrial
Interim Job Descriptions and KSA Lists for Electrical Line Construction Worker	National Electrical Contractors Association (NECA) Phone: (301) 657-3110 Web: www.necanet.org	Industrial
Interim Job Descriptions and KSA Lists for Electrical-Residential-Construction Worker	National Electrical Contractors Association (NECA) Phone: (301) 657-3110 Web: www.necanet.org	Industrial
National Photonics Skill Standards for Technicians	Center for Occupational Research and Development (CORD) Phone: (254) 772-8756 Web: www.cord.org	Industrial
National Skill Standards: Heating, Air-Conditioning, and Refrigeration Technician	V-TECS Phone: (800) 248-7701 Web: www.v-tecs.org	Industrial
National Voluntary Skills Standard: Hazardous Materials Management Technology	Center for Occupational Research and Development (CORD) Phone: (254) 772-8756 Web: www.cord.org	Industrial

Setting the Standard: A Handbook on Skill Standards for the High-Tech Industry	American Electronics Association Phone: (800) 284-4232 Web: www.aeanet.org/	Industrial
Skill Standards for Workers in the Uniform and Textile Service Industry for Production Workers	Uniform and Textile Service Association Phone: (703) 247-2600 Web: www.utsa.com	Industrial
Skill Standards for Workers in the Uniform and Textile Service Industry for Maintenance Technician	Uniform and Textile Service Association Phone: (703) 247-2600 Web: www.utsa.com	Industrial
Voluntary Industry Standards for Chemical Process Industries Technical Workers	American Chemical Society Phone: (800) 227-5558 Web: www.acs.org	Industrial
Voluntary Industry Standards for Chemical Process Plant Operators	American Chemical Society Phone: (800) 227-5558 Web: www.acs.org	Industrial
Welding Skill Standards Entry Level Welder	American Welding Society Phone: (800) 443-9353 Web: www.aws.org	Industrial
Welding Skill Standards Inspector	American Welding Society Phone: (800) 443-9353 Web: www.aws.org	Industrial
Health, Safety & Environmental Assurance	Manufacturing Skill Standards Council Phone: (202) 254-8628 Web: www.nssb.org	Manufacturing
Logistics & Inventory Control	Manufacturing Skill Standards Council Phone: (202) 254-8628 Web: www.nssb.org	Manufacturing
Machine Building	National Institute for Metalworking Skills Web: www.nims-skills.org	Manufacturing
Machining Operations	National Institute for Metalworking Skills Web: www.nims-skills.org	Manufacturing
Maintenance, Installation & Repair	Manufacturing Skill Standards Council Phone: (202) 254-8628 Web: www.nssb.org	Manufacturing
Manufacturing Production Process Development	Manufacturing Skill Standards Council Phone: (202) 254-8628 Web: www.nssb.org	Manufacturing

Metalforming	The Metalworking Industry Skills Standards Board Phone: (202) 254-8628 Web: www.nssb.org Precision Metalforming Association Educational Foundation Phone: (216) 901-8800 Web: www.pma.org/edufound/	Manufacturing
National Occupational Skill Standards: CADD (Computer Aided Drafting and Design)	National Coalition for Advanced Manufacturing (NACFAM) Phone: (202) 429-2220 Web: www.nacfam.org	Manufacturing
Production	Manufacturing Skill Standards Council Phone: (202) 254-8628 Web: www.nssb.org	Manufacturing
Quality Assurance	Manufacturing Skill Standards Council Phone: (202) 254-8628 Web: www.nssb.org	Manufacturing
Tool, Die and Mold Making	National Institute for Metalworking Skills Web: www.nims-skills.org	Manufacturing