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Report to the Chairman,
Joint Economic Committee,
U.S. Congress

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SKILL STANDARDS

Experience in Certification Systems Shows Industry Involvement to Be Key

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Human Resources Division

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The Honorable David R. Obey
Chairman, Joint Economic Committee
United States Congress

Dear Mr. Chairman:

To remain internationally competitive, many experts believe America must have a work force whose members are both skilled upon entry and responsive to rapidly changing skill demands. In earlier work, we observed that occupational skill standards and certification systems can help improve skill training and the school-to-work transition for youths not going to college.[1] Skill standards identify the knowledge and skills needed to perform satisfactorily in the workplace; certification indicates the attainment of these skills and knowledge by an individual, usually through competency-based assessment. Although such systems are used extensively by some of our foreign competitors—notably Germany, France, and Japan—they are used little in the United States.

This report responds to a request from the former Chairman of the Subcommittee on Education and Health that we study the role that occupational skill standards and certification systems might play in improving the efficiency and effectiveness of skill training programs. Specifically, we were asked to review existing standards and certification systems in a few selected occupations and identify (1) their common characteristics, (2) barriers to their development and use, (3) benefits of standards and certification to employers and workers, and (4) actions taken by the federal government concerning their development and use.

Background

To maintain quality occupational training, some of our foreign competitors use national skill standards and certification of skill attainment as part of their employment and training policy. These skill standards and certification programs provide potential employers with assurances that applicants possess certain skills or attributes specifically related to their field of endeavor. Various U.S. industries have given considerable attention to the concept of developing national, industry-based systems of skill standards, assessment, and certification for their workers. The industries that are supporting skill standards and certification systems have become involved for a variety of reasons. Some industries perceive a

[1]Training Strategies: Preparing Noncollege Youth for Employment in the U.S. and Foreign Countries (GAO/HRD-90-88, May 11, 1990).

shortage of skilled workers in their fields; others see the mutual benefits to employers and workers of a higher skilled, credentialed work force; while still others are responding to external threats. Regardless of the reason, these industries have made an investment in skill standards and a certification system for their workers because they see this to be in the best interests of their industry.

Industry sponsors believe that standards and certification systems improve workers' competencies; provide uniform, updated curricula and training materials for educators and industry trainers; enable workers to demonstrate competencies to employers; and recognize individual achievement. For example, in the automotive repair industry, the National Institute for Automotive Service Excellence (ASE) identified task descriptions, and entry-level skills and qualifications for 24 specialty areas in automotive and truck repair. Candidates seeking certification take a voluntary, written exam that assesses diagnostic and repair skills and knowledge. Candidates who pass the exam and have 2 years of experience receive a certificate of accomplishment as a certified technician. Advocates suggest that such systems can aid employers in their search for qualified, skilled workers; help workers find skilled employment; improve worker mobility; improve the transferability of skills; and link and improve the quality of the diverse training programs used for work force preparation and retraining.

Voluntary systems of industry-driven skill standards with assessment and certification are uncommon in the United States. However, several industries have begun efforts to develop such systems, and others have started to express similar interest. In addition, the federal government, through the Department of Labor's Office of Work-Based Learning and the Department of Education's Office of Vocational and Adult Education, supports the development of these systems through demonstration grants and other activities. The Carl D. Perkins Vocational and Applied Technology Education Act Amendments of 1990 call for the development and implementation of statewide systems of standards and measures of performance, including measures of job or work skill attainment. The act, as amended, also authorizes the Secretary of Education to establish a program of grants to business and labor for the purpose of organizing and operating technical committees to develop national standards for competencies in industries and trades.

Scope and Methodology

We examined voluntary skill standards and certification systems for 20 occupations listed in the Bureau of Labor Statistics' Occupational Outlook Handbook that require less than a bachelor's degree for entry-level employment. We selected eight of these standards and certification systems for further review, using the following criteria, which experts helped develop (see app. I):

- Employment in the occupation is substantial or projected to grow.
- Substantial and growing numbers of persons have gained or are seeking certification.
- Credentials gained through certification are intended to be recognized nationwide.
- Individual workers are certified, as opposed to programs being accredited.
- Systems are developed and maintained by industry rather than by educators, educational institutions, or the federal government.

The eight systems we selected represent a variety of occupational areas: automobile mechanic; medical records technician; heating, ventilation, and air conditioning service technician; operating engineer; medical or clinical laboratory technician; welder; printing technician; and craftworker (that is, stone mason and carpenter). Information about each of these programs including origin, examinations, recertification, size, and funding is in appendix II. Quantitative data on the value of certification to employers and workers or employer attitudes about its usefulness were unavailable because the systems do not collect such data or are too new to have started data collection.

Certification systems differ from program accreditation—which recognizes and approves programs of study—in that certification applies to individuals and attests that workers or applicants meet predetermined standards related to specific occupational knowledge or performance. The assurance that individuals have acquired certain skills is one of the underlying premises of standards and certification systems. However, several of the standards and certification systems we initially reviewed provided only institutional program accreditation, not individual worker certification, or did not provide performance-based assessment.

To obtain information on current and planned federal actions, we interviewed Labor and Education officials, monitored activities of the Secretary of Labor's Commission on Work-Based Learning, and examined Labor and Education grant announcements and awards concerning skill standards and certification systems.

We conducted our review from January through November 1992 in accordance with generally accepted government auditing standards. Data on program participants, costs, and funding were obtained from the program sponsors and not independently verified.

Results in Brief

Organizations and industries sponsoring skill standards and certification systems believe that the time and resources devoted to developing and managing such systems represent wise investments in the future of their industry, but little data are available with which to assess such beliefs. Several of the standards and certification systems that have gained acceptance have common elements: industry ownership and control, built-in requirements that ensure that certificate holders' skills are kept up-to-date, transferability of skill credentials from employer to employer, and a mechanism that integrates industry standards with educational programs.

The process of identifying occupational skill standards was not seen by certification sponsors as a formidable obstacle to establishing certification systems. In fact, many industry groups, on their own or with academic consultants, have broken down their job activities into individual processes, skills, and knowledge requirements. However, there are significant obstacles to the development of standards and certification systems. The six most commonly identified by sponsors were high costs, long time periods required for system acceptance, difficulties in developing industry coalitions and reaching agreement on standards, the lack of a structure for promoting standards across industry, a lack of uniform occupational definitions across employers, and the problems in bringing all stakeholders together to develop these systems.

Although many industry representatives, educators, and policymakers believe that standards and certification systems are valuable, insufficient data exist to determine their true value to employers and workers. Sponsors of such systems indicate that the benefits include helping workers obtain and retain employment, receive higher wages, and increase their mobility. The cited benefits to employers include identifying qualified workers, saving money on screening job applicants, assisting in the recruitment of workers, and increasing consumer awareness. However, despite these cited benefits, most sponsors can neither provide evidence on the level of employer acceptance and use of their systems, nor provide hard data on their use in hiring, wage determination, portability of credentials, or their impact on promotion and training opportunities.

The Departments of Education and Labor believe that skill standards and certification systems have potential value and have initiated efforts to help industry, labor, and education groups develop these systems. The two Departments awarded 13 grants with fiscal year 1992 funds totaling $4.7 million to industry, national research, and trade groups to develop voluntary skill standards. Education's Business and Education Standards Program plans to award 9 grants in 1993 totaling $3.5 million to develop national standards for occupational competencies. Labor's National Commission on Work-Based Learning is working with Labor to explore ways to develop voluntary systems to certify workers' skills.

Common Elements of Existing Certification Systems

Common elements among systems that we reviewed included industry ownership and control, recertification requirements to keep certificate holders' skills current, national portability of credentials, and integration of industry standards with education providers through some sort of accreditation program.

We believe that industry ownership and control was the most important element of the voluntary skill certification systems we reviewed because it resulted not only in significant investments of industry resources, but also a commensurate interest in ensuring that the systems are up-to-date. The American Welding Society (AWS), for example, has Qualification and Certification (Q&C) committees to ensure that standards are revised to reflect changes in welding technology; otherwise, its standards would become obsolete. Industry representatives, in concert with educators and workers, were primarily responsible for setting standards and developing test content. Sponsors from all of the systems we reviewed maintained that their industries' continued commitment of resources and time ensures that the standards and assessment mechanisms keep current with technological changes.

A requirement for recertification, which encourages workers to keep up with technological change, was also a common element of certification systems. Certificate programs were either of fixed duration (for example, 5 years) and required passing another assessment to be recertified or permanent with periodic continuing education required (every 2 to 4 years, depending on the system). For example, in the automotive repair industry, ASE provides certificates valid for 5 years to those who pass a written exam in a designated skill area and document at least 2 years of related work experience. After 5 years, workers must pass another exam made up of the most difficult questions from initial certification exams to be recertified.

Because exams are updated as automotive equipment changes, ASE asserts that passing an exam would be very difficult for those who do not maintain their skills.

Another important element is that credentials be portable, so that workers are encouraged to seek certification. For example, wide recognition of certified medical laboratory technicians led 65,000 workers nationwide to acquire this nationally recognized certificate by August 1991, most in the last 3 years. This certification is accepted, and often required, by hospitals and health employers across the country. All eight systems we reviewed established credentials that are valid across the United States.

A final common element is that occupational training providers are linked to the certification system. Most certification systems we reviewed are associated with a body that develops curricula for training providers or accredits programs directly. This linkage aids providers in developing updated curricula and training programs and ensures that educational programs are responsive to employers' needs. For example, the Committee on Allied Health Education and Accreditation of the American Medical Association accredits schools for training in medical records technology. Community colleges, hospitals, and other training providers base their programs on the requirements needed for certification by this group. By using the industry standards, the training programs are kept up-to-date and provide training valued by employers in the medical community.

Obstacles to Developing and Expanding Certification Systems

We identified several obstacles to the development and expanded use of skill standards and certification in the United States, where there is little collaboration within industries, especially with respect to worker training. Specific obstacles identified by system sponsors were high costs, the long time required for system acceptance, difficulties in developing industry coalitions and reaching agreement on standards, the lack of a structure for promoting standards across industry, a lack of uniform skill needs across employers, and the problems in bringing all stakeholders together to develop these systems. Contrary to common belief, the process of identifying occupational skill standards was not seen by certification sponsors as a major obstacle to establishing certification systems.

High Cost of Developing and Maintaining Certification Systems

Associations and industry groups reported large expenditures over several years to develop and maintain such systems. We could not determine, however, exactly how much was spent because much of the expenditures

were in-kind contributions of staff time and materials over several years and could not be separately quantified. Three of the eight systems we examined (ASE, Medical Laboratory Technicians, and Medical Records Technicians) were financially self-sustaining through exam and other fees. We were told that the other systems lose money but continue because of the sponsors' commitment and belief in their potential. For example, AWS officials said that their certification system for welders took 4 years to develop and was very costly. They said that their initial plans for the system to be financially self-sustaining in 7 years were optimistic. The large investment of resources was possible because AWS and the industry were committed to the system. They plan to invest about $100,000 to develop a marketing program to spread acceptance of this system throughout the industry, an amount the association considers to be significant given its level of resources. (See app. II for available data on development and maintenance costs.)

Long Time Required for System Establishment and Acceptance

The development time for the eight systems we examined ranged from 2 to 7 years without payback. During these periods, program sponsors invest substantial staff time in support of programs, but do not have assurance that the system will sustain itself financially. In addition to the development time, it takes a number of years for the systems to gain national credibility and acceptance across the spectrum of employers, workers, and educators and to increase participation.

Difficulty in Developing Industry Coalitions to Develop Systems

Another obstacle is the difficulty in developing a coalition of industry representatives to help develop and reach agreement on such systems. Employers may share common skill needs, but they often have difficulty organizing to jointly identify and document those needs, overcoming competitive differences, allaying fears of "pirating" (when employers not contributing to the costs of maintaining a certification system "steal" certified, trained workers), and sharing the costs of curriculum development and assessment. However, regulatory or market forces may act to help employers to organize. For example, employers in the automobile industry (domestic and foreign manufacturers, oil companies, dealer associations, and after-market parts manufacturers) collaborated to develop ASE partly in response to allegations of widespread fraud and abuse in the automotive service industry. They anticipated potential federal regulation if some mechanism were not developed whereby consumers could be assured of quality service.

Even where coalitions are easier to form, such as in tightly linked industries or segments of an industry, problems may exist in implementing a nationwide program. For example, labor and employer representatives operate local apprenticeship programs for operating engineers (operators of construction industry equipment, such as bulldozers, cranes, and roadgraders). The local programs and the International Union of Operating Engineers developed performance-based standards because their individual apprenticeship training programs lacked uniform training methods and materials. This problem became apparent when local sites hired workers and sought apprentices from different parts of the country and noted disparities in training and performance (for example, some workers were less prepared to handle various pieces of equipment than others from different areas). Even though these apprenticeship programs are linked, they ultimately operate independently and use of the standards is not mandatory. Although performance-based standards and training materials are available for these occupations, they are being used by only about one-third of the training sites.

Lack of Structure to Disseminate Information and Promote Certification

For most industries, no central body or administrative structure exists to lend credibility to standards and certification developed by industry representatives and to help market them throughout the industry. Without assistance in advertising, promotion, and organizing industry and labor to support these efforts, new programs find it difficult to convince nonparticipating employers and workers of the system's benefits. In many cases, no single organization or group represents all workers in an occupation spread across various U.S. industries. For example, AWS has 41,000 members, but the Department of Labor has identified 318,000 welders and cutters nationwide. (The work of cutters is closely related to that of welders.)

Occupations Not Defined Uniformly Across Employers

Standards can be specific or general, depending on whether an occupation is defined narrowly or broadly. There is disagreement about the breadth of standards and how occupations and, thus, standards should be defined. Employers fear that workers receiving broad training will move to competitors; workers fear that specific training will decrease their job mobility. AWS, recognizing the differences among welders by industry, developed general standards but made supplements available for specific industries, such as boilermakers, plastics, and the military.

Inability to Bring All Stakeholders Together in Developing a System

A sixth obstacle was the inability to bring all the stakeholders (employers, educators, and labor) together in developing such a system. None of the systems we reviewed had developed and maintained a true collaboration of employers, educators, and workers. For example, AWS originally developed standards for industry but no curriculum for educators. Because educational institutions expressed a need for such material, AWS designed curricula for the secondary and postsecondary levels and plans to accredit training programs. In addition, workers affected by such systems usually had little input into their development.

Although collaboration with workers is said to be key to many of the systems operating in competitor nations, the systems we reviewed (with the exception of the operating engineers) did not seek the involvement of workers or their representatives in the development or maintenance of their certification programs. However, experts believe that this collaboration is crucial to the success of these programs. As a result, Labor and Education both required applicants for their skill standards grants to demonstrate the collaboration of all stakeholders on their projects before they received awards.

Benefits Claimed but No Data Available to Demonstrate Certification's Success

We sought quantifiable data from the eight certification systems to determine their value to employers and employees, but most system representatives could not provide evidence that these systems facilitated the hiring and promotion of certified workers, led to wage premiums or additional training opportunities, or increased worker mobility. They also had no data to demonstrate the benefit that employers gained by more easily identifying qualified workers.

Although individual certification ensures that the candidate has attained certain skills or competencies, the means used to assess these competencies is a significant issue. Organizations, such as National Occupational Competency Testing Institute (NOCTI) and Vocational and Industrial Clubs of America (VICA) maintain that performance-based testing is the best method to measure skill competency. However, of the certification systems we reviewed, only two used such testing to assess competency (welders and operating engineers); the rest used written exams. Sponsors said that logistical difficulties, high costs, potential problems with unfamiliar equipment, and inconsistent rating were reasons for relying on written rather than performance tests for assessment.

Although comprehensive data on benefits were not available, sponsoring organizations provided anecdotal information about benefits that accrue to both workers and employers from certification systems.

Benefits to Workers

Certification may help workers obtain and retain employment. For example, the Associated General Contractors of America surveyed their members and found that 41 percent of craftworkers who responded to their survey believed that certification helped them obtain or retain their jobs. In another example, Dade County, Florida, requires a Certified Welding Educators credential for hiring welding instructors. Moreover, some state laws incorporate ASE certification standards to regulate segments of the auto repair industry. California, for example, requires workers who maintain fire prevention equipment to be ASE certified.

Certification can increase wages. One example involved the International Association of Bridge, Structural, and Ornamental Ironworkers, which represents many ironworkers employed as welders. Union officials estimated that certified welders earn $10,000 to $12,000 more per year than noncertified welders. In another example, ASE officials reported that one large chain of automotive repair outlets increases workers' wages by $1 per hour for each of the six certification specialties that an employee has.

Certification can increase workers' mobility. For welders in the construction industry, certification enhances their opportunities to move from state to state as jobs appear and have their certification honored. Without certification, welders seeking work in another state must forgo wages while waiting to be certified to work on a project. In one example, a naval facility in Hawaii hired welders from Oregon immediately after receiving documentation that they were certified. Without portable certification, there may have been considerable delays in getting the workers certified.

Benefits to Employers

Certification can help employers identify qualified workers. Furthermore, some can save money on screening applicants. For example, welder certification is a requirement of most building and bridge construction projects. On-site certification involves testing workers before they can be hired. The ironworkers estimated that employers of welders on construction projects spend between $200 and $700 per worker (depending on the area of the country) to certify welders before hiring

them. Hiring workers with standardized and portable certification reduces, and may even eliminate, the large expense involved in on-site testing.

Certification systems can aid employers in recruiting. Industry can assess the quality of training programs and choose from a pool of qualified applicants. For example, printing employers in Colorado requested a list of schools using the approved curriculum from the Printing Industries of America to help identify certified students they could recruit.

Certification of workers can improve the public perception of a particular firm, thus increasing its market share. According to ASE officials, automotive repair firms reported that customers look for the ASE logo on a repair facility and often inquire about the certification credentials of mechanics. ASE officials believe that this gives ASE-certified businesses an advantage over their noncertified competitors.

Federal Efforts in Support of Standards and Certification

The Departments of Labor and Education have acted to support the skill standards and certification process. Labor awarded six grants worth $1.3 million to industry coalitions for the development of new systems, matched with funding by the grantees. Labor has also awarded grants for technical assistance and research on equal opportunity and access issues, and is developing a database on certification systems. Education has also supported the development of skill standards and certification systems and funded a multiyear series of seven grants worth $3.4 million through the Carl D. Perkins Vocational and Applied Technology Education Act Amendments of 1990. Education will be awarding nine additional grants worth $3.5 million to develop occupational competencies. (A list of grantees from both departments is in app. III.) Education also funded a contract with the Institute for Educational Leadership to compile a database and report on such systems.

The Departments have been coordinating these grants to maintain efficiency in allocating limited federal resources. By continuing to work together on grant awards processes and sharing information and evaluation results from demonstration grants, the Departments have the potential for greater understanding of the issues and can better discern the proper federal role in the standards and certification process. In addition, Labor's National Advisory Commission on Work-Based Learning is reviewing issues related to the development and implementation of skill standards and certification. The objectives of its subgroup on skill standards and certification are to help Labor and Education initiate pilot

projects to develop standards; provide leadership, research, and technical assistance to industry, labor, and education groups beginning or already involved in skill standards; and help determine a national framework for skill standards. The Commission is also reviewing issues of access to programs related to the Americans With Disabilities Act.

Federal Government Can Assist, but Sponsors Say Industry Must Lead Certification Efforts

Certification sponsors said that federal support and collaboration could foster the broad-based development of skill standards and certification systems. However, no consensus was evident on how such federal support should be provided. Government, most often at the state level, already is involved in licensing and certification for a variety of occupations. Sponsors indicated, however, that federal efforts will not be effective without industry ownership and control of standards and certification systems, industry commitment to training, and incentives to workers who attain higher skills.

In identifying an appropriate federal role in the development of such systems, one must ask why an industry or occupation does not have such a system. Some systems we reviewed were developed in response to industrywide concerns of worker knowledge and skills, others for the mutual benefit to employers of increasing the skill levels of the work force. Why are other industries not following suit? Is it because of high costs? Is it because of coordination or incentive difficulties? Or is it because of the lack of an institutional structure to support agreement on and dissemination of standards to stakeholders in an industry? If a certification system has failed to develop because of coordination difficulties, the federal government could provide the impetus and play an important role in providing the institutional support structure to organize and facilitate industry efforts. Table 1 lists potential federal roles for encouraging the development of standards and certification systems that was contributed by representatives of the various certification and industry groups. Education and Labor have already undertaken some actions related to these activities.

Table 1: Potential Federal Roles

Role	Action
Information	• Maintain clearinghouse on existing standards and certification systems
	• Develop promotional materials and fund promotional activities
	• Provide technical assistance to industry to develop standards
Advocacy	• Fund further development of systems
	• Adopt existing systems for federal jobs
	• Mandate use of systems in training programs receiving federal dollars (e.g., Job Training Partnership Act and student loans)
Facilitation/Mediation	• Facilitate development of industry/labor/education coalitions
	• Mediate disagreements over composition of groups from industry
	• Help develop agreed-upon definitions of occupations
	• Integrate standards with federal and state requirements (e.g., state and federal road construction projects)
Oversight	• Recognize industry coalitions and resulting standards
	• Ensure that tests are free from bias and discrimination
	• Ensure equal access to certification
	• Evaluate impact on workers and employers
Education	• Provide mechanism to link standards systems with vocational education through education and training funding
	• Fund equipment used by training providers

Agency Comments

We provided copies of our draft report to agency officials from the Departments of Labor and Education and they provided oral comments. Officials from both Departments generally agreed with our findings and we have incorporated their comments where appropriate. We are sending copies of this report to the Secretaries of Education and Labor, and interested congressional committees. Copies will be available to others upon request.

Please call me on (202) 512-7014 if you or your staff have any questions. Other major contributors to this report are listed in appendix IV.

Sincerely yours,

Linda G. Morra
Director, Education
and Employment Issues

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Abbreviations

AGC	Associated General Contractors of America
AHIMA	American Health Information Management Association
ARI	Air Conditioning and Refrigeration Institute
ASCP	American Society of Clinical Pathologists
ASE	National Institute for Automotive Service Excellence
AWS	American Welding Society
IUOE	International Union of Operating Engineers
PIA	Printing Industries of America

Occupations Selected and Criteria for Selecting Them

	CRITERIA					
OCCUPATION	High employment or growth[a]	Growth in certification-seekers	National credential	Individual certification	Industry-driven	Total
Auto mechanic	Yes	Yes	Yes	Yes	Yes	5
Medical records technician	Yes	Yes	Yes	Yes	Yes	5
Radiologic technologist	Yes	Yes	Yes	Yes	Yes	5
Medical lab technician	Yes	Yes	Yes	Yes	Yes	5
Respiratory therapist	Yes	Yes	Yes	Yes	Yes	5
Horticulture	Yes	N/A	No	No	N/A	1
Welder	Yes	Yes	Yes	Yes	Yes	5
HVACR technician	Yes	Yes	Yes	Yes[b]	Yes	5
Ranger officer	No	N/A	Yes	Yes	No	2
Operating engineer	Yes	No	Yes	Yes	Yes	4
Electronics technician	Yes	N/A	No	No	N/A	1
Aviation technician	Yes	Yes	Yes	Yes	No	4
Trucker	Yes	N/A	No	No	N/A	1
Hospitality	Yes	N/A	No	No	N/A	1
Bank teller	Yes	N/A	No	No	N/A	1
Construction	Yes	No	Yes	Yes	Yes	4
Locksmith	No	Yes	Yes	Yes	Yes	4
Printing	Yes	Yes	Yes	Yes[b]	Yes	5
Environmental trainer	No	Yes	Yes	Yes	Yes	4
Payroll	Yes	Yes	Yes	Yes	Yes	5

[a]"Yes" represents employment over 45,000 or projected growth that is expected to grow faster than the average for all occupations through the year 2000.

[b]Systems that accredit training programs and indirectly certify individuals.

Profiles of Certification Systems

The following profiles are based on our examination of eight skill standards and certification systems. By occupation and certification sponsor, these include the following:

1. Automotive Technician: National Institute for Automotive Service Excellence

2. Medical Record Technician: American Health Information Management Association

3. Medical Laboratory Technician: American Society of Clinical Pathologists, National Certification Agency for Medical Laboratory Personnel

4. Welder: American Welding Society

5. Heating, Ventilation, Air Conditioning, and Refrigeration Technician: Air Conditioning and Refrigeration Institute, Gas Appliance Manufacturers Association

6. Operating Engineer: International Union of Operating Engineers

7. Craftworker: Associated General Contractors of America

8. Printing Technician: Printing Industries of America

Automotive Technician

Background

The National Institute for Automotive Service Excellence (ASE) began certifying auto mechanics in 1972 to improve worker competency. ASE certifies individuals in 24 different exam areas recognized nationwide, including automobile technicians. ASE members represent oil companies, auto repair and service chains, industry suppliers (for example, Borg-Warner), the Motor Vehicles Manufacturers' Association (MVMA), the National Automobile Dealers Association (NADA), and educators from vocational education and community colleges. No labor representatives serve on the board or advisory committees.

MVMA and NADA members developed standards that would reflect the skills needed for an entry-level position. Development took about 2 years. The program was turned over to ASE, whose advisory committees set and updated standards for the various exam areas. Initial funding came from MVMA, NADA, and employers who paid to send representatives to planning sessions. That amount is unknown.

Accreditation

ASE accredits training programs through the National Automotive Training and Education Foundation (NATEF). Programs must meet certain standards, such as requirements that instructors be ASE certified. As of January 1993, NATEF had accredited 650 high school, trade school, vo-tech, and 2- and 4-year college programs in automotive service. The state of Kentucky has adopted ASE's curriculum for all of its vocational programs in automotive service.

Certification Exam

The exam is offered twice a year at 450 sites nationwide. This written, multiple-choice exam costs $35. Practical exams are not feasible given the large number of sites, according to the ASE. The passage rate ranges from 60 to 70 percent. ASE employs American College Testing to validate, administer, and score the exams. In addition to passing the exam, candidates seeking certification must document 2 years of practical experience, ensuring that certified technicians are prepared for entry-level jobs. An advisory committee evaluates job tasks, updates standards, and reviews questions. However, exams lag new technology because of the time needed to develop and pretest new exam questions.

Recertification

Technicians must be recertified every 5 years by taking the regular exam or a recertification exam.

Current Data

As of April 1993, there were 307,208 certified automobile technicians. The number of exam candidates has increased over the years.

Funding

The program is self-sustaining through exam fees. ASE officials could not determine costs for certification. Employers pay the costs for their representatives to work on certification. Development for additional exams must be financed by the interested organization.

Medical Record Technician

Background

The American Health Information Management Association (AHIMA), the national organization of medical record administrators and technicians, certifies Accredited Medical Record Technicians (ART). A shortage of trained medical record administrators in 1951 pointed to the need for trained ancillary workers qualified to work under the supervision of medical staff or registered record administrators. Doctors and hospital administrators wanted a way to measure the ability of job candidates. Potential employees wanted a credential that would recognize their individual qualifications. The first schools for medical record technicians were approved in 1953; certification began in 1955. AHIMA officials could not determine the amount spent to establish the program.

Two organizations oversee ART certification. AHIMA's House of Delegates, comprised of elected representatives from AHIMA's 52 state organizations, determines the standards of initial certification. The Council on Certification, whose AHIMA-elected members are not beholden to the board, administers the certification and recertification programs (that is, they develop and administer the exam, and determine eligibility of applicants to sit for exams). Council members include certified ARTs, Registered Record Administrators (RRA), and ART and RRA educators. No employers, labor representatives, or lay members serve on the Council.

In June 1992, the first exam was administered for Certified Medical Record Coding Specialists as part of a new certification program. This credential, which ensures accuracy in coding skills, requires completion of a 1-day written exam; experience is highly recommended. AHIMA took 18 months to develop and verify standards, develop test items and questions, and design a practical exam.

Accreditation

AHIMA and the Committee on Allied Health Education and Accreditation of the American Medical Association accredit schools for medical record technology. As of March 1992, there were 116 accredited programs in medical record technology nationwide and in Puerto Rico.

Certification Exam

The ART certification exam tests for entry-level competencies. AHIMA verifies that these competencies are knowledge and skills that reflect entry-level practice. Task groups assigned by the Council on Certification are responsible for exam development and updating. The exam costs $125 and is administered annually at 45 sites in 37 states nationwide, and in Puerto Rico. Candidates must be trained through an accredited program to take the test of 200 general and coding multiple-choice questions. Exam content is current as of March 1 of the year in which the exam is taken. The Professional Examination Service scores the tests. Certification requires successful completion of the exam and an approved academic program. Once certified, an ART credential is recognized by hospitals and employers nationwide.

Recertification

ARTs must complete 20 continuing education (CE) hours every 2 years (for example, educational programs, courses, published materials, independent study activities). AHIMA members pay a $5 CE assessment with their annual membership dues ($50 for nonmembers).

Current Data

There were 16,848 ARTS as of December 1992. In 1992, 1,811 candidates sat for the exam, continuing the trend of increasing numbers of candidates. The passage rate ranged from 75 to 85 percent.

Funding

The program is self-sustaining through fees for exams and certification renewal, although additional costs for committee participation are borne by AHIMA. Membership fees also subsidize certification. The cost of certification activities cannot be determined because members who spend time on certification volunteer their time and because certification and membership activities overlap and are not clearly defined.

Medical Laboratory Technician

Background

The American Society of Clinical Pathologists (ASCP) began the Medical Lab Technician (MLT) certification in 1969 and the Clinical Lab Assistant (CLA) certification in 1963; the two fields merged in 1980. As extenders of physicians, pathologists and other specialists had skills that were increasingly in demand. Standards were developed by the Board of Registry that included pathologists, medical technologists, representatives from other medical specialty societies, and lay members. Exams were developed by MLTs, medical technologists, employers of MLTs, representatives of different sites (for example, private labs and hospitals), educators, and psychometricians. ASCP provided the initial funding for certification, but officials could not determine these costs. Nor could they tell us how long it took to develop MLT and CLA certification; new systems take 2 to 3 years to develop.

ASCP's Board of Registry certifies MLTs: they receive and evaluate exam and certification applications; develop and administer exams, including criteria that meet performance standards; and maintain a registry of all certified persons. Based on a job analysis, the exam committee and ASCP psychometricians develop, review, and validate the test. The exam committee is made up of educators, MLTs, scientists, members of other health associations, employers, and representatives of labs, hospitals, and other sites across the country.

The National Certification Agency for Medical Laboratory Personnel (NCA) certifies Clinical Lab Technicians (CLT), the equivalent of MLTs. NCA was established by the American Society of Medical Technicians, a group that split from ASCP and was established in 1977. NCA administered its first CLT exam 18 months after it was founded.

Accreditation

ASCP and the Committee on Allied Health Education and Accreditation of the American Medical Association accredit training programs that help students prepare for MLT certification. There are 251 accredited MLT programs in community colleges and hospitals. NCA does not accredit training programs.

Certification Exam

The MLT certification exam tests for skills and knowledge expected at career entry. The exam costs $75 and is usually paid by the examinee. Eligibility requirements to take the exam vary (for example, candidates could have an associate's degree and completed an MLT program, or have a high school diploma, clinical experience, and completed a military program). Tests are administered twice a year at 75 sites in 46 states, the District of Columbia, and Puerto Rico. The test is written and includes 200 multiple-choice questions. Each exam is unique and includes new test items. However, there is a 6-month lag in updating exam content since the exam committee meets semiannually. In addition to passing the exam, certification requires certain academic and clinical requirements. Once certified, an MLT credential is recognized by hospitals and employers nationwide.

NCA's CLT exam is offered twice a year at 74 Saturday test centers in 46 states, the District of Columbia, and Puerto Rico, and at Sunday test centers in 10 states. The exam costs $65. The test is continually updated to reflect current practice.

Recertification

ASCP does not require recertification because initial certification is voluntary; it cannot mandate recertification. To remain certified, MLTs must pay an annual registration fee of $20.

NCA requires that CLTs take four CE units (equivalent to 40 hours) every 2 years or retake the exam every 4 years to remain certified.

Current Data

As of August 1992, there were 68,897 MLTs and CLAs. The number of examinees has increased over the last few years; 2,850 candidates took the exam in 1992. The passage rate is 72 percent.

NCA certified a total of 6,155 CLTs as of December 1992. In 1992, 884 examinees took the CLT exam, reflecting an increase over the years. The passage rate is about 70 percent.

Funding

MLT certification is self-sustaining based on registration and testing fees and professional society membership dues. Although the exams lose money, the registration fees subsidize the loss. It is difficult to determine the cost of MLT certification because all certification categories are lumped together. However, costs include annual committee meetings ($6,000 per

year); materials and services (about $86,000 in 1992); overhead, which is minimal; and wages for a part-time evaluator.

NCA's CLT certification program is self-sustaining. They could not, however, determine annual operating costs because costs for all certification specialties are budgeted together.

Welder

Background

The American Welding Society has programs for Certified Welder Inspectors and Certified Associate Welder Inspectors (CWI), Certified Welder Educators (CWE), and Certified Welders (CW). The programs began in 1976, 1989, and 1992, respectively. Each took about 4 years to develop, including 2 to 3 years to develop standards. AWS began the CW certification in response to an expressed need of industry and labor for a way to determine and document welders' qualifications. Many employers are required to hire certified welders. Certification would circumvent the expense and time of repeatedly testing workers before hiring and would make welders' skills transferable through portable credentials. Such a credential is expected to save the ironworking industry millions of dollars each year. Educators also expressed a need for a program that would generate uniform, widely recognized curricula and standards for teaching.

Qualification and certification (Q&C) committees define and develop the qualifications and standards for each certification, in accordance with rules from the American National Standards Institute (ANSI). Q&C committees include representatives from manufacturers, suppliers, contractors, technical societies, and education. One labor representative is on the certified welder committee. Initial funding for certification came from AWS. This amount is unknown, partly because AWS relies on voluntary labor.

The International Association of Bridge, Structural, and Ornamental Ironworkers also has a national welder certification program using ANSI and AWS codes and standards. Their aim is to "have every ironworker welder who becomes certified under this program accepted on job-sites nationwide without being subject to lost time and the expense of recertification." Although employers spend a lot of money to certify workers before hiring them, the estimate for individual certification is $40.

Therefore, national certification could potentially save employers millions of dollars each year. A committee devises the certification policy and procedures, consisting of contractors, technicians, ironworkers, and representatives of power companies, employer associations, the Department of Transportation, and the Canadian Welding Bureau. Educators are not represented. Annual recertification requires welders to retake the exam or document experience.

Accreditation

AWS does not accredit training programs. They are, however, currently developing curricula for secondary, 2- and 4-year degree students.

Certification Exam

The CWI exam consists of two written and one practical test. The exam costs $230 for members and $285 for nonmembers. The CW exam includes a written exam and a practical exam supervised by a CWI; fees range from $65 to $600, depending on the test site. The CWE exam includes one practical and two written exams; it costs $175 for members, and $250 for nonmembers. Employers usually pay the exam fees. The Q&C committees are responsible for ensuring that standards do not become obsolete and must revise the standards every 5 years. Exams are rotated every 3 months. CW certification is achieved by passing an eye exam as well as the written and practical exams. Exams are given throughout the year in the United States and several countries abroad.

Recertification

CWs are recertified every year through retesting or demonstration of work experience. CWIs must be recertified every 3 years by retaking the exam or demonstrating 2 years of experience. CWEs are recertified every 4 years by demonstrating 2 years of experience or completing coursework.

Current Data

There were 10,987 CWIs, 418 CWs, and 17 CWEs as of October 1992. Although AWS does not maintain data on registration or passage rates, increasing numbers of candidates sit for the exams, and the CWI exam usually produces a 3-percent failure rate. The Ironworkers have certified about 600 welders and about 80 CWIs.

Funding

AWS certification programs are not self-sustaining. AWS initially planned to break even in 7 years but they have not done so. It hopes to reach that goal in a few more years, bolstered by a marketing campaign anticipated to

cost $100,000. Operating expenses include five AWS staff members (plus test proctors and supervisors), meeting facilities and amenities, publications, printing, and marketing.

Heating, Ventilation, Air Conditioning, and Refrigeration (HVACR) Technician

Background

The Air-Conditioning and Refrigeration Institute (ARI) and Gas Appliance Manufacturers Association (GAMA) jointly developed a competency test for HVACR students to remedy two problems. First, contractors and manufacturers sought better qualified workers; employers found it difficult to find and keep qualified service technicians. Second, schools offering HVACR programs were not training students efficiently; teaching standards were not up-to-date or consistent across schools, and the quality of programs varied.

ARI/GAMA collaborated with employers, association and industry representatives, training specialists, engineers, and HVACR instructors from vo-tech schools, trade schools, and community colleges to determine minimum standards of competency necessary for entry-level positions. They also developed a curriculum guide. Two years later, in December 1987, they administered the first exam. Initial costs for program development could not be identified because much of the work relied on volunteer labor from members and educators.

Accreditation

ARI/GAMA does not accredit schools or training programs. ARI's curriculum is only a guide for educators. The test is voluntary; schools determine whether students must take the test.

Certification Exam

The ARI/GAMA test measures basic skills and competencies. It is not a certification exam—passing the test does not qualify a candidate as a "certified technician." Rather, passing the test, along with graduation from an HVACR program, shows the student has met industry-based standards for general competencies in the test area passed. To be eligible for the test,

candidates must have completed 75 percent or more of program courses. Graduates who have been out of school for up to 1 year and have less than 1 year of experience are also eligible. Tests are administered semiannually at 85 sites in the United States and cost $25.

Test content was developed by representatives from ARI/GAMA and other industry associations, along with HVACR instructors from vo-tech schools and community colleges. Although HVACR knowledge can vary by geographical region and include specialties, the test measures everyone against the same minimum set of skills. The Professional Examination Service (PES) designs, administers, and scores the test, which includes 100 multiple-choice questions. PES updates the test annually.

Recertification

ARI/GAMA's program is not a certification system; hence, there is no recertification.

Current Data

The test is sponsored by 207 schools. In 1992, approximately 2,453 candidates sat for the test. Given an average passing rate of 60 percent, an estimated 1,472 students passed the test. The number of candidates taking the test has increased over the years.

Funding

ARI/GAMA's HVACR program is not self-sustaining, nor has it broken even. It is expensive to maintain remote testing sites. While it is difficult to estimate total operating costs, which include volunteer labor, 1992's budget for staff, overhead, and secretarial labor totaled $325,000.

Operating Engineer

Background

The International Union of Operating Engineers (IUOE) has run time-based apprenticeship programs since 1960. Training coordinators and local industry representatives acknowledged the lack of uniform training standards and materials, and measures to assess and demonstrate competence. Employers noticed differences in workers' skills. To make standards and training uniform, and to demonstrate workers' skills and knowledge, IUOE developed a certification program with performance-based standards.

In 1973, IUOE contracted with a firm to conduct a job task analysis that would result in occupational standards. Based on these standards, local IUOE representatives developed performance standards and assessment procedures to provide national certification for workers in 13 areas, such as bulldozers and cranes. Passing written and practical tests would demonstrate minimum competency. Certification was first offered in 1980, after 7 years of development. Initial funding for certification came from local training centers that contributed $500,000 and in-kind services, and a Labor grant for $1 million.

IUOE is still fine-tuning the system. National standards must be validated. Training materials must be identified: there is no consensus on the best training materials to use, and many locals develop their own training materials.

Accreditation

Certification was not developed for non-IUOE training providers. It was designed to improve IUOE training and made available to all locals. However, only 35 percent of the 246 locals use the training materials and certify workers. IUOE does not exercise complete control over the activities of local chapters, which are autonomous.

Certification Exam

IUOE requires a written and a practical exam that are both administered by local training supervisors throughout the year. The practical exam requires candidates to demonstrate their skills using operating engineer equipment. There is usually no exam fee. IUOE has not revised the standards since they were first developed.

Recertification

Certification is for life with payment of annual dues. Retraining is encouraged, but not required.

Current Data

Data on the number of certified workers are unavailable—IUOE does not require locals to report on the number of workers who take and/or pass tests. Due to the recession and the tendency of journeymen to stick to their specialty, there has been no increase in the number of workers taking tests.

Funding

The program is funded through collective bargaining agreements. Companies contribute a certain portion of training funds based on worker hours, ranging from 10 cents to $1. IUOE estimated that the apprenticeship program costs about $200 million annually to operate.

Craftworker

Background

Because of their need for improved training materials and curricula, the Associated General Contractors of America (AGC) initially developed curriculum and competency-based testing, not a certification system. AGC asked Oklahoma's Department of Vocational-Technical Education to develop competency-based materials. Oklahoma and AGC conducted their own task analyses to design a carpentry curriculum. AGC gathered information from trade associations, existing curricula, and craft specialists that was then reviewed by industry representatives. This resulted in competency profiles listing skills needed for employment. Oklahoma developed and validated the test that was then reviewed by construction industry representatives. AGC implemented the new curriculum and competency-based testing in 1986.

In 1989, AGC decided to establish a national certification system that would give workers recognition, prestige, and more job opportunities. They established standards and competency-testing in residential carpentry, commercial carpentry, and brick and stone masonry. By June 1990, after 4 years of development, certification testing was offered to all chapters. Initial funding came from AGC. The program would have cost $2 million to develop but a portion of this amount was defrayed by in-kind services from Oklahoma.

AGC runs the certification program and maintains the exam and data. Oklahoma and AGC share the copyright to the final test questions and revise the curriculum. Test questions are written by trained test writers from vocational education and industry, and the questions are then reviewed by industry representatives and a national committee of general contractors.

Accreditation

AGC administers a recognition program that endorses secondary schools that meet AGC standards. These standards are based on guidelines

developed by AGC and the National Association of State Directors of Vocational Education for construction craft programs that meet industry training needs. The recognition standards help construction training programs assess and improve education quality, and ensure that graduates are qualified. Graduates from these programs, with recommendations from their instructors, receive an AGC-skill card demonstrating their completion of a program that meets industry standards. There are 300 recognized programs in the country.

Certification Exam

The craftworker exam is usually given once a year. Depending on the test cycle, the number of test sites has ranged from 39 to 72 in 20 to 35 states. The test consists of about 70 (50 to 90) written multiple-choice questions. According to AGC practical test would be too expensive to administer. Candidates, with some exceptions (for example, high school students), must have 2 years of job experience to be eligible to take the exam. Although the test is difficult for high school students, AGC is planning to allow high schools to become test sites and will adjust the passing rate and certification level accordingly. The fee for one test is $30 (each additional test is $15). Employers often pay the test fee. Test questions are based on competency profiles, which are reviewed on a continuing basis.

Passing the test qualifies a certified worker as a carpenter, brickmason, or stonemason in a specific trade area. This certificate is an adjunct to achieving journeyman status.

Recertification

Certification is valid for 5 years. At that time, the worker must retake the exam to maintain certification.

Current Data

As of June 1992, there were 1,657 participants certified in at least one area. The passage rate is about 80 percent. The number of test registrants has fallen over the last five test cycles. Of the 101 local AGC chapters, the number participating in certification ranges from 28 to 35.

Funding

Exam fees do not cover program costs. AGC made $15,000 during its first year of operation because of the staff and resources lent by Oklahoma. Thereafter, AGC lost $55,000 to $75,000 annually. In 1990-91, they lost an estimated $80,000. They hope to market the program and increase the number of testees, rather than raise the exam fee.

Printing Technician

Background

Printing Industries of America (PIA) created PrintED to provide industry-approved instructional and program guidance to schools and training programs that teach printing and graphics. The industry needed qualified entry-level employees who could adapt to the continuous changes in printing technology. This was critical, given the shortage of printing and graphics workers. PrintED is intended to accredit programs, not to certify individuals.

Educators in Georgia wanted to improve vocational education and approached the Georgia PIA chapter for assistance. PIA members (for example, employers and manufacturers) and educators established nine program standards based on ASE accreditation criteria. No unions were involved. They also devised 412 competencies to identify the basic skills needed for entry-level positions in art and copy preparation, reproduction photography, image assembly and platemaking, duplicator operations, electronic imaging (desktop publishing), and introduction to printing. PrintED took effect after 5 years of effort, in March 1991, when schools in Colorado and Oklahoma adopted the program. Initial funding came from PIA members and a grant from Rockwell Graphics for $80,000.

Although there is no set curriculum or mandatory training, teachers at PrintED-accredited schools must teach all 412 competencies. Students receive a "certificate" by graduating from an accredited program and completing competencies in a specialty area. Certificates are valid nationwide. PIA is currently developing a national curriculum for secondary and postsecondary students.

Accreditation

PIA evaluates schools for approval (a 1-year process). Twelve secondary schools and one community college are PrintED-accredited, concentrated in Georgia, Oklahoma, and Colorado. Over 200 schools in the United States and Canada are pursuing accreditation.

Certification Exam

There is no PrintED exam. Students must pass 80 percent of the competencies in a specialty area by scoring no less than a "3" on a 4-point scale. Testing is left up to the schools. The program requires 200 hours of study. Students who complete the accredited program have the equivalent

of 6 months of on-the-job training and receive certificates to recognize their skills and knowledge. PIA industry representatives and educators update the standards and competencies every year with input from employers' feedback on an annual survey.

Recertification

This is not a certification program; hence, recertification does not apply. Schools must be reaccredited every 5 years.

Current Data

Although PIA does not keep data on the number of students who complete the program every year, an official provided a rough estimate of 700 students for the 1991-92 school year.

Funding

The program is self-sustaining through accreditation fees ($600 per school). Some states cover this fee for their schools. Operating costs are hard to accurately identify, but include two-thirds of one staff member's salary, promotion, and travel costs. A $25,000 grant from Rockwell Graphics covers mailing, printing, and other marketing costs.

Skill Standards Grants

Grantee	Amount
Department of Education[a]	
Far West Lab for Educational Research and Development (health science and technology)	$500,000
Electronics Industries Foundation	545,658
Foundation for Industrial Modernization (computer-aided drafting)	546,687
Vocational-Technical Education Consortium of States (air conditioning, refrigeration, and power)	253,070
Education Development Center (biosciences)	527,383
The Graphic Arts Technical Foundation (printing)	516,127
National Automotive Technicians Education Foundation	544,537
Department of Labor[b]	
Institute of Industrial Launderers	108,035
Council on Hotel, Restaurant and Institutional Education (food, lodging, and travel-related services)	298,560
National Tooling and Machining (metalworking)	300,000
American Electronics Association	300,000
National Electrical Contractors (electrical construction)	65,600
National Retail Federation	207,000

[a]Education grants are for 3 years (in two 18-month funding cycles).

[b]Labor grants are for 1 year.

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Related GAO Products

Systemwide Education Reform: Federal Leadership Could Facilitate District-Level Efforts (GAO/HRD-93-97, April 1993; GAO/T-HRD-93-20, May 4, 1993).

The Changing Workforce: Demographic Issues Facing Employers (GAO/T-GGD-92-61, July 29, 1992).

Correspondence on Multiple Employment and Training Programs (GAO/HRD-92-39R, July 24, 1992).

Apprenticeship Training: Administration, Use and Equal Opportunity (GAO/HRD-92-43, Mar. 4, 1992).

Transition From School to Work: Linking Education and Worksite Training (GAO/HRD-91-105, Aug. 2, 1991).

Training Strategies: Preparing Noncollege Youth for Employment in the U.S. and Foreign Countries (GAO/HRD-90-88, May 11, 1990).

Vocational Education: Opportunity to Prepare for the Future (GAO/HRD-89-55, May 10, 1989).

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