SKILL STANDARDS PROJECT REPORT

STATE STRATEGIES
FOR
WORKFORCE DEVELOPMENT
THROUGH SKILLS STANDARDS
AND WORKER CREDENTIALING

MAY 2002

STATE STRATEGIES
FOR
WORKFORCE DEVELOPMENT
THROUGH SKILLS STANDARDS
AND WORKER CREDENTIALING

May 31, 2002

Prepared for

THE GOVERNOR'S WORKFORCE POLICY BOARD
STATE OF OHIO

PROJECT TEAM

Larry Ledebur, Associate Dean for Research
Jon Shelton
MAXINE GOODMAN LEVIN COLLEGE OF URBAN AFFAIRS
CLEVELAND STATE UNIVERSITY

Greg Browning, President
Patricia Smith
CAPITAL PARTNERS
Columbus, Ohio

Joan Wills, Director
Barbara Kaufman, Senior Associate
CENTER FOR WORKFORCE DEVELOPMENT
INSTITUTE FOR EDUCATIONAL LEADERSHIP
Washington, D.C.

Shara Davis, Director
JOINT CENTER FOR POLICY RESEARCH
LORAIN COUNTY COMMUNITY COLLEGE
Lorain County, Ohio

Peter Creticos, President
INSTITUTE FOR WORK AND THE ECONOMY
DeKalb, Illinois

TABLE OF CONTENTS

DETAILED
TABLE OF CONTENTS

PART I

EXECUTIVE SUMMARY

INTRODUCTION
OHIO'S CHALLENGE IN WORKFORCE DEVELOPMENT

In the charge to the Governor's Workforce Policy Board, Governor Taft stated:

> *Few issues are as important to Ohio's prosperity as ensuring that we have a cohesive workforce system -- that is, a system where all parts are working together to provide employers with an ample supply of trained workers and to provide workers with job opportunities."*[1]

He called upon the Policy Board to commit its time and efforts to building a world-class workforce system in the state of Ohio. This system, he charged, must be business-led, closely linked to the state's economic development activities, locally implemented, and focused on the system's primary customers—Ohio employers, workers and potential workers.[2]

The vision of the Governor's Workforce Policy Board for developing this world class, cohesive workforce system is that it will provide:[3]

> *Ohioans with the ability to obtain the skills needed to remain successful at family-sustaining jobs.*
>
> *Ohio employers with the ability to meet their current and future workforce needs and to remain competitive in the world economy.*
>
> *Ohio communities with the ability to support, retain, and attract employers and residents through aligned and accessible workforce programs and services.*

In responding to this charge, the Governor's Workforce Policy Board has established a goal of creating a state workforce development system of education and training services that provide individuals with the skills that employers need for their company to be successful and that individuals need to succeed in their careers. [Goal 4]. The third objective of this goal is to:

> *Improve the quality of training for selected employment sectors through incorporation of industry-recognized skill standards and the incorporation of effective training assessments.*

This report examines the potential of nationally recognized and industry-valued skill standards to contribute to the goal of creating a cohesive, world-class workforce system. It concludes:

> Skill standards can be an important tool in Ohio's efforts to create a cohesive, world-class workforce system. By using industry-valued skill standards as a key organizing tool throughout the workforce development system, there is an opportunity to contribute to successful implementation of the Workforce Investment Act through the Governor's Workforce Policy Board, local Workforce Investment Boards, the business community, and the education and training communities.

---

[1] Speech to the Workforce Policy Board Meeting, September 5, 2001, p. 2.
[2] Ibid., pp. 6-7.
[3] Taken from the Governor's Executive Order Creating the Workforce Policy Board, undated, p. 1.

TERMS: CONCEPTS AND CONTEXT

Skill Standards: There is a core set of concepts that are common to all definitions of skill standards. The term skill standard focuses on work-related competencies and includes (often embedded in the skill statement) academic knowledge and skills. A standard includes two key factors.

The Content: What does a person need to know?

The Performance: What does a person need to be able to do? This can include levels of achievement or competency within a content area (e.g., advanced, proficient, and basic). Performance can be set either for an individual content standard or across groups of content standards.

Standard Types: There are several different types of skill standards, one building upon the other: *core academic, generic workplace readiness, industry core, occupational family, and occupational or job specific*.

Core academic standards cover those subject matter areas such as mathematics, language arts, and science that are necessary to function as a member of society and help develop career-related skills.

Generic workplace readiness standards cover those skills and qualities that workers must have to learn and adapt to the demands of *any* job. These include personal attributes, interpersonal skills, thinking and problem solving, communication, and use of technology.

Industry core standards apply to most of the occupations in a particular industry. Thus, there are core standards for the hospitality industry that are distinct from core standards for the electronics industry. Industry specific standards are critical to career-preparation programs (e.g., career majors and programs of study).

Occupational family standards specify the knowledge and skills that are common to a related set of occupations or functions within an industry or across industries. For example, within the health care industry, occupations in medical laboratory, imaging, and radiography can be thought of as belonging to a larger diagnostic family (or cluster) of occupations. The occupations in this diagnostic family focus on creating a picture of patient health at a single point in time. Whereas individual job-specific requirements may change, depending on changes in the job market as well as changes in the structure of the workplace, occupational family level standards provide a broad base of skills for individuals.

Occupational or job specific standards address the skill expectations of a specific occupation. This is the level on which most certification systems focus.

Education providers need to incorporate all of these levels of standards when preparing programs of study and curriculum.[4]

Voluntary Skill Standards: The term voluntary skill standards is a "term of art" derived from the National Skill Standards Act of 1994. The term voluntary was used to show that neither the public nor the private sectors would be mandated to use the products endorsed by the National Skill Standards Board. However, units of government or an individual business can (and many do) choose

[4] See Glossary for further definitions of terms used by the National Skill Standards Board that build upon this contextual set of definitions.

to mandate the use of skill standards for a variety of purposes. One key purpose of the National Skill Standards Act is to facilitate the development and use of standards for broad clusters of occupations due to the recognition that it is in the public and private interest to establish broad-based standards to meet the needs of a whole industry in order to promote career advancement.

Process for Establishing Standards: Skill standards are established through a variety of job analysis processes that involve documentation and validation by a wide range of workers and work place supervisors. In the case of certification programs that attest to the competencies of an individual the courts have upheld these various processes if there is proof the organization responsible for conducting the work has complied with national requirements of civil rights laws and followed procedures established by the American Psychological Association. If a certification program desires to be national in scope a key requirement is that the job validation process must show proof that all regions of the country have been included in the activity. This proof allows recognition and portability of credential being recognized across state lines.

Certification

1) The process by which a non-government agency or association grants recognition of competence to an individual who has met predetermined qualifications specified by the agency or association. (National Organization for Competency Assurance)
2) The type or name of particular state license or professional or technical certification programs required for given jobs or possessed by an individual. (US Department of Labor)

Credentialing

1) Encompasses both the certification of individuals who have been found to meet criteria of competence and the accreditation of academic institutions that have been approved as meeting quality standards. Credentialing activities can include:
   a) prescribing education and experience qualifications for certification candidates;
   b) establishing curriculum, faculty, and faculty qualifications for potential accredited institutions;
   c) administering competitive examinations; and
   d) conducting assessment visits. (American Society of Association Executives)

2) The recognition of professional or technical competence. The credentialing process may require registration, certification, licensure, professional association membership or the award of a degree in the field. (National Organization for Competency Assurance)

   When the focus on credentialing is centered on the institution the term accreditation is used predominately by institutions of higher education; for programs that are focused on secondary education institutions the term of art is program certification.

PROJECT OVERVIEW

In Ohio, as well as most other regions, workforce development systems are fragmented with limited coherence between industry and education and training resources. Many employer activists and employer-led organizations recognize that more meaningful and effective means need to be found to meet the workforce development needs of business and industry.

Reducing fragmentation will require establishing effective strategic alliances between the supply side providers and demand side customers (employers and individual students/job seekers). New tools are needed to link the various institutional networks together. Some parts of workforce development systems have turned to employer-endorsed skill standards as a key tool to improve the linkages among the various institutions that make up the workforce development system – on both the supply and demand sides of the system.

Workforce skills standards, certification, and credentialing are critical tools in the arsenal for all parts of the workforce development system to a) engage the employer-community in helping to design workforce development products and services; b) meet the needs of key industries; c) help market publicly financed education and training programs to individual employers; d) help individuals develop career pathways; and e) provide public and private sectors alike with information to monitor results and promote quality assurance.

Standards can provide a common language/framework to assist education and training providers develop competency-based curricula; provide articulation strategies and program approval techniques to develop more coherent programs of study that move from the general to the occupation/job specific. By using industry-valued standards as a key organizing tool throughout the workforce development system there is the opportunity to ensure successful implementation of the Workforce Investment Act through state and local Workforce Investment Boards (WIBs), the business community, and the education and training communities.

The Skills Standard Project was undertaken to address nationally accredited skills standards – their evolution, extent, use, and necessity. The intent is to provide information that could enhance the quality and employability of Ohio's workforce by raising the level of awareness of the need to more clearly identify and more effectively teach desired occupational skills.

To that end, the project includes both a national assessment and a review of skill standards utilization in Ohio with emphasis on "best practices" in Ohio and key reference states. It also includes consideration of "next steps" for the state in terms of appropriate policy and program advancement.

Its primary goal is to help policy makers and program officers improve employment and training programs so that specific occupational skills can be clearly identified and therefore more effectively taught.

The national assessment portion of the report finds that no state has developed a comprehensive one-stop/full service system for the infusion of skill standards throughout the workforce development system. The following states were selected to review either because they have a history and reputation regarding skill standards or because they have state characteristics similar to Ohio's. These states are:

Florida	Michigan
Georgia	Pennsylvania
Illinois	Texas
Indiana	Virginia
	Washington

Examined were the roles of multiple agencies (general secondary education, career technical education, postsecondary institutions, and state workforce development boards and agencies) and the specific use of skill standards in their policies, practices, and local program approval processes. The review looked at:

- how a state organized its work around skill standards;
- how a state engaged the employer community; and
- how the standards are used and by whom.

Among the nine states, only Texas and Illinois have separate entities whose primary purpose is to endorse skill standards for use within the state while Indiana has a "Workforce Proficiency Panel," established by Indiana Public Law, which also works on curriculum for existing vocational programs and develops written and performance-based scenario assessments so industry-recognized Certificates of Technical Achievement can be awarded. The other six states house skill standards in existing state organizations.

Part IV addresses the nature of skill standards utilization among education and training providers in Ohio. It provides a summary of standards based activities among education and training providers along with key observations and emerging policy considerations for the state of Ohio. It concludes that, based on current activities among education and training providers that industry skill standards are a tool for establishing greater coherence between business/industry requirements and education/training systems.

Part V makes recommendations for getting started and presents a suggested budget for the Phase I.

The report includes information, in three notebooks, on six of 16 career clusters in the U.S. Department of Education (ED), plus a miscellaneous grouping of credentialing programs in several occupational areas sponsored by industry or professional organizations. The categories were determined by the Cleveland State University team as being most relevant to the economy of the state of Ohio. Included are: (1) Business and Administration; (2) Health and Human Services; (3) Manufacturing, (4) Information Technology, (5) Education and Training, and (6) Hospitality and Tourism. The notebooks also include certifications in other clusters that are related to these priorities. This is resource material that tells the reader what exists or, more to the point, what has been found by either the National Skill Standards Board (NSSB) or one of the projects funded by ED.

Also included in the report are definitions of widely used terms and, in an appendix, a more detailed glossary of terms that are specific to practitioners rather than to constituencies.

The project confirmed the need for "common language" for communicating with all audiences, but given the scope and magnitude of this issue, the project report cannot serve to establish the necessary consensus around terms and a common language.

GUIDING PRINCIPLES

The recommendations that follow are predicated on eight general tenets or principles for the use of skill standards in Ohio's workforce development system.

1. System must be designed to promote opportunities for individuals to acquire credentials based upon industry standards that are recognized by education institutions for credit regardless of where the learning occurs.

2. System must include use of assessments for awarding credentials for use by industry and education.

3. System should be based upon common career pathways used by all institutions within the workforce development system.

4. In order to promote standards-based career advancement development of curriculum and instructional materials, all programs of studies should move from the academic foundations to occupation/job-specific regardless of where the learning occurs.

5. System should include preparation of all instructional and counseling staffs to use standards-based materials in all workforce development organizations.

6. A long-term goal of the system should be to develop streamlined program accreditation processes based upon the programs of study within the common career pathways. This streamlined process should be designed to reduce cost burden to institutions and employers.

7. Curricula, instructional materials and staff development should be coordinated across institutions (e.g. common RFP's for curricula development). Curricula should be developed whenever feasible based on competencies modules and be fully accessible to all education and training institutions in the state.

8. National skill standards should be aligned with the state academic standards and this information should be accessible to all education and training institutions in the state.

SUMMARY OF RECOMMENDATIONS

The 13 primary recommendations of this report are summarized below. Detailed recommendations are presented in Part II of this report.

1. **Ohio should initiate a process to build a comprehensive system of skill standards and credentialing based on nationally-validated industry skill standards that can serve as an organizing focus for a cohesive world-class workforce system.**

2. **The Governor should establish a cabinet-level Skills Standards Working Group to determine an appropriate administrative structure for design and implementation of a comprehensive Ohio skills standards initiative.**

3. **Immediate and extensive efforts must be made to involve and educate key employers and business associations' leadership to mobilize support for a comprehensive performance-based skills standards system.**

4. **To effectively leverage time, resources and energy, Ohio should assume the role of an adopter state that imports skill standards from nationally recognized industry organizations if these organizations have been recognized by national quality assurance bodies such as NSSB. If national organizations have not received national recognition by a quality assurance organization Ohio should establish adaptation criteria that ensures the standards are current and were developed using generally accepted professional practices.**

1. **The programs and lessons learned of other reference states should be carefully examined in building the Ohio Skills Standards Initiative. The Ohio Initiative should build on the strengths of these programs, as well as current skill standards strengths in the Ohio Workforce development system.**

6. **An overarching strategy for performance-based assessment of students/ trainees and certification of the skills attained should be developed.**

7. **A strategy to ensure quality assurance in program delivery should be developed. This strategy should include a set of common, standards-based criteria for program approval, program certification, and instructor certification among all four state agencies involved in Ohio's workforce development.**

8. **Ohio's continued efforts to develop a statewide skill standards initiative should focus on a relatively small set of industries.**

9. **Steps necessary to bring about coordination and collaboration among the four state departments involved in workforce development should be identified and implemented. Similar steps should be established for coordination and collaboration of these departments with the Governor's Workforce Policy Board and, through it, the employer community.**

10. **A plan for using the Ohio Skill Standards Initiative as a centralizing focus for, and strengthening of, the Ohio Workforce Investment Agencies and Boards should be developed.**

11. **A training Medallion Program should be developed that awards medallions to training providers who train to nationally recognized performance-based skill standards and gold medallions to training providers that, in addition, provide trainees with certification of skills attainment.**

12. **An Ohio Skill Standards resource, including web site (should be established) that would provide electronic communication of information, activities, and programs**

and strongly reflect inter-agency cooperation/ coordination and strategic partnerships with the business community.

13. **An evaluation framework for the development and implementation of the Ohio Skill Standards Initiative should be established. A core component of this ongoing evaluation should address the benefits/payoffs to employers in terms of productivity gains and workforce quality.**

NOTE

The recommendations above are distilled primarily from the national overview [Part III] and the overview of education and training providers in Ohio [Part IV]. These 13 recommendations reflect a general consensus of the project team. Both Parts III and IV contain recommendations, some of which are not included above. A decision was made not to edit the concluding sections of these two parts for consistency with the 13 primary recommendations, but to retain the richness of this information for those stalwarts who hopefully move a skills standards initiative into the recommended Phase I.

PART II
RECOMMENDATIONS

PERFORMANCE BASED SKILL STANDARDS

Skill standards can be an important tool in Ohio's efforts to create a cohesive, world-class workforce system. By using industry-valued skill standards as a key-organizing tool throughout the workforce development system, there is an opportunity to contribute to successful implementation of the Workforce Investment Act through state and local Workforce Investment Boards, the business community, and the education and training communities. These industry-validated standards for the knowledge, skills and abilities to successfully perform specific occupations can be used in Ohio's workforce development system to:

- engage the employer community in helping to design workforce development products and services;
- permit employers to establish and communicate their skills needs.
- meet the needs of key industries;
- inform consumers (students, job seekers, and current workers) about requirements of the workplace;
- allow individuals to provide proof of their knowledge, skills and abilities;
- help market publicly-financed education and training programs to individual employers;
- provide public and private sectors alike with information to monitor results and promote quality assurance; and
- reduce costs of a state's education and training system

By establishing a skill standards-based system, it is possible to focus the interactions between individual employers, employer associations, and the various public sector partners in an effective and efficient manner.

Skill standards are a key tool to a state's success in tying industry needs into the public education and training system. Skill standards can provide a common framework to assist education and training providers develop competency-based curricula, and provide articulation strategies and program approval techniques to develop a more coherent program of study.

Ohio has the opportunity to build on national efforts and to learn from other states in establishing a state-of-the-art, standards-driven workforce development system.[5] No state, however, has yet developed a comprehensive one-stop/full service system for the infusion of skill standards throughout the workforce development system that can serve as a model for Ohio.

Skill standards are not meaningful components of other Ohio workforce programs beyond career and technical education and the merging thrusts of the SkillMax Center of EnterpriseOhio

[5] This project examined the following states either because they have a history and reputation regarding skill standards or because they have state characteristics similar to Ohio's. These states are:

Florida
Georgia
Illinois
Indiana
Michigan
Pennsylvania
Texas
Virginia
Washington

Network. Local Workforce Investment Agencies do not appear to be oriented toward using skill standards in their local training initiatives or investing in training organizations that adhere to national skill standards.

The corporate community of Ohio must be mobilized in support of skill standards if a state initiative is to succeed. This does not appear to be the case at present. Any initiative around skill standards in the development of a world-class workforce system must address this critical need for support of business leadership in the state.

This report presents 13 recommendations for the infusion of skill standards throughout Ohio's workforce development system. Before moving to these recommendations, two caveats should be clearly noted.

- Skill standards have the potential to be a very useful tool in building a cohesive, integrated workforce system in Ohio. Standards, however, are that, a tool and only one tool. Skill standards are not a singular or comprehensive solution of current limitations of the workforce development system in the state.

- Skill standards are not a simple or quick fix to the problems of Ohio's workforce development system. Development of a successful comprehensive delivery system for skill standards will require:

  Sustained commitment, sustained leadership, sustained investment, sustained effort and sustained persistence.

  Sustained interagency cooperation within Ohio state government.

  S*ustained efforts to build new and enduring partnerships between the private and public sectors at both state and local levels.*

RECOMMENDATIONS

1. OHIO SHOULD INITIATE A PROCESS TO BUILD A COMPREHENSIVE SYSTEM OF SKILL STANDARDS AND CREDENTIALING BASED ON NATIONALLY-VALIDATED INDUSTRY SKILL STANDARDS THAT CAN SERVE AS AN ORGANIZING FOCUS FOR A COHESIVE WORLD-CLASS WORKFORCE SYSTEM.

A strong case can be made that skill standards can be an important tool in Ohio's efforts to create a cohesive, world-class workforce system. Further, skill standards appear to have a potential to contribute significantly to the realization of the core values, goals and objectives of the Governor's Workforce Policy Board. The Board has set forth six primary goals for building a cohesive, world-class workforce development system.[6]

Link economic development and workforce development: A core value articulated in the Governor's Executive Order creating the Workforce Policy Board is that the initiative to create a cohesive, world-class workforce system *must effectively link economic development and workforce development.* Skill standards have the potential to provide one element of the linkage through documentation of industry-valued skills required by Ohio industries and ensuring educational and training resources that can train to the standards and worker credentials certifying accomplishment of these skills.

Facilitate communication within the workforce development system and the economic development system. Workplace skill requirements are intended to place standards under a widely recognized and commonly used organizational framework that can be used by multiple providers for multiple purposes. This framework for skill standards provides a vehicle for focusing and facilitating communications within the workforce development system and with the economic development system. Skill standards, therefore, can contribute to the Policy Board's objective of developing:

> *an effective communications program between the Governor's Workforce Policy Board and local workforce policy boards and agencies and between the Policy Board and employers, business associations and Ohio citizens. The program will promote best practices in workforce development and training. The program will evaluate the current efforts of State organizations to promote continuing education for students and adults* [Goal 1, Objective 3].

Enhanced employer engagement: Skill standards can enhance employer engagement in the education and training of individuals/workers. Skill standards by their very nature are intended to *document* workplace skill requirements under "a widely recognized and commonly-used organizational framework that can be used by multiple providers for multiple purposes". Thus, skill standards become a communication tool for greater coherence among education and training enterprises and the business community.

Inform development of curriculum: Standards-based materials can inform development of curriculum so industry skill requirements are integrated into instruction and learning at a variety of levels (i.e., elementary, secondary, post-secondary, welfare-to-work, etc.) for a variety of individuals (i.e., future workers, incumbent workers, transitional workers). In

[6][Governor's Workforce Policy Board, Draft Objectives, March 13, 2002]

other words, integration of industry skill requirements into instruction and learning provides business/industry a role in the *design* of education and training services.

Thus, skill standards has the potential to contribute to the Workforce Policy Board's objective of developing *a program to align existing education and training programs and increase articulation and transferability of educational credits between state sponsored educational institutions* [Goal 4, Objective 2].

Frame individual assessment and individual credentialing. Skill standards can help frame individual assessment (used to test individual learning and achievement) and individual credentialing (or "proof of an individual's knowledge, skills, and abilities"). Individual assessment and credentialing that is driven by industry standards helps to assure individuals have the skills necessary to succeed in their careers and that workers possess skills/abilities necessary for company success. Standards can also establish the foundation for career growth and individual advancement. They improve individual opportunity by putting greater emphasis on objectively measured skills tied to cored functions of work.

Skill standards, therefore, can be one response to the Workforce Policy Board's call for a system that *will provide effective career development opportunities and the best and most current career information possible.* [Goal 3 of the Workforce Policy Board Draft Objectives.]

Promote quality assurance within the workforce development system. Similar to individual credentialing, information derived from skill standards frameworks can be used as important *criteria* for program approval and instructor training/credentialing. Use of standards-based materials in this fashion can help to create a workforce development system that is built upon *industry-driven performance* criteria (i.e., program approval criteria) which is also used to evaluate the effectiveness of education and training programs.

Skill standards, therefore, can become a primary tool in accomplishing Goal 7 of the Governor's Workforce Policy Board Draft Objectives, which mandates that *the system will provide statewide performance criteria and assessments.* This goal derives from the Board's core value that *performance criteria should lead to continuous improvement in workforce programs and services and should identify best practices.*

2. THE GOVERNOR SHOULD ESTABLISH A CABINET-LEVEL SKILLS STANDARDS WORKING GROUP TO DETERMINE AN APPROPRIATE ADMINISTRATIVE STRUCTURE FOR DESIGN AND IMPLEMENTATION OF A COMPREHENSIVE OHIO SKILLS STANDARDS INITIATIVE.

The State of Ohio has a variety of workforce development programs located in a variety of state agencies. The prevailing opinion appears to be that these programs are fragmented and uncoordinated. The Ohio Department of Jobs and Family Services is still working towards consolidating the gains and fully capturing the potential gains of the consolidation of two major state departments into one. The Governor's Workforce Policy Board has not yet charted a clear direction for creating a cohesive, world-class workforce development system. Further, Ohio does not appear to have a particularly strong history of interagency cooperation and coordination.

These circumstances complicate the design of politically feasible and sound structural recommendations. It is therefore recommended that the Governor create a cabinet. Level Skill Standards Working Group to determine the appropriate administrative structure for the design and implementation of a comprehensive skill standards initiative. It is also strongly recommended that this Working Group have strong representation from the business leadership of the Governor's Workforce Policy Board, as well as clear channels of sustained communications with, and accountability to, the Board.

This recommendation is consistent with the Policy Board's objective of *creating a State Interagency Workforce Council to coordinate State programs and support local workforce initiatives* [Goal 1: Objective 2]. There is currently a four-agency workforce development working group facilitated by the Governor's Office [Department of Development, Board of Regents, Department of Education, and Department of Jobs and Family Services]. This working group, enhanced by effective connections to the Workforce Policy Board, provides a logical focus for sorting through the fragmentation, coordination, integration, administrative/governing issues.

The Governor's Workforce Policy Board should play a strong role in the design and implementation of the administrative/governance structure. The Workforce Investment Act is not just a new program but also a way of bringing change to the whole workforce development system. The vision of the federal WIA legislation is that these resources will help states establish a system that builds upon substantial investments already existing in the state and bind them together more effectively to meet the needs of citizens. Skill standards may be one of the most powerful tools to realize that vision.

Having such a responsibility can help focus and anchor the work of the Workforce Policy Board and be designed to assist all of its stakeholders. This can help ensure the Workforce Policy Board is meeting a state need as well as acting as an agent to support federal priorities. No other organization within Ohio brings all the appropriate stakeholders—industry, education, and government—together. The Policy Board can use its role to study, convene experts and interested stakeholders, build consensus and take action, and provide support to build a new system.

There are a variety of organizational models among the states examined.[7] No single model stands out as a unique model for replication in Ohio. Among the nine states, only Texas and Illinois have separate entities whose primary purpose is to endorse skill standards for use within the state, while Indiana has the "Workforce Proficiency Panel," established by Indiana Public Law, which also works on curriculum for existing vocational programs and develops written and performance-based scenario assessments so industry-recognized Certificates of Technical Achievement can be awarded.

The other six states examined house skill standards in existing state organizations. Skill standards help support the mission of the state of Washington's Workforce Training and Education Coordinating Board (i.e., the state workforce investment board or WIB) which is, "to bring business, labor, and the public sector together to shape strategies to best meet the state and local workforce and employer needs of Washington in order to create and sustain a high-skill, high-wage economy." The others are housed in education agencies.

[7] The organizational models of reference states are presented in Part III.

3. **IMMEDIATE AND EXTENSIVE EFFORTS MUST BE MADE TO INVOLVE AND EDUCATE KEY EMPLOYERS AND BUSINESS ASSOCIATIONS' LEADERSHIP TO MOBILIZE SUPPORT FOR A COMPREHENSIVE PERFORMANCE-BASED SKILLS STANDARDS SYSTEM.**

The full potential of using the powers of the state government will not happen without strong and enduring leadership from a central consumer group – the employer community. The business community must provide sustained and cross-industry, coordinated leadership to help ensure the political and professional leadership of the state will have the necessary support to penetrate the state's education and training systems, culminating in the development of meaningful support structures.

There is little evidence that the Ohio employer community is particularly invested in a state performance-based skill standards enterprise as a means for improving the state's workforce and for achieving greater cohesiveness in the state's workforce development system. Ohio's efforts to develop a strong skill standards and credentialing system throughout its workforce development system is unlikely to succeed without mobilizing the business community.

In addition, national experience suggests that in order for there to be cross-industry coordination of leadership support, employer and public institutions will need to work in collaboration with one another. This will require the support of industry associations along the way for different tasks such as marketing to employers. It is recommended that Ohio consider strategies for mobilizing state industry associations to serve as demand-side brokers as one component of the effort to mobilize the state's business community.

4. **TO EFFECTIVELY LEVERAGE TIME, RESOURCES AND ENERGY, OHIO SHOULD ASSUME THE ROLE OF AN ADOPTER STATE THAT IMPORTS SKILL STANDARDS FROM NATIONALLY RECOGNIZED INDUSTRY ORGANIZATIONS IF THESE ORGANIZATIONS HAVE BEEN RECOGNIZED BY NATIONAL QUALITY ASSURANCE BODIES SUCH AS NSSB. IF NATIONAL ORGANIZATIONS HAVE NOT RECEIVED NATIONAL RECOGNITION BY A QUALITY ASSURANCE ORGANIZATION OHIO SHOULD ESTABLISH ADAPTATION CRITERIA THAT ENSURES THE STANDARDS ARE CURRENT AND WERE DEVELOPED USING GENERALLY ACCEPTED PROFESSIONAL PRACTICES.**

There are three national organizations that have established procedures that can be used: the National Skill Standards Board, the American National Standards Institute, and the National Organization for Competency Assurance (focused primarily on health related standards). NSSB has working relationships with the other two. Each of these organizations have established protocols that ensure standards meet all applicable federal laws, standards are constantly updated, certification processes are fair and open based upon law and court rulings; etc. For example, NSSB criteria for recognizing organizations that offer specialty certifications includes:

- Assessments are consistent with federal civil rights laws with respect to race, color, gender, age, religion, ethnicity, disability and national origin.
- Assessments are developed consistent with relevant professional and technical standards and government guidelines to ensure reliability, fairness, and validity.
- Assessments are maximally accessible to individuals.

- Administration of assessments is delivered consistently.
- Assessments are based upon clearly articulated standards.
- Confidentiality of the assessment-related documentation is maintained.
- Certifications are accepted by the industry or profession that the content represents.
- Certification procedures include a mechanism to provide feedback to candidates on their performance, including whether the candidate passed or failed certification.
- Certification includes a formal process for individuals to appeal the outcome.
- Certifications include a mechanism to ensure the continued relevancy to the industry.
- Certification illustrates alignment with NSSB standards or NSSB framework.

It is recommended that a review of each of these organization's criteria should be undertaken to establish the most cost effective and efficient for adopting of national standards for use in the state. It is further recommended that if an organization is endorsed by one of the aforementioned organizations that the state accept such as endorsement as its own. This would reduce time and cost.

Additionally it is recommended the state not require national organizations that have such endorsement to undertake additional work such as reformatting standards; this should be considered a state responsibility. Such reformatting can be achieved through the use (or development) of computer-assisted programs.

Finally, it is recommended the state seek technical advice from the National
An adopter strategy is clearly the most cost-effective approach as well as the most credible with employers. However, it is important to establish the state's own criteria for quality indicators about which standards to use as baselines, as the State of Washington has done. Ohio should consider using materials developed by the National Skills Standards Board [NSSB] for endorsement of specialties or other long-standing quality control organizations such as American National Standards Institute as a base for review criteria.[8] However, as important as it is for the state to establish its own criteria, it is prudent to operate under the assumption that minimal "rework" would be expected of a national industry association to fit their materials into a standard format preferred by the state[9].

Skills Standards Board regarding the processes and rationale they have developed for the recognition of specialty certification organizations and others issues related to quality assurance.

5. THE PROGRAMS AND LESSONS LEARNED OF OTHER REFERENCE STATES SHOULD BE CAREFULLY EXAMINED IN BUILDING THE OHIO SKILLS STANDARDS INITIATIVE. THE OHIO INITIATIVE SHOULD BUILD ON THE STRENGTHS OF THESE PROGRAMS, AS WELL AS CURRENT SKILL STANDARDS STRENGTHS IN THE OHIO WORKFORCE DEVELOPMENT SYSTEM.

[8] Information about national credentialing programs has been provided for the state's use as a part of this national study.
[9] Virginia's approach, i.e., assuming it is the public responsibility to do "crosswalks," has merit. That state has also developed software to crosswalk state academic standards with industry standards easily accessible to other states.

Ohio can build on national efforts and learn from other states in developing a standards-driven workforce system. While no state that had yet developed a comprehensive one-stop/full service system for the infusion of skill standards throughout the workforce development system in a state, there are important lessons to be learned from other states and building blocks that can be used. Part III examines a set of states that have a history and reputation regarding skill standards or because they have state characteristics similar to Ohio's. The review of these states identifies the roles of multiple agencies (general secondary education, career technical education, postsecondary institutions, and state workforce development boards and agencies) and their specific use of skill standards in their policies, practices, and local program approval processes.

Ohio is a national leader in the use of skill standards in career-technical and adult education through the Office of Career-Technical Education in the Ohio Department of Education. This expertise and programmatic experience and capacity provide a starting point for a new Ohio initiative around skill standards.

The Office of Career-Technical Education within the Ohio Department of Education (consisting of 93 planning districts serving 86,000+ secondary students and 160,000+ post-secondary students) actively participates on the National Skills Standards Board (NSSB) and uses nationally recognized standards-based materials produced by more than 60 industry associations. When the Career-Technical Education Occupational Competency Analysis Profiling System (OCAPS) was developed in the late 1980s (which has sustained since), national skill standards were the foundation for this development. In fact, more than 60 occupational competencies were developed within Ohio – building upon national skill standards developed in all industry clusters identified by NSSB. Ohio was also instrumental in the development of national skill standards and the first state to mandate ASE program certification within the automotive sector. The newly established Integrated Technology & Academic Competencies (ITAC) initiative and Technical Competency Profiles (TCP) of Career-Technical Education build upon the OCAPS work and nationally-validated skill standards as well.

Nationally recognized skill standards utilization is also evident within Ohio's system of higher education. The newly established SkillsMax Resource Center (and 10 SkillsMax Centers) within the two–year system (EnterpriseOhio Network) focuses on services to employers for making sound worker recruitment, retention, training, promotion, and succession decisions. IT skill standards developed by the North West Center for Emerging Technologies, National Adult Literacy Standards, Hospitality Industry Standards, Health Services Industry Standards, and Private Vendor Standards (IBM, Oracle, etc.) serve as the foundation for these services. In addition, the AIM Center in Ohio (which developed a new competency-based, occupationally verified, seamless curriculum beginning in grade 11 through the Associate of Applied Science, culminating in a Bachelor of Science using advanced manufacturing as the focus) is nationally recognized and builds upon NSSB standards, SCANs, National Science Education Standards, and other standards. Within Ohio, awareness and utilization of both academic standards and industry standards are evident. Other pockets of excellence are notable in the activity profiles presented in this report.

2. AN OVERARCHING STRATEGY FOR PERFORMANCE-BASED ASSESSMENT OF STUDENTS/TRAINEES AND CERTIFICATION OF THE SKILLS ATTAINED SHOULD BE DEVELOPED.

The least developed part of the workforce development system in other states is the assessment component. No state has an overarching strategy for assessment that links parts of the education and training systems.

If Ohio can achieve this goal, it will be a national leader among the 50 states in performance based skill standards. At present, here is less activity in Ohio than some reference states around *systemic* utilization of skill standards for individual assessment and credentialing.

Georgia and Virginia appear to be infusing assessment into some parts of the system and rely heavily upon national credentialing organizations.

In Indiana, individuals are awarded Certificates of Technical Achievement (CTAs), documenting skills that they demonstrate and standards that they meet. Through a performance-based scenario assessment system, Certificates of Technical Achievement document an individual's application of essential skills and technical proficiencies. The scenario assesses the work employers expect to be performed and the consistency with which they expect it to be performed. Individuals, whether students, incumbent workers, or adults, who demonstrate they can perform the scenario each time they are called upon to do so are eligible to be awarded Certificates of Technical Achievement.

Pennsylvania's Career and Technical Education has made it mandatory for secondary vocational education programs to use nationally normed tests provided by the National Occupational Competency Testing Institute (NOCTI) for their programs.

Michigan has focused its work-related assessment efforts on general workplace skills. The Department of Career Development has proposed the use of private assessment and certification, Work Keys, throughout the state as a way of assessing an individual's employability for secondary education and welfare-to-work programs. It will also be used in WIA programs at a later date. The certification is based on the Work Keys competencies: reading, writing, locating information, and applied math. Illinois also uses a part of the Work Keys battery of tests in the eleventh grade state-mandated Prairie State Exam.

3. A STRATEGY TO ENSURE QUALITY ASSURANCE IN PROGRAM DELIVERY SHOULD BE DEVELOPED. THIS STRATEGY SHOULD INCLUDE A SET OF COMMON, STANDARDS-BASED CRITERIA FOR PROGRAM APPROVAL, PROGRAM CERTIFICATION, AND INSTRUCTOR CERTIFICATION AMONG ALL FOUR STATE AGENCIES INVOLVED IN OHIO'S WORKFORCE DEVELOPMENT.

Program certification is viewed as a key quality assurance tool by industry associations that have been involved in standards-based work. Ohio must address this need. This, however, is a complex task beyond the scope of this study. It is complex, in part, because some training providers, particularly the state's community colleges, confront multiple certification requirements from state agencies and professional organizations. A skills standards quality assurance program should avoid the pitfall of being viewed as an additional layer of state certification requirements. Further, the pitfall of different certification requires by different state agencies must be avoided. The core of a successful state quality assurance program should be a set of common standards-based criteria for program and instructor certifications for all four state agencies.

In Virginia, the state takes the lead from industry, so if a national sponsoring association requires program certification, such as National Institute of Metalworking Skills (NIMS), Virginia requires it as well. In addition, if the industry association requires some guarantee of a teacher's knowledge related to the standards, the state works with school divisions to help them implement this by providing matching grants to pay half the cost of teacher certification. In the past three to four years, the Office of Career and Technical Education (CTE) has spent $340,000 to help certify between 700 – 800 teachers. School divisions can use the grant money toward costs involved in program certification as well.

Ohio's Career-Technical Education system has used industry skill standards as a foundation for program approval in nearly all career clusters. An application process for new or expanded programs must document the appropriate standards incorporated via the advice of a specific advisory committee, delineate curriculum and facility design and secure an appropriately licensed or credentialed teacher prior to state approval for funding. Staff members from the Office of CTE carefully review each application to ensure that requirements are met and then provide technical assistance to local districts to incorporate standards, implement the program and secure appropriate accreditation. For the application for preliminary approval, a VE-26 application is available.

Program and teacher certification has the potential to become a core component of a quality assurance program consistent with the Workforce Policy Board goal of creating a system that will *provide statewide performance criteria and assessments* [Goal 7].

4. OHIO'S CONTINUED EFFORTS TO DEVELOP A STATEWIDE SKILL STANDARDS INITIATIVE SHOULD FOCUS ON A RELATIVELY SMALL SET OF INDUSTRIES.

Ohio should decide which industries and occupations are most important to Ohio's economy and organize the work around those key clusters as an early priority – the Policy Board is well positioned to make such a decision. Consideration should be given to the industries targeted by the Office of Career-Technical and Adult Education for which

standards have been adapted to Ohio needs and for which progress has been made in development of effective curriculum.

An immediate starting point is an industry by industry assessment to identify those for which skill standards exist in Ohio building from the nationally-recognized accomplishments of the Office of Career-Technical and Adult Education.

The Governor's Workforce Policy Board has identified 12 priority industry sectors. The Board's goal is to *create Advisory Boards for 12 employment sectors to provide information on projected employment opportunities, career paths, and employee training needs. The information would be used for planning the workforce resources needed at the State and local level to meet the identified needs of each employment sector* [Goal 1].

1. Manufacturing
2. Agriculture and Environment
3. Information Technology
4. Transportation and logistics
5. Health Care and Social Service
6. Retail and Wholesale Trade
7. Construction Trades
8. Business Services
9. Government and Public Service
10. Utilities
11. Arts, Entertainment and Recreation
12. Hospitality, Lodging and Food Service

As part of the overall examination of skill standard for the state of Ohio, standards were collected around the 16 career clusters used by the U.S. Department of Education.[10]

The array of standards information went deeper on specific occupational areas of interest to the state of Ohio. These categories were determined by the Cleveland State University team as being most relevant to the economy of the state of Ohio and include:

1. Business and Administration;
2. Health and Human Services;
3. Manufacturing,
4. Information Technology,
5. Education and Training, and
6. Hospitality and Tourism

5. STEPS NECESSARY TO BRING ABOUT COORDINATION AND COLLABORATION AMONG THE FOUR STATE DEPARTMENTS INVOLVED IN WORKFORCE DEVELOPMENT SHOULD BE IDENTIFIED AND IMPLEMENTED. SIMILAR STEPS SHOULD BE ESTABLISHED FOR COORDINATION AND COLLABORATION OF THESE DEPARTMENTS WITH

[10] Appendix A. In addition, the project report includes information, in three notebooks, on six of 16 career clusters in the U.S. Department of Education's (ED), plus a miscellaneous grouping of credentialing programs in several occupational areas sponsored by industry or professional organizations.

THE GOVERNOR'S WORKFORCE POLICY BOARD AND, THROUGH IT, THE EMPLOYER COMMUNITY.

"By the early 1990s, the State of Ohio had created over forty different workforce development programs located in fifteen different state agencies. A mirror image of the federal scene, Ohio's workforce development programs were largely uncoordinated and inaccessible; a group of discrete programs each with its own set of rules and regulations" [Capital Partners, 1998]

Another report prepared for the Cleveland Growth Association in 1997 identified 149 workforce training programs on the books. Of these 121 had budget authority and were active.

The findings of these two studies give credence to what appears to be the prevailing consensus that the state's workforce development system is fragmented, uncoordinated and not meeting the needs of employers or workers. If this is correct, Ohio faces a major task of coordination and, perhaps, consolidation it is to achieve the Governor's vision of a cohesive world-class workforce development system. The creation of the Ohio Department of Jobs and Family Services, a consolidation of two state departments, and the creation of the Governor's Workforce Policy Board to guide the implementation of the Workforce Investment Act are designed, in part, to work toward this end.

While the larger issue of coordination and cohesion lies beyond the scope of this study, a successful Ohio skills standards initiative will require collaboration and cooperation among the four major state departments involved in workforce training and the multiple agencies of which they are comprised. Any effort to create a statewide skill standards initiative will inevitably flounder on the shoals of fragmentation, agency turfism, and failure to cooperate and coordinate across departments and agencies.

Ohio Governor's Workforce Policy Board must play a major role in this task. The Workforce Investment Act is not just a new program but also a way of bringing systems change to the whole workforce development system. The vision of the federal WIA legislation is that these resources will help states establish a system that builds upon substantial investments already existing in the state and bind them together more effectively to meet the needs of citizens. Skill standards may be one of the most powerful tools to realize that vision. No other organization within Ohio brings all the appropriate stakeholders—industry, education, and government—together. No other organization has the outreach to the employer community.

6. A PLAN FOR USING THE OHIO SKILL STANDARDS INITIATIVE AS A CENTRALIZING FOCUS FOR, AND STRENGTHENING OF, THE OHIO WORKFORCE INVESTMENT AGENCIES AND BOARDS SHOULD BE DEVELOPED.

GOAL 1: Objective 3 of the Governor's Workforce Policy Board's draft strategic plan is to:

> *Develop an effective communications program between the Governor's Workforce Policy Board, local workforce policy boards and agencies and between the Policy Board and employers, business associations and Ohio citizens.*

This study does not attempt to address the strengths or weaknesses of Ohio's implementation of the Workforce Investment Act. It is the strong consensus of the project team, however, that industry-validated skills standards can provide a strong centralizing focus for the Ohio system of Workforce agencies and board, a centralizing focus that does not appear to exist. Further, a skills standards focus can provide a framework for an effective communications program between the Policy Board and employers, business associations and Ohio citizens.

7. A TRAINING MEDALLION PROGRAM SHOULD BE DEVELOPED THAT AWARDS MEDALLIONS TO TRAINING PROVIDERS WHO TRAIN TO NATIONALLY RECOGNIZED PERFORMANCE-BASED SKILL STANDARDS AND GOLD MEDALLIONS TO TRAINING PROVIDERS THAT, IN ADDITION, PROVIDE TRAINEES WITH CERTIFICATION OF SKILLS ATTAINMENT.

The proposed Medallion and Gold Medallion program is a quick and relatively easy initial step in the process of developing a comprehensive system of performance-based skill standards and skills credentialing in Ohio. It is an essentially voluntary system that requires only that training providers apply for designation as a Medallion or Gold Medallion provider.

Medallion status is awarded to training providers who document that they train to nationally recognized performance-based skill standards. Gold Medallion status is awarded to training providers who document that they both train to nationally recognized performance-based skill standards and provide the trainee with a certification of skills attainment.

To implement, the State of Ohio needs four key implementation steps.

1. Establish an application intake, verification. and awards process.
2. Designate Medallion status on all state lists of training providers and approved training providers.
3. Evaluate feasibility of indicating that Medallion providers are recommended.
4. Evaluate feasibility of giving preference to Medallion providers in the use of state training dollars.

8. AN OHIO SKILL STANDARDS RESOURCE, INCLUDING WEB SITE (SHOULD BE ESTABLISHED) THAT WOULD PROVIDE ELECTRONIC COMMUNICATION OF INFORMATION, ACTIVITIES, AND PROGRAMS AND STRONGLY REFLECT INTER-AGENCY COOPERATION/ COORDINATION AND STRATEGIC PARTNERSHIPS WITH THE BUSINESS COMMUNITY.

Ohio has been able to establish a one-stop resource for standards-based materials. It is recommended that this resource be web based. In the audit of Ohio providers many recommended the state play a role in the establishment of a centrally located one-stop for information and referral. The one-stop should encompass not only resources for industry skill requirements but also better research and data support around broader industry trends (i.e., Most describe the current state labor market data as inadequate). Better organization of information and resources could dramatically reduce time/effort currently spent

researching business trends and skill requirements. In addition, criteria for adapting nationally validated skill standards to local levels could improve efficiency of skill standards application within Ohio. (Many providers have used the bulk of their resources on local employer engagement and prioritization of competencies for integration into curriculum and by the time the instructional materials are developed and published the process needs replicated to keep pace with changing environments and skill requirements). Another entity to keep pace with industry skill requirements and the availability of resources is needed.

9. AN EVALUATION FRAMEWORK FOR THE DEVELOPMENT AND IMPLEMENTATION OF THE OHIO SKILL STANDARDS INITIATIVE SHOULD BE ESTABLISHED. A CORE COMPONENT OF THIS ONGOING EVALUATION SHOULD ADDRESS THE BENEFITS/PAYOFFS TO EMPLOYERS IN TERMS OF PRODUCTIVITY GAINS AND WORKFORCE QUALITY.

The literature on evaluations of skill standards is not strong. It is important that Ohio measure, monitor and evaluate both the process of designing and implementing a statewide skill standards initiative and the outcomes of skill standards utilization. The outcome evaluation must address the outcomes for both providers and workers. It is equally important, if not more so, to document the outcomes of skill standards for employers in term of worker quality, worker retention, cost effects, and productivity. This is the information required to truly mobilize the employer community in support of skill standards. Unfortunately, this information is not presently available. Ohio can make a significant contribution by addressing this unmet need.

PART III
NATIONAL OVERVIEW OF SKILL STANDARDS

NATIONAL OVERVIEW OF SKILL STANDARDS

PREFACE

This report is one of several being produced for the Governor's Workforce Policy Board of the State of Ohio, which has commissioned a study of the potential use of skill standards throughout the workforce development system of the state.

The Institute for Educational Leadership (IEL) has the lead responsibility for providing a national overview of how the federal government, other states, and national industry associations are developing and using skill standards. This report includes information, in three notebooks, on six of 16 career clusters in the U.S. Department of Education's (ED), plus a miscellaneous grouping of credentialing programs in several occupational areas sponsored by industry or professional organizations. The categories were determined by the Cleveland State University team as being most relevant to the economy of the state of Ohio. Included are: (1) Business and Administration; (2) Health and Human Services; (3) Manufacturing, (4) Information Technology, (5) Education and Training, and (6) Hospitality and Tourism. The notebooks also include certifications in other clusters that are related to these priorities. This is resource material that tells the reader what exists or, more to the point, what has been found by either the National Skill Standards Board (NSSB) or one of the projects funded by ED.

A key part of this national overview is a multi-state review of how key states use skill standards. IEL, along with Cleveland State University, identified nine states to contact. The results of this survey are contained in this report.

The report also provides an overview of the current state of practice and suggests ways Ohio can improve the state of the art by actions of state workforce policy makers.

A STATE OPPORTUNITY TO PROMOTE A QUALITY WORKFORCE DEVELOPMENT SYSTEM

WHY SKILL STANDARDS?

Skill standards are a tool that can be used by the workforce development system to:

- engage the employer community in helping to design workforce development products and services;
- meet the needs of key industries;
- inform consumers (students, job seekers, and current workers) about requirements of the workplace;
- allow individuals to provide proof of their knowledge, skills and abilities;
- help market publicly financed education and training programs to individual employers;
- provide public and private sectors alike with information to monitor results and promote quality assurance; and
- reduce costs of a state's education and training

This report will help to establish a road map for using this tool, called *skill standards*, across the various component parts of the state's workforce development system.

Skill standards are common tools of industry used for a myriad of purposes such as determining who is permitted to sell a house, perform surgery, and connect a power line. It is therefore not unexpected, when talking with representatives of the private sector, to hear that they are often surprised that suppliers of education and training do not have the same tradition of using skill standards as a basic tool in workforce preparation. By establishing a skill standards-based system, it is possible to focus the interactions between individual employers, employer associations, and the various public sector partners in an effective and efficient manner. It is the employer community that must articulate the workplace skill requirements within the economy, but it is not efficient to do so on a case-by-case basis. In order to generate maximum impact, it is necessary to have a widely recognized and commonly used organizational framework around which skill standards are developed and which can be used by multiple actors and for multiple purposes.

Skill standards can provide a common framework to assist education and training providers develop competency-based curricula, and provide articulation strategies and program approval techniques to develop a more coherent program of study, moving from the general to the occupation/job specific. Using standards-based tools can also support economic development activities at the local and state levels of government to help promote growth of different industry sectors. By using industry-valued skill standards as a key organizing tool throughout the workforce development system, there is an opportunity to ensure successful implementation of the Workforce Investment Act through state and local Workforce Investment Boards, the business community, and the education and training communities. The term *industry-valued standards* is key, meaning one must look beyond the borders of a state to help build the road map.

STATES – A CENTRAL ACTOR

States have long played a pivotal role in the development and use of skill standards for a variety of purposes including consumer protection through state licensure laws that allow individuals the right to practice in a particular profession or trade. Many of the state licensure bodies are connected to national voluntary organizations that establish the content of the knowledge, skills, and abilities (KSAs) required in the workplace (e.g., the law profession).

Skill standards are a key tool to a state's success in tying industry needs into the public education and training system. In economic development, the state, working in concert with the private sector and local communities, establishes target industries for growth that can help define the skill standards of most importance for the state. Skill standards can be used to help development officials market the skills of the workforce and structure training to attract or keep companies.

In education, it is the state that establishes the governance framework for the public education systems, defines the powers of the individual institutions, establishes the input (e.g. qualifications of instructional staff) and output standards (e.g. graduation requirements), and in most cases, provides the bulk of the fiscal resources. Increasingly states are developing more holistic K-16 strategies in order to promote more choice for individuals, minimize redundancies in credit requirements among institutions, and reduce cost of education for the individual and taxpayers alike. Skill standards are useful tools for all of the above purposes.

For any organization wanting to promote wide use of skill standards they must find ways to do so in the context of state law, regulations and/or implementation strategies in order for individuals to have access to the standards in their programs of study. Thus, states are in a pivotal position regarding the use of skill standards. However, the reality that industry does not operate only within the jurisdiction of individual states must be recognized.

NATIONAL CONTEXT

The United States has a strong tradition of using voluntary networks that mix public and private resources to achieve a common goal. An example would be developing research and development networks to expand the growth of key industries through Advanced Technology Centers or supporting the American National Institute of Standards, a non-governmental organization representing the United States in all international standard-setting bodies, such as the International Standards Organization (ISO). This is most certainly true in the realm of skill standards. There are multiple organizations that have developed certification programs to meet the needs of a particular profession or industry.

Work-related standards (now known as *skill* standards) have been around for hundreds of years. They form the basis of how a profession is defined (e.g. law, the different branches of medicine, architecture, engineering). In the crafts and trade occupations, the content of apprenticeship training is guided by the requirements of the workplace. The private sector has been the primary torchbearer focusing on the requirements of the workplace as the framework to determine the KSAs needed for an individual to become a productive member in a specific workplace or profession. No complete listing exists of all the different organizations, professions, associations, or the work-related standards themselves, all of which would number in the thousands; there probably never will be such a listing,

The use of skill standards is not restricted to traditional professions and occupations. In the past decade, the "newest industry," information technologies (IT), has followed the tradition of other industries. As this sector has grown, it has turned to the use of certification of workers as the key

tool to document the KSAs of many of its workers – particularly the technical workers. The expansion of the IT sector has led to an increased number of certification programs. For example, the number of professional, industry and trade organizations offering certification has grown substantially over the past several decades, from about 120 in 1965 to more than 1,600 in 1996. A survey of more than 1,500 associations reported that 26 percent offer a program leading to certification or licensure.[11]

Just a little over a decade ago, using standards as key instruments of education and training programs gained renewed interest on the national policy agenda. This interest was driven in large measure by the search to find the appropriate tools to improve the quality of our public education system. Thus, the now familiar emphasis on establishing academic standards became part of the nation's education agenda. Simultaneously, attention was given to the development of a more user-friendly and pervasive system of skill standards. The National Skill Standards Board (NSSB), established by the National Skill Standards Act, is charged with establishing a voluntary, national system of skill standards, assessments, and certification to ensure a skilled and productive workforce for the United States. Participation in the development of skill standards and the use of them is not mandated. The Board draws upon the private sector to provide guidance for the development of the system and is charged with the responsibility of working with both public and private organizations to establish a framework within which organizations can come together to collaborate in the development of skill standards. The Board links certification services of the private sector with the work of the public supply-side organizations responsible for educating and training the current and future workforce.

A central feature of the National Skill Standards Act of 1994 is that a range of interested parties must be involved in the development and implementation of a voluntary skill standards system The Act appropriately gives the lead responsibility to the private sector to identify the priority occupations for which standards will be developed with the intent that employers will be the primary consumers of the standards for hiring and promoting their workers. However, the Act recognizes that employers are dependent on the efforts of others and, most especially, the education enterprise. The legislation assumes the providers of education and training will be evaluated, in part, based upon the standards, and shall simultaneously be:

- a conduit to spread standards to students and institutions alike;
- a user of the standards to develop curriculum and instructional materials; and
- a generator of portable skill certificates.

There is mutual self-interest that exists between the state government and a federally supported, but voluntary, national skill standards system. This mutual self-interest includes:

- building industry networks to maximize employers' involvement in the process and use of standards;
- promoting portability of credentials; and
- minimizing cost.

In order to construct a framework for action, NSSB has divided the economy into 15 clusters (See Appendix A). Within each cluster, a Voluntary Partnership is to be established which will develop skill standards for the cluster with the primary focus being on the skill standards required for front line workers. Voluntary Partnerships are a coalition of representatives within a

[11] Carnevale, Anthony P. and Desrochers, Donna M., "Help Wanted: Credential Required, Community Colleges in the Knowledge Economy, Educational Testing Service", Princeton, NJ, 2001.

specific industry sector that develop a skill standards, assessment, and certification system for a specific industry sector. The focus on front line workers is due to a perception adopted by the NSSB that this is the weak link in the current array of skill standards. This is because most skill standards development work supported by the private sector through industry trade or professional societies have focused on specific occupations and have not been sufficiently linked to the initial entry into the workforce.

Supporting findings by others in the field, NSSB found that clarity and consistency in the definitions used to organize work are essential. NSSB adopted the following language, dividing skill standards into two components.

1. The *work*-oriented component: This aspect of skill standards describes duties performed on the job and the level of proficiency required to perform these duties.
2. The *worker*–oriented component: This aspect of skill standards describes the knowledge and skills an individual needs to have in order to perform at the required level.

The standards developed by the Voluntary Partnerships and endorsed by the NSSB are to include three tiers of work functions (core, concentration, and specialty) and corresponding skills and knowledge (academic, employability, and occupational).

- *Core* refers to the level of description applicable to an entire cluster, such as "transportation;"
- *Concentration* refers to the level of description applicable to broad industry or occupational areas or job families within a cluster, such as "trucking"; and
- *Specialty* refers to the level of description applicable to particular or specialized jobs or occupations within a concentration, such as "tractor-trailer driver."

There are three broad classes of skills and knowledge: *academic and knowledge* skills (e.g., language arts, mathematics, and science), *employability and knowledge* skills (e.g., teamwork, problem solving, and negotiation skills), and *occupational and knowledge* skills (e.g., small engine repair and double-entry bookkeeping).

The current (2001) status indicates four voluntary partnerships are operational:
- Manufacturing;
- Sales and Service;
- Education and Training and
- Hospitality and Tourism.

The first two have published standards that have been endorsed by the NSSB. NSSB has a comprehensive endorsement process for approval of core and concentration skill standards and assessments. The process includes specific, well-defined work components and key quality assurance checkpoints. At these checkpoints, work submissions are evaluated by NSSB's Endorsement Review Panel (ERP), composed of independent, nationally recognized Industrial/Organizational Psychologists.

In addition, the NSSB is now recognizing quality certifications developed for specialty occupations in a number of industries by developing rigorous criteria to identify those certifications whose development processes meet expert professional and technical standards for quality assurance. NSSB Certification Recognition gives users a benchmark to choose the best certifications based on nationally recognized, skill standards developed by industry trade associations or professional societies.

The use of the aforementioned definitions has not yet been widely adopted outside of standards development organizations financially supported by NSSB, but it is anticipated that over time, as is the case with all voluntary initiatives, their definitions will begin to permeate the standards development community.

There have been calls for a common format for all standards from many educators who have found it frustrating to deal with the many different approaches being used by national organizations. However, it is doubtful that a single common one-size-fits-all format will soon exist. Different customers have different needs. Educators use standards to frame curriculum while credentialing organizations are focused on developing test items. NSSB has already found that their standards documents are not as user-friendly for educators as they need to be. This is specifically the case for the skills and knowledge (academic, employability, and occupational) components of their NSSB-endorsed skill standards. NSSB is currently working with the Manufacturing Industries Careers Alliance, sponsored by the National Association of Manufacturers and a consortium of 16 state education agencies (V-TECS, Vocational-Technical Education Consortium of the States), to establish a common format that meets the needs of educators, which NSSB would then promote throughout the system. This approach would help promote a national system that generates products to meet different customer needs.

Another major federally supported effort to promote the infusion of skill standards is one supported by the U.S. Department of Education Office of Vocational and Adult Education (OVAE). This is an important new direction for those involved in technical education because it is a deliberate effort to broaden and deepen the value of career-technical education in the United States. There are 16 career clusters in this schema that reflect a new direction for education (See Appendix B). There is only a modest variation between NSSB and OVAE's approach to clustering. The variation is driven in part by the needs of the end users, which dictates how classification systems are constructed. Each cluster consists of entry level through professional level occupations in a broad industry area and includes both the academic and technical skills as well as the knowledge needed for further education and careers. A key reason for this new approach is the recognized need to move vocational education beyond its traditional, narrow, job-specific focus. These clusters provide an organizing tool to assist educators, training organizations, counselors, and parents in their work with students, high school through postsecondary levels, to identify their interests and goals for the future. All states are involved in the development of this new approach through the aegis of the National Association of State Directors of Career-Technical Education with technical support provided by V-TECS, which has a long history of supporting states in the development of skill standards materials.

Although national resources exist that can be tapped by a state, there does not yet exist a one-stop shop for skill standards at the national level. Several sources must be accessed and, with the advent of websites, the task of information gathering is becoming easier to manage. Websites, however, do not replace the more powerful approach of using state industry trade association to connect Ohio to the most important national resource in the skill standards community – the employers. These connections to organizations provide the portable credential certifying that the individuals meet the KSAs required in the workplace.[12] A portable credential is one commonly recognized by industry that easily allows an individual to show that the skills gained in one state are recognized in another.

[12] As noted in the preface of this report, a three-volume resource document has been provided under separate cover providing information about such organizations.

It is important to recognize some challenges remain in these nationally supported efforts to engage employers. The majority of individual employers do not have the time, expertise, resources or, indeed, the interest to participate in the development of the organizations and products. It is from larger companies that most employer representatives have been drawn as members of the NSSB-sponsored Voluntary Partnerships. It is necessary to use networks and/or organizations known and trusted by employers to act as brokers for employers – thus, the strong reliance upon industry trade associations. NSSB is increasingly building strong alliances with industry trade associations that have been chartered by their members to be engaged in standards-based work. However, not all industry trade associations have strong state and local networks. This lack can hamper marketing of standards and the infusion of standards in both the workplace and throughout the supply chain of education and training institutions. This is an issue that any state needs to be cognizant of when becoming involved with industry associations in order to improve the workforce development system in their state.

LESSONS FROM STATES

Experience at the state level in the use of skill standards is not new, particularly in career-technical education (formally called vocational education). Using skill standards for career-technical education has been supported by the federal Perkins legislation for over a decade and the state of Ohio has been recognized as a leader in this area for several years. It has developed skill standards specifically for the state. It was recognized from the outset there was no state that had yet developed a comprehensive one-stop/full service system for the infusion of skill standards throughout the workforce development system in a state. The following states were chosen either because they have a history and reputation regarding skill standards or because they have state characteristics similar to Ohio's. These states are:

Florida	Michigan
Georgia	Pennsylvania
Illinois	Texas
Indiana	Virginia
	Washington

This review considered the roles of multiple agencies (general secondary education, career technical education, postsecondary institutions, and state workforce development boards and agencies) and their specific use of skill standards in their policies, practices, and local program approval processes. The review looked at:

- how a state organized its work around skill standards;
- how a state engaged the employer community; and
- how the standards are used and by whom.

Particular emphasis has been placed on learning how or whether the state uses nationally developed skill standards because of the work of the National Skill Standards Board and specialty organizations described earlier. (It was not surprising to find that all of the states used at least some nationally developed skill standards and have adopted/adapted national skill standards to meet their own purposes. In some cases national standards were not available and the state then developed their own standards). The protocol and the request for an interview were sent to leaders in workforce development, vocational education, and Tech-Prep. Five of the calls were group interviews, with more than one person involved in responding to the protocol. (See Appendix C for the protocol and Appendix D for summaries of the interviews.)

ORGANIZATION

Among the nine states, only Texas and Illinois have separate entities whose primary purpose is to endorse skill standards for use within the state while Indiana has the "Workforce Proficiency Panel," established by Indiana Public Law, which also works on curriculum for existing vocational programs and develops written and performance-based scenario assessments so industry-recognized Certificates of Technical Achievement can be awarded. The other six states house skill standards in existing state organizations. (See Table 1 for details.) Skill standards help support the mission of the state of Washington's Workforce Training and Education Coordinating Board (i.e., the state workforce investment board or WIB) which is, "to bring business, labor, and the public sector together to shape strategies to best meet the state and local workforce and employer needs of Washington in order to create and sustain a high-skill, high-wage economy". The others are housed in education agencies.

DEVELOPMENT PROCESSES

In Illinois, Indiana, and Texas, standards are developed through industry committees whose work is endorsed or approved by a state council. Illinois has identified 14 industry sub-councils, which will soon increase to 16, to reflect the U.S. Department of Education's clustering system. Not all are active; those that are active have a standards development council whose work is endorsed by the Illinois Skill Standards Council. Texas has standards developed by an industry group, referred to as the Industry Technical Advisory Group (ITAG), with the Texas Skill Standards Board endorsing their work. Texas has organized its work around the NSSB clusters and adopts standards developed nationally by associations or the NSSB when a Texas industry indicates interest. In Indiana, a State Technical Committee (STC), comprised of key stakeholders within a specified occupational cluster, is the moving force. Unlike other states, this committee also examines performance-based instructional practices and assessment strategies, which are used in the issuance of certificates of technical achievement. If instructors have questions about content, these are sent back to the STC for final determination.

A number of states, when asked about the cost of their skill standards activities, did not identify the amount, not because they were reluctant to provide the information, but because they could not separate skill standards activities from other responsibilities. The range is from $146,000 a year up to $1 million spent on skill standards activities, with the source of money varying, but with Perkins and state dollars being mentioned most often. Michigan has used its tobacco settlement dollars to establish assessment centers.

The final products and services of the work by these different organizations are skill standards for use by both education and industry within the state for curriculum and instructional design or credentialing services. They have organized their product development work around: (1) the National Skill Standards Board (NSSB) clusters; (2) the U.S. Department of Education clusters initiative; or (3) some combination of their own making. The national clustering systems have not had much affect on the states' activities to date since most states have other criteria by which they choose standards. For example, Illinois endorses standards for occupations with a future demand critical to the economic competitiveness of Illinois and that meet a salary range of $18,000 - $43,000 (1995 dollars).

Staffing showed variation as well. The state of Florida has 18 staff working on vocational standards in its division of workforce development in the Department of Education. More

common are states that employ between one to four staff that are involved in standards work part-time; these states use consultants to augment the work.

Table 1
Development Processes

State	Authority	Responsible Entity/Audience	Budget and Staff	Product	State Role	Assessment
Illinois	Legislation	IOSSCC /Grades 9-14 Managed by St Bd of Ed	$500,000 Perkins, STW, Goals 2000, ES Contracts with Southern Ill. University for staff	42 sets of endorsed standards in 9 of 14 clusters Used voluntarily	Providing the standards and encouraging their use.	No statewide assessments. Encourage use o national assessments Priority is to hel teachers develop assessments
Indiana	Legislation	Workforce Proficiency Panel/9-14, WIA Managed by Dept of Workforce Development	$1,000,000 Perkins 4/FTE	State- developed industry-driven standards in 8 broad occupational areas	Providing training and assistance to local areas; encouraging development of standards by Industry Subcouncils; certifying individuals (certificate from Gov.)	Locally developed scenario assessments; Certificates of Tech Achievement
Michigan[13]	Legislation and Executive Order	Council on Technical Excellence/9-12, Adult Ed, WTW Managed by Dept of Career Development	$500,000 Tobacco Settlement $$ and as needed from Department of Career Development	MI Career Readiness Certification Program (2002) Based on Work Keys competencies	Laying groundwork and providing seed money for WorkKeys service centers offering job profile and test-scoring training	Credential and/o certificate
Pennsylvania ED	Director's initiative	Bureau of VT Ed 9-12; Adult Ed	$300,000 for NOCTI testing State funds	Credentialing system based on required NOCTI tests; Resource book of 80 SS providers	Provide resources and pay for testing	State- or nationally-recognized credentials
Pennsylvania WIA[14]	Workforce Investment Board	Charged with organizing entire workforce system, not just WIA-eligible				
Florida	State Code	Dept of Education/ Grades 7-14	Not known Perkins, general revenue/18 staff in Dept	Locally developed and nat'l skill standards	Providing, promoting the standards and changing the frameworks	No standard assessments Some districts exploring industry

[13] Dept. of Career Development also funds development of competency-based curriculum by secondary and post-secondary institutions in partnership with professional (industry) associations.
[14] Surveying WIBs to see what standards, competencies, credentials, etc. they are using and why.

State	Authority	Responsible Entity/Audience	Budget and Staff	Product	State Role	Assessment
			of Education to work on vocational standards		based on local action	certification
Georgia post-secondary	Legislation	State Bd of Technical and Adult Education/ 2-yr colleges and 4-yr with tech programs	$750,000 Perkins, and general revenue/seven staff but not full time on this	Industry-developed and state approved competency-based curriculum standards for postsecondary	Approves and disseminates the curriculum	Construction and Manufacturing Specialty Certifications
Georgia K-12	Department initiative	State Bd of Education/Grades 9-12	$500,000+ Perkins and state/ consultants are used as staff	Competency-based curriculum. Standards (based on Nat'l SS, exemplary programs)	Determines core curriculum and standards	Industry-recognized certifications
Texas	Legislation	TSSB/2-yr colleges, WIA Staffed by TCWEC	$152,000 from TCW to TSSB	Voluntary program with 20 state-approved standards	Promoting, recognition	
Virginia	State Code	State Bd of Ed/ Accountability Council and grades 9-12	$50,000+ from Perkins State Leadership $	Certification program based on industry-recognized standards	Approving programs and curricula, establishing essential competencies	Certification exams of approved programs
Washington	Board Initiative	State Board CTC/ 2-yr community colleges	$750,000	25 sets of industry-based standards	Provide leadership, policies, conceptual design and dev. funding	

STATE AND LOCAL PROCESSES

We asked state representatives about their roles and responsibilities in skill standards *vis a vis* local entities and institutions. Like Ohio, many of the states interviewed are "local control" states throughout their education and workforce development systems. While there are variations of state vs. local roles within the different components of the education and training enterprise, many key decisions are made at the local level regarding the use of standards-based materials. The states have provided leadership mainly by creating curriculum frameworks, supporting staff development activities, providing materials endorsed by industry, and other forms of encouraging the use of standards-based material.

Georgia, for both K-12 and postsecondary, has the strongest state role. The state establishes curriculum and standards and defines the form of certifications that are acceptable. In the case of career and technical education, Georgia is a strong advocate of using national industry-endorsed certifications if they exist and has established their own state-based certifications when no national ones exist. Virginia, another state that plays a strong role, has established the essential competencies that must be included in all academic and career and technical education programs and is currently in the process of recognizing certification exams for their approved programs.

For other parts of the workforce development system, particularly the non-credit training funded by the Workforce Investment Act (WIA), Welfare-to-Work or state economic development focused training, minimal attention has been given to sorting out what functions are best performed at the state level vs. the local level as it relates to using standards-based materials to drive the design of programs or quality assurance strategies.

Table 2
State and Local Roles and Responsibilities

State	Endorsing Entity	Use of National Skill Standards	Criteria	Developer	Process
Illinois	9-member, Gov-appoints Illinois Occupational Skill Standards and Credentialing Council (IOSSCC)	Analyzes them before developing their own Has found them to be primarily lists of tasks and equipment, with no quality component IOSSCC requires a time element or tolerance range in each standard	1) Require basic workplace skills and tech training; 2) Occupation with future demand; 3) Critical to economic competitiveness of IL; 4) Meet salary range of $18,000-$43,000 (1995 dollars)[15]	14 industry subcouncils (moving to 16), each with an industry standards development committee (ISDC)	1. Researchers from Southern Illinois University work with an ISDC. The researchers determine what's out there, and then prepare an outline of the standards. They then work with incumbent workers and supervisors from all over the state to flesh out the outline, doing task analyses 2. Once standards developed, 2-3 educators are brought in to determine whether the standards are understandable. ISDC provides clarification if needed 3. Standards reviewed by ISDC, and then sent to industry subcouncil for review and approval. Subcouncil sends standards on to IOSSCC for endorsement

[15] If occupation doesn't meet salary range, but is part of a career ladder where the top of the ladder is in the range, the occupation can be recognized as part of a *cluster*.

State	Endorsing Entity	Use of National Skill Standards	Criteria	Developer	Process
Indiana	Gov-appoints Workforce Proficiency Panel (WPP)	Use as reference materials	High wage; high demand; and economic development target by state Dept. of Commerce	State Tech Commission comprised of key stakeholders within specific occupational cluster	1. STC and staff meet to identify 5-year direction of industries in occupational. Areas represented. Staff invited to conduct on-site visits at work sites 2. During visits, staff meet with incumbent worker group (IWG); employees nominated by STC members, to conduct job task analysis and focused interviews 3. STC meets to review lists of broad skills validated by IGW. Later, IWG members meet at one of 3 regional gatherings to identify applications that can be identified as industry-wide standards. Staff mails survey to additional 120 employers in the industrial area 4. IWG members meet with Instructional Review Team (educators) to recommend performance-based instruction practices and assessment strategies 5. STC meeting for review of survey data and drafts of essential skills and tech proficiencies. STC ratifies standards and recommends approval by WPP
Michigan	9 member, Gov-appoints MI Council on Technical Excellence (MCTE)				Department of Career Development has proposed a Work Keys-based career readiness certificate/credential to the MCTE
Pennsylvania	Bureau of Vocational Technical Education	NOCTI Tests; National industry-based skill standards/credential programs	1) nationally validated curriculum 2) require teacher training 3) require facility inspection (real, virtual, paper)		Bureau developed list of some 80 industry-recognized standards/certification programs for school systems can use

State	Endorsing Entity	Use of National Skill Standards	Criteria	Developer	Process
Florida	Division of Workforce Development, FL DOE	Did lots of crosswalks to nat'l skill standards		State Technical Committees (STC)	State began work in 1970s. Local areas indicate need and work through tech commission to develop or update. Conduct DACUM or modified DACUM. Bring in panel of incumbent workers, with statewide representation, large and small employers. STC reviews and approves, then have different stakeholders look at them. A state entity, composed of 2 gov-appt'd reps and reps from CCS and sds used to approve; now Bureau head and rep from CCS review requests.
Georgia postsecondary	State Board of Technical and Adult Education	Looking to build nat'l standards/ certifications into curriculum		State Tech Commission	STC for each program propose updates to curricular frameworks, although local faculty commission and local ind. comms. can propose action. Updates undergo a statewide review by a committee of faculty and presidents to identify any admin or institutional problems.
Georgia K-12	State Board of Education	Use national skill standards as well as exemplary programs in other states and in GA		Division of Technical/Career Ed	Division consultants look at nat'l SS and exemplary programs. Conduct site visits with groups including teachers and industry reps. Develop outline to present to groups of teachers/business. Division develops curriculum standards (based on nat'l standards or certification program) with help from educators, present them to State Bd of Ed and provide time for feedback from the public on their web site.
Texas	11 member, Gov-appoints Texas Skill Standards Board (TSSB)	TSSB has worked with nat'l groups and with NSSB	State has developed protocols and format	Industry Technical Advisory Group	The first 4 standards efforts were developed through community colleges. Now ITACs develop the standards.

State	Endorsing Entity	Use of National Skill Standards	Criteria	Developer	Process
Virginia	Board of Education appoints Accountability Council (External entity that approves all alternatives tests to state's Standards of Learning assessments—academic and certification)	Each certification must be from a recognized industry, trade or professional assoc. and includes NIMS, ASE, NALS, along with Oracle, Microsoft, etc.	1) in Career/Tech Ed field that confers certification from a recognized industry, trade or assoc 2) standardized and graded independently of where student is enrolled 3) knowledge-based 4) administered on multi-state or int'l basis 5) course of study is designed to prepare student for occ or occ area or for college-level credit in technical occupation	Office of Career and Technical Education	Research new certification programs and review current ones. Programs meeting criteria are recommended to and reviewed/approved by the Accountability Council
Washington	State Board for Community and Technical Colleges	Grantee researches national standards to regional or local level Standards developed nationally or by other states are reviewed by SBCTC using criteria that compare those with the state's development process	Have an established set of criteria (and format) for development		Proposals are submitted to SBCTC either by a local college and its partners (business, labor, K-12 system) as need emerges or STCTC identifies a need and seeks out a partnership to develop the standards. Grantee researches national standards as well as those developed by other states. Conducts a focus group of front-line workers, calls people from across the state to validate, then SBCTC publishes the standard

STANDARDS USES

We asked which state organizations and providers used skill standards and how they used them (See Table 3). Standards among the states contacted tend to be used foremost by educational vocational programs at the postsecondary level and secondary vocational education programs. States develop and adopt standards or curriculum framework and make them available to educational institutions.

The standards for programs that WIA has established are just now being examined for various other applications within the states. Pennsylvania is surveying its 22 local WIBs workforce investment boards to get a picture of what standards, competencies, and credentials the WIBs are using and for what reason. Indiana has overlapping membership between its panel and the state WIB, thus ensuring that the standards have been introduced to that body. Several states specifically mentioned that standards are being used in their welfare-to-work programs.

Below are some examples of the three primary uses of standards.

Curriculum development. Georgia has five broad program areas: Business, Marketing and Information Technology; Family and Consumer Sciences; Health Occupations; Technology Education; and Trade and Industry. First, consultants look at national skill standards of exemplary activities in other states and of exemplary programs within Georgia. Next, its Technology Career Education Division within the Georgia Department of Education brings in teachers and business/industry representatives who visit sites in Georgia and in other states to look at their activities. Once there is a clear idea of what should be in the curriculum, the material is presented to groups of teachers and businesses. Department of Education consultants develop the curriculum standards (based on national materials where available) and, with help from educators, present them to the state school board, allowing feedback from the public on their web site. Finally, the State Board approves the curriculum standards after the public has provided feedback through the website. Georgia started this process in summer of 2000, has completed 40 percent of the curricula, and anticipates completing another 40 percent by June 2002.

Program approval for providers. Program certification is viewed as a key quality assurance tool by industry associations that have been involved in standards-based work. In Virginia, the state takes the lead from industry, so if a national sponsoring association requires program certification, such as National Institute of Metalworking Skills (NIMS), Virginia requires it as well. In addition, if the industry association requires some guarantee of a teacher's knowledge related to the standards, the state works with school divisions to help them implement this by providing matching grants to pay half the cost of teacher certification. In the past three to four years, the Office of Career and Technical Education (CTE) has spent $340,000 to help certify between 700 – 800 teachers. School divisions can use the grant money toward costs involved in program certification as well.

Assessment of students. In all the states interviewed, the most embryonic part of the workforce development system is the assessment component, although Georgia and Virginia appear to be infusing assessment into some parts of the system and rely heavily upon national credentialing

organizations. However, at this point, no state has an overarching strategy for assessment that links parts of the education and training system. This does not mean that nothing is being done in this about assessment.

In Indiana, individuals are awarded Certificates of Technical Achievement (CTAs), documenting skills that they demonstrate and standards that they meet. Through a performance-based scenario assessment system, Certificates of Technical Achievement document an individual's application of essential skills and technical proficiencies. The scenario assesses the work employers expect to be performed and the consistency with which they expect it to be performed. Individuals, whether students, incumbent workers, or adults, who demonstrate they can perform the scenario each time they are called upon to do so are eligible to be awarded Certificates of Technical Achievement. The Indiana Department of Workforce Development certifies each assessment site, and site staff has been trained to follow the assessment protocol and conduct assessments leading to Certificates of Technical Achievement. This process ensures that each Certificate awarded has value. Assessors can be any experts working in the occupational area in which assessment will occur. The assessment site staff is responsible for maintaining the validity of the assessments and the assessment process. Involving employers in the assessment process is required at education-based sites and builds closer alliances between the school-based training environment and the work performed in the workplace. Pennsylvania's Career and Technical Education has made it mandatory for secondary vocational education programs to use nationally normed test provided by National Occupational Competency Testing Institute (NOCTI) for their programs.

Michigan has chosen to focus its work-related assessment efforts on general workplace skills. The Department of Career Development has proposed the use of private assessment and certification, Work Keys, throughout the state as a way of assessing individual's employability for secondary education and welfare to work programs. It will also be used in WIA programs at a later date. The certification is based on the Work Keys competencies: reading, writing, locating information, and applied math. Illinois also uses a part of the Work Keys battery of tests in the eleventh grade state-mandated Prairie State Exam.

Table 3
Use of Standards

State/Initiative	Curriculum Dev	Program Approval	Assessment	Education Accountability	Other
Illinois Occupational skill standards	Secondary education Postsecondary education (At discretion of individual institution)	• Use of standards required for approval of secondary and postsecondary programs for Perkins $ • WIA criteria call for using occupational skill standards in next several years	• Secondary education (no statewide assessments of skill standards; looking to help teachers develop assessments) • Some companies have contract with workers for promotions, for evaluations	All 11th graders take Prairie State Exam, one portion of which is ACT, 2 parts of Work Keys	• Articulation agreements between secondary and postsecondary • Career planning software for middle and high school students
Indiana Occupational skill standards and certification of technical achievement (CTA)	Secondary education	• CTA is one measure for companies seeking economic development grants. • State vocational education funding formula incorporates training in high skill, high wage, high demand occupations, but not actual certification • Task analysis required for workforce literacy grants. Inclusion of CTA gets extra points	Secondary education Postsecondary education Companies (Incumbent workers) One-stop Centers	State academic standards include teamwork, communications	New community college system has "centers for certification"
Michigan Career Readiness Certification Program	Somewhat for secondary education[16]		Secondary education Welfare-to-Work Work Keys	Alternative method of qualifying for state's Merit Scholarship	
Pennsylvania ED Industry-based credentialing system		NOCTI credentials are mandatory	Secondary education		

[16] Dept. of Career Development funds development of competency-based curriculum by secondary and postsecondary institutions in partnership with professional (industry) associations.

State/Initiative	Curriculum Dev	Program Approval	Assessment	Education Accountability	Other
Pennsylvania WIA					Interested in skill sets/entry-level competencies for a particular industry
Florida Vocational curriculum frameworks	Secondary education Postsecondary education		No standard assessments; all locally derived	Crosswalked curriculum frameworks to academic Sunshine State Standards	Some districts exploring industry certification
Georgia post-secondary Vocational curriculum standards	Postsecondary education	All technical colleges have to be approved by state board, and any program offered has to be approved (required to teach to state curriculum standards)			
Georgia K- 12 Vocational curriculum frameworks	Secondary education		Developing statewide assessment system for secondary students	Work readiness objectives covered in state's quality core curriculum and embedded in content objectives, e.g., solve problems, attendance, working with others	Crosswalking secondary standards to postsecondary standards in articulation for credit
Texas Occupational skill standards	Postsecondary education	Local WIBs must ensure training providers use some type of standards			
Virginia Industry-recognized certification program		• If local program certification is required by sponsoring association, VA requires it as well. • Teachers must be certified to teach course	All secondary ed programs must lead to certification	• Each course must teach essential state competencies as appropriate • Industry certification exam recognized as 1 of 5 exams for standard diploma • 2 new diploma seals approved for tech & math achievement	Postsecondary institutions recognize the standards, no articulation agreements necessary

State/Initiative	Curriculum Dev	Program Approval	Assessment	Education Accountability	Other
Washington Occupational skill standards	Postsecondary education	• Secondary ed adopting new program approval standards that include meeting skill standards where they exist • Extra credit in RFPs and grant proposals if using skill standards	Work underway	Work readiness and standards in state's workforce development plan and workforce education goals for postsecondary institutions	Tech prep articulation agreements

ADVICE FROM THE STATES

Each of the states was asked to reflect upon their own experiences and make suggestions for what they would do if they were in Ohio's current positions. Their advice is summarized as follows:

- Take time to plan before acting. Developing and using standards is complex and planning can save time and money later on.
- During the planning time, determine what Ohio wants to achieve with standards. Standards can improve education and be a tool for business but it helps to know which of these goals is most important for the state.
- Start with goals that involved business. Some states thought that standards were an easier sell to business and then employers could help change education.
- Take time to communicate goals and aims of standards to various audiences and keep communicating.
- Several states touted having an independent body to lead the standards effort but all thought it was important to involve all the relevant stakeholders.
- Be aware that a standards effort requires staff and money and identify sources of both.
- Build on the work of others—other states, industries, or national standards. It will help with number six.

The specific recommendations from each state appear below:

Florida

- Don't reinvent the wheel. Decide what you want it to look like and then go backwards. Use what's there and develop to fill the gaps. Lots of this stuff is free, on the web.
- Do everything electronically from the beginning—it saves money.
- Spend the time planning, then implementation is easier.

Georgia

- Each state has to carve out what's good for them.
- Need to paint a big picture for students, with everyone involved having their component. For the picture to develop as it should, everyone has to be clear how their component fits into that big picture. Otherwise, you're left with a collage of separate, unrelated pictures.
- Found standards initiative to be exceptionally useful to assure training programs are doing what is needed and that there is consistency in preparation around the state. Also found it to be useful in program development process with a fast response time in many areas. Quicker to build a program where it's needed than to start from scratch.

Indiana

- Most important thing is to have a separate entity, independent, appointed by the governor. No other group/board would have been able to get the initiative where it is today.
- Takes a long time to do this, also pretty costly.
- Be clear about the purpose of the standards. Focus on needs of business and industry rather than curriculum. Would have started with incumbent workers instead of education if doing it over again. That audience was only targeted two years ago, but find doing the assessments at a business first, the industry accepts that certification as theirs from the start, rather than first having to sell the educators and then having to sell a local business. Also, this helped bring business and education together, with business playing more than just an advisory role. A business can go to a local school saying we need these skills and knowledge and will hire students with them.
- Plan to do lots of professional development and training.
- Getting into state funding formula would be faster than how Indiana evolved, though they became creative because of lack of funding.

Illinois

- Have a continuous source of funding. Illinois has cobbled together funding from different sources and agencies. Problems getting agencies to commit and then to ante up. Difficult to build annual budget. Goal is to get line item in one agency for $1 million for development of standards, assessment, and certification system.
- Ample staffing. Getting people to do this as an add-on or small part of their jobs often results in things falling through. Top-level administrative support is critical.
- Independent council – business, labor, agriculture, and health. Good because of their connections. Need to partner with the other agencies, makes it a workforce development initiative, not an education initiative, which results in more support.
- Make sure business, industry, and labor buys in. It's easy when there's a surplus of labor, harder when they'll take anyone they can get to fill a job.
- If able to develop standards, certification and assessment as one package, great, but the cost is astronomical. Find it's hard to sell standards to education if there is no assessment.

Michigan

- Need to determine your primary objectives and mission – so many ways to go regarding curriculum improvement vs. industry credentials. What is industry demanding and how do you connect with all employers?
- Student assessment is potentially litigious and complex. What problem are you trying to solve.
- In Michigan, greatest concern was with the academic side and establishing a foundation upon which technical skills can be developed. Plus, in looking at experiences of other states, question ability to cover it all. No state has the resources to develop, update, and sustain an industry-based standards system over the long haul. Need to see the response from industry.

Pennsylvania

- Take look at Indiana's program—excellent certification program with industry involvement.
- Need central staff to carry it out. Lots of work involved to maintain a standards system; also need to determine how valuable it is to industry.
- Be prepared for the cost (such as for testing in PA), but don't let that dissuade you. Cost aside, having students pursue credentials is vital.
- Like NOCTI (National Occupational Competency Testing Institute), because it's not reinventing the wheel, doesn't require a whole staff, is a validated process that leads to national certification, state is not responsible for updating (being done on a 2-year cycle), also strengthens curriculum. Weakness is that it doesn't cover all the areas.

Texas

- Figure out what the state wants to do – are you going to be developer, adopter, or adaptor[17]. If going to be a developer do those things that are critical to your economy in next 20 years.
- Make sure that groups are developing standards to common protocol that has specific recognition criteria.
- Link to national efforts.
- Work collaboratively with states that have mileage.

[17] Developer States

States such as Washington, Illinois, Indiana and Texas develop skill standards that reflect the skill and knowledge needs of industry and business in their states. All these states have specific skill standards nomenclature and formats, as well as development protocols. Developers are usually not adopters, although they may be adapters.

Adopter States

Other states, such as Pennsylvania and Florida could be called adopters of skill standards. These states import skill standards developed by other states or by industry groups for use in their respective states. They disregard the differences in structural format, elements, and nomenclature, using the content to inform education and training in a variety of ways. Because these states have not determined a "standard" (including format, elements and nomenclature) for standards in their states, they typically are not developers nor adapters. These states may or may not slightly modify the standards content to "fit" state needs.

Adapter States

Illinois and Texas are examples of adapter states. Both states import skill standards and adapt them for recognition and use in their respective states. The sources of imported skill standards are most likely to be nationally recognized industry groups such as NIMS. At a minimum, adapter states must crosswalk the imported standards content (matching element by element) with the state's endorsed standards for standards - format, elements, and nomenclature. Adapter states may or may not undertake a statewide validation of imported skill standards. When a content validation process is performed, the original skill standards content will be amended to reflect those skills and knowledge determined to be different. An adapter state is most likely to also be a developer. Because adapter states "adapt", they are not adopters.

Virginia

- Most important for VA was the selection criteria for the credentialing programs. By adopting the criteria used for selecting alternative tests for academic subjects, the education system and industry immediately understood the integrity and high level of the certifications.
- Before teachers can teach a program, they must have certification in it.
- Be prepared for a huge learning curve, in the field and outside, regarding industry certification. People need to learn about content, assessment, and what a certification enables the student to do.

Washington

- Invite skill standards technical and policy experts from leading states to participate in a focused discussion with key representatives of Ohio's industry, secondary and postsecondary education systems to discuss design, support and implementation issues.
- Focused discussions around core design and implementation issues with state experts would prove invaluable and help inform an effective design and pragmatic strategies for Ohio.
- Communicate early—skill standards are an industry document. Faculty meets with local partners. Take sheet of paper to draw out objectives, use that to map what you need for course or program.
- Developing standards is very labor intensive/resource intensive. Important to decide what the successful endgame looks like. Take the time.
- Engage business and industry to demand skill standards. Adds impetus to funding. Helps education change.
- It's never done, always updating, revising. This is a long-term investment. Once graduates are trained to industry standards, business and industry become your biggest advocates. They then move it into their own human resources function.

RECOMMENDATIONS FOR NEXT STEPS

The lessons from these nine states, as well as those derived from the experiences of NSSB, provide key guideposts for the construction of a state-of-the-art workforce development system driven in large measure by the requirements of Ohio's industries. As noted throughout this report, there are several advantages for developing a public/private partnership that uses standards-based tools as a central strategy (albeit not the only one) in the creation of a workforce development system that respects the different roles and functions of the multiple institutions within the state. These advantages include:

1. Standards provide an organizing tool to engage the employer community in an efficient manner and to document the skills required in the key industries of the state.
2. Standards can organize curriculum and instructional materials for use in a wide range of education and training institutions – not just one silo – with the education and training enterprise.
3. Standards-driven processes can be a key part of the quality assurance system for funding agencies to approve programs of study within single institutions and across institutional

boundaries (e. g. articulation between secondary and postsecondary institutions). Also standards-based program accreditation systems can be professional development guideposts to determine the type of training instructors need. Also, information regarding which programs are most successful in assisting individuals gain industry-recognized credentials can become a part of the quality assurance system.

4. Standards-based credentials can increase individual earning power and help them succeed in their career pathways of choice.

As the report shows, there are multiple steps that must be taken for these four advantages to be realized and the work must be given high priority and attention by key policy makers. There are governance and organizational location decisions that must be made. Decisions about how to finance the development of infrastructure need to be addressed. Determinations about the depth, breadth, and range of use of standards-based materials that will be used by different parts of the workforce development system require attention. Priorities about where to start must be established, and building support and marketing cannot be ignored.

WHO SHOULD TAKE THE LEAD TO PROCEED?

Regarding governance and organizational issues, we suggest that skill standards, at least initially, be a responsibility of the Ohio Governor's Workforce Policy Board, the state WIB, much like in the state of Washington, where skill standards oversight reside in the state WIB. WIA is not just a new program but also a way of bringing systems change to the whole workforce development system. The vision of the federal WIA legislation is that these resources will help states establish a system that builds upon substantial investments already existing in the state and bind them together more effectively to meet the needs of citizens. Skill standards may be one of the most powerful tools to realize that vision.

Having such a responsibility can help focus and anchor the work of the Workforce Policy Board and be designed to assist all of its stakeholders. This can help ensure the Workforce Policy Board is meeting a state need as well as acting as an agent to support federal priorities. No other organization within Ohio brings all the appropriate stakeholders—industry, education, and government—together. Similar to the nine states, work can be done with staff from various agencies on a part-time basis, augmented by consultants, using existing funds from Perkins, Tech Prep, and WIA in the beginning. The Policy Board can use its role to study, convene experts and interested stakeholders, build consensus and take action, and provide support to build a new system.

BUILD A SYSTEM THAT GOES SOMEWHERE FOR THE INDIVIDUAL.

Career growth opportunities for individuals should be a fundamental consideration in the overall design of the effort. Therefore, the concept of career pathways becomes important for the ultimate customers (consumers?) as a key organizing tool for all of the work. The responsibilities

of different institutions, however, are not nor need be the same regarding promoting career growth of individuals.[18]

ASSUME THE ROLE OF AN ADOPTER/ADAPTER STATE.

Build upon the work of national industry-endorsed standards as well as that of NSSB and OVAE. It is clearly the most cost-effective approach as well as being the most credible with employers. However, it is important to establish the state's own criteria for quality indicators about which standards to use as baselines, as Washington has done. Consider using materials developed by NSSB for endorsement of specialties or other long-standing quality control organizations such as American National Standards Institute as a base for review criteria.[19] However, as important as it is for the state to establish its own criteria, it is prudent to operate under the assumption that minimal "rework" would be expected of a national industry association to fit their materials into a standard format preferred by the state[20].

HOW TO START?

There are some important early steps.

1. *Decide which industries and occupations are most important to Ohio's economy* and organize the work around those key clusters as an early priority – the Policy Board is well positioned to make such a decision.

2. *Determine which parts of the workforce development system will be a part of a skill standards-based effort*. A state-of-the-art system would include all parts of the education and training enterprise in the state — regardless of the funding sources (e.g. federal vs. state or secondary vs. postsecondary, formal degree-granting institutions).

3. *Organize both educators/trainers and employers*, separately at first and then together. A beginning approach could be to establish ad hoc working groups of employer-led organizations and interested employers to review the range of current national standards and credentialing programs within the relevant cluster and establish a process to "validate" the standards with employers within the industry. Have these employer-led groups help "set the course" to establish the priorities for proceeding (e.g. occupational priorities, validation[21], marketing.[22]). Initially, work with educators on a separate track.

---

[18] The career pathways materials being developed through the auspices of the OVAE projects should provide valuable information in the design and implementation phases of this work.

[19] Information about national credentialing programs has been provided for the state's use as a part of this national study.

[20] Virginia's approach, i.e., assuming it is the public responsibility to do "crosswalks," has merit. That state has also developed software to crosswalk state academic standards with industry standards easily accessible to other states.

[21] There are several cost effective tools that can be used to conduct this local validation such as web-based gap analysis or focus groups.

[22] This is a lesson from Indiana: start with the employers.

Through ad hoc groups, bring together representatives of all "levels" of providers and develop "geographic and numeric access maps " of available programs of study for occupations and industry-endorsed certifications within the career pathway/industry clusters; identify which certifications are promoted by all of the funding sources (i.e. secondary, postsecondary, WIA, TANF, etc.) and conduct a gap analysis—what exists and what is missing.

4. *Determine range of the initiative*. A state-of-the-art standards-driven system would include all three primary uses of standards-based materials:
   - informing curriculum and instruction;
   - ensuring quality of programs through a range of measures including program accreditation[23]; and
   - promoting industry-valued credentials.

These various uses have different cost implications, are in different stages of readiness for implementation, and need to be addressed differently by various parts of the education and training enterprise. However, as a beginning step, the Policy Board could review current policies and practices and establish priorities for action that will eventually lead to a more seamless system. For example, assessments and certifications within WIA and programs funded by Welfare to Work appear to be the weakest links in the use of industry-driven documentation of knowledge and/or skills acquired while participating in government-sponsored programs. Thus early attention needs to be given to correcting this deficiency.

RECOGNIZE A LONG-TERM NEED TO DEVELOP AN OVERARCHING ASSESSMENT/CERTIFICATION OF COMPETENCIES STRATEGY FOR THE WORKFORCE DEVELOPMENT SYSTEM.

It is beyond the scope of this study to suggest what needs to be included in such a strategy. However, the desirability of developing such a strategy seems obvious. If the initial vision is built upon the assumption that it makes sense to eventually connect-the-dots across institutions, then the work undertaken in a limited number of clusters can inform this larger need. After a year or so of experience, it may prove timely to support a study group to help inform the next steps.

BE OPEN TO SUPPORTING A NETWORK OF DEMAND SIDE BROKERS.

While state government is pivotal in undertaking the aforementioned tasks, the reality is that the full potential of using the powers of the state government will not happen without strong leadership from a central consumer group – the employer community. This community must provide sustained and cross-industry, coordinated leadership to help ensure the political and professional leadership of the state will have the necessary support to penetrate the state's education and training systems, culminating in the development of meaningful support structures. Experience suggests that in order for there to be cross-industry coordination of leadership support, employer and public institutions will need to work in collaboration with one

[23] See Florida, Georgia, and Virginia for examples of how standards can be used as a part of a quality assurance system.

another and this may well require that fiscal support be provided to industry associations along the way for different tasks such as marketing to employers.

FINAL THOUGHT

The good news is that Ohio can build on national efforts, learn from other states, and establish a state-of-the-art, standards-driven workforce development system. However, this journey is not for the faint of heart, nor will a quick silver-bullet solution emerge in the next three to six months.

PART IV
SKILL STANDARDS UTILIZATION IN OHIO

TABLE OF CONTENTS

PREFACE

This report is one of several being produced for the Governor's Workforce Policy Board of the state of Ohio, which has commissioned a study of the potential use of skill standards throughout the workforce development system in the state. The state scan of skill standards utilization has been undertaken by a unique partnership comprised of the Urban Center at Cleveland State University, the Joint Center for Policy Research at Lorain County Community College, the Institute for Work and the Economy at Northern Illinois University, and Capital Partners – a private firm specializing in public policy advising and management strategies in Ohio.

The overall intent for this work was twofold. The research was intended to:

1) Assess the nature of skill standards utilization among employer-led organizations and education/training providers in Ohio (including secondary education, post-secondary education, career and technical education, welfare-to-work, and workforce investment boards).

2) Recommend strategies to promote and facilitate the development and utilization of skill standards, assessment, and credentialing, including possible state roles in skill standards applications and workforce development.

The guiding principle for this work was that skill standards are a *potential* organizing tool from which to develop and build greater coherence among education/training systems and the business community.

This report addresses the nature of skill standards utilization among education and training providers *only (not employer-led organizations)*. To develop a map of skill standards utilization across the workforce development system, a series of key informant interviews were conducted *primarily* with persons in state-level education/training positions. It was beyond the scope of this research to interview every public school district, career center, institution of higher education, local workforce investment board, or union apprenticeship training program. In some cases, the research team was steered in the direction of regional efforts or individual campus initiatives, but the overall intent was to focus on more systemic use of industry validated standards. In addition, emphasis was placed on utilization of *industry* skill standards with less attention paid to *academic* standards within elementary and secondary education. The only exception was a math and science standards-based initiative in Ohio. This initiative was included because it was an outgrowth of state level activities and represents a potential collaborative model from which policy recommendations might be inferred.

Outlined in this report is a summary of standards based activities among education and training providers along with key observations and *emerging* policy considerations for the state of Ohio.

NATURE OF SKILL STANDARDS UTILIZATION AMONG OHIO'S EDUCATION & TRAINING PROVIDERS

The Institute for Educational Leadership (IEL) in its national report to the Governor's Workforce Policy Board identifies four overall advantages of skill standards utilization. First, skill standards can **enhance employer engagement** in the education and training of individuals/workers. Skill standards by their very nature are intended to *document* workplace skill requirements under "a widely recognized and commonly used organizational framework, which can be used by multiple providers for multiple purposes". Thus, skill standards become a communication tool for greater coherence among education and training enterprises and the business community. Second, standards-based materials can **inform development of curriculum** so industry skill requirements are integrated into instruction and learning at a variety of levels (i.e., elementary, secondary, post-secondary, welfare-to-work, etc.) for a variety of individuals (i.e., future workers, incumbent workers, transitional workers). In other words, integration of validated and documented industry skill requirements into instruction and learning provides business/industry a role in the *design* of education and training services.

Much in the same way that skill standards inform curriculum development by specifying what an individual needs to know and be able to do, skill standards also articulate how well an individual needs to perform. In this sense, skill standards can **help frame individual assessment** (used to test individual learning and achievement) and **individual credentialing** (or "proof of an individual's knowledge, skills, and abilities"). Individual assessment and credentialing that is driven by industry standards helps to assure individuals have the skills necessary to succeed in their careers and that workers possess skills/abilities necessary for company success [Goal 4 of the Governor's Workforce Policy Board Draft Objectives]. A fourth advantage of skill standards utilization as cited in IEL's national report relates to **quality assurance within the workforce development system**. Similar to individual credentialing, information derived from skill standards frameworks can be used as important *criteria* for program approval and instructor training/credentialing. Use of standards-based materials in this fashion can help to create a workforce development system that is built upon *industry-driven performance* criteria (i.e., program approval criteria) which is also used to evaluate the effectiveness of education and training programs [Goal 7 of the Governor's Workforce Policy Board Draft Objectives].

In essence, standards specify industry skill requirements which can then help organize and inform instruction and learning, individual assessment/credentialing, and programmatic performance and educational accountability. The key question for Ohio is: *Are national industry skill standards being used for these purposes and is there a role for the state of Ohio in promoting use of these standards so that greater coherence is achieved between the state workforce development system and the business community*? The following summary is based on key informant interviews with education and training providers in Ohio and is organized around these four skill standards applications.

EMPLOYER ENGAGEMENT

There is evidence that Ohio education training providers are keenly aware of and using skill requirements as specified and documented by national employer communities. This is evident at

two levels. First, all initiatives we interviewed were using nationally recognized skill standards for some purpose with the exception of Ohio's SMART Consortium which uses national *academic* standards (like National Science Standards) as the primary foundation. The Office of Career-Technical Education within the Ohio Department of Education (CTAE) (consisting of 93 planning districts serving 86,000+ secondary students and 160,000+ post-secondary students) actively participates on the National Skills Standards Board (NSSB) and uses nationally recognized standards based materials produced by more than 60 industry associations. When the Career-Technical Education Occupational Competency Analysis Profiling System (OCAPS) was developed in the late 1980s national skill standards were intentionally used as the foundation for this effort. In fact, more than 60 occupational competencies were developed within Ohio – building upon national skill standards developed in nearly all industry clusters identified by NSSB. Ohio was also instrumental in the development of national skill standards and the first state to mandate Automotive Service Excellence program certification within the automotive sector. The newly established Integrated Technology & Academic Competencies (ITAC) initiative and Technical Competency Profiles (TCP) of Career-Technical Education build upon nationally validated skill standards and the OCAP work.

Nationally recognized skill standards utilization is also evident within Ohio's system of higher education. The newly established SkillsMax Resource Center (and 10 SkillsMax Centers) within the two–year system (EnterpriseOhio Network) focuses on services to employers for making sound worker recruitment, retention, training, promotion, and succession decisions. IT skill standards developed by the North West Center for Emerging Technologies, Hospitality Industry Standards, Far West Laboratory Health Service Industry Standards, and Private Vendor Standards (IBM, Oracle, etc.) serve as the foundation for these services. In addition, the AIM Center in Ohio (which developed a new competency-based, occupationally verified, seamless curriculum beginning in grade 11 through the Associate of Applied Science, culminating in a Bachelor of Science using advanced manufacturing as the focus) is nationally recognized and builds upon industry validated skill requirements (like those developed by the National Institute for Metalworking Standards and the National Tooling and Machining Association). This means industry standards are recognized among Ohio education and training providers and employer skill requirements are a foundation for program and service delivery to individuals.

At another level, there is no doubt that Ohio employers have been engaged in processes for adapting national standards for use by education/training providers. Most key informants referenced the adaptation as a local "validation," "verification," or "prioritization" process. In fact, interviews with providers reveal that every initiative using nationally recognized industry skill standards has also engaged Ohio employers in skill standards verification and adaptation.

CURRICULUM DEVELOPMENT

In addition to employer engagement, probably the greatest share of activity around skill standards utilization in Ohio has occurred through translation and integration of standards into curricula and instructional materials. Integration of standards into curriculum, as described by many key informants, is a process in and of itself. Many providers have turned to Ohio's Universities for guidance/technical assistance with translation of industry skill requirements into curricula. Given the changing nature of work, education and training providers view curricula

development and modification as an ongoing responsibility. Most indicated that instructional materials should be reviewed and updated every three to five years to adequately meet market demands.

Where applicable, processes used to engage employers and educators in translating skill requirements into curricula have been detailed within the activity profiles of this report. For example, Ohio Tech Prep has established rigorous curriculum in Information Technology, Health Services, and other technical career areas. All resource tools have been built upon industry standards like the Far West Laboratories Health Services Standards. The Ohio Tech Prep process engages both employers and educators in curricula development at high school and post-secondary levels. First initial industry research is conducted including identification of national industry skill standards. A "futuring" or "visioning" panel of business/industry is then convened to build upon market specifications as established through initial research. The industry trends and profiles of work are translated into a draft document of industry competencies. Another business panel is convened to identify essential competencies that transcend industry functions nationally and to recommend final competencies to be incorporated into Ohio's Tech Prep curriculum. A team of secondary and post-secondary teachers/educators then translate the industry competencies into an educational curriculum context. A stakeholder panel is convened to finalize the curriculum guides. The stakeholder panel consists of business/industry, educators, and training vendors (e.g., CISCO brought in to align the Tech Prep curriculum with their training certification program).

Another example of curriculum integration occurring in Ohio involves the development of scenario based resource guides for community colleges. The intent is to build the capacity of faculty within six of the U.S. Department of Education Career Clusters to understand the impact of IT on careers within their cluster, understand how IT is used and applied to work functions within their particular cluster, and to integrate IT applications within their cluster at the core, pathway, and specialization levels. A team from Lorain County Community College, an affiliate of the EnterpriseOhio Network, is working with the Education Development Center (EDC) in Boston to develop web-based resource guides for Allied Health and Nursing. The resource guides will include scenario-based lessons and assessments which will be disseminated for use by faculty across the nation. The U.S. Department of Education, National Skills Standards Board, National Alliance of Business, and other organizations are partners in this work.

It is important to note that expertise exists within Ohio for translating industry skill requirements into curricula/instructional materials. These individuals are both experienced and published in cross-walk applications (e.g., individuals from the University of Dayton who have served as national consultants for the AIM Center and other applications). In addition, curriculum development processes used in Ohio have focused on a blending of technical industry skill requirements (like those established by NSSB) with national and state academic skill requirements (like the National Science Standards and Ohio Proficiency Standards).

INDIVIDUAL ASSESSMENT/CREDENTIALING

Like states reviewed in the companion study produced by IEL, there is less activity in Ohio around *systemic* utilization of skill standards for purposes of individual assessment and credentialing. The Office of Career-Technical and Adult Education has made some progress in this area. In addition, individual certification in Information Technology is becoming increasingly more prominent at post-secondary levels where vendor certifications are offered. In other areas, providers either intend to move their work to this level or have not yet developed industry-driven assessment/credentialing programs to test and provide individuals with official documentation or proof of their learning accomplishments. While pockets of progress are evident, most individual assessment and credentialing are not yet systemic in Ohio (i.e., promoted or required by state decision making bodies).

EDUCATIONAL ACCOUNTABILITY/QUALITY ASSURANCE

Ohio's Career-Technical Education system has used industry skill standards as a foundation for program approval in nearly all career clusters. An application process for new or expanded programs must document the appropriate standards incorporated via the advice of a specific advisory committee, delineate curriculum and facility design and secure an appropriately licensed or credentialed teacher prior to state approval for funding. Staff members from CTAE carefully review each application to ensure that requirements are met and then provide technical assistance to local districts to incorporate standards, implement the program and secure appropriate accreditation. For the application for preliminary approval, a VE-26 application is available.

Industry-based *program* accreditation has also been a mechanism for developing greater alignment of post-secondary education/training programs with business/industry requirements. An initial scan of Ohio's two and four year institutions of higher education revealed that there are more than 30 associations providing accreditation for degree programs within health services alone. Providers undergo comprehensive review of curriculum, student learning outcomes, instructor/professor credentials to achieve and/or maintain program accreditation from the industry associations.

In addition to the applications of skill standards, IEL recommends that Ohio assume the role of an adopter or adapter state (as opposed to a developer state) as it begins to "establish a state-of-the-art workforce development driven in large measure by the requirements of Ohio's industries." According to IEL, developer states like Washington, Illinois, Indiana, and Texas "create skill standards that reflect the skill and knowledge needs of business and industry in their states." Adopter states like Pennsylvania and Florida, "import skill standards developed by other states or by industry groups for use in their respective states and disregard the differences in structural format, elements, nomenclature, etc., because they have not determined a 'standard'". Adapter states like Illinois and Texas "import skill standards and adapt them for recognition and use in their respective states."

Based upon key informant interviews with state education and training providers, the nature of industry skill standards activity suggests that Ohio can be classified as an adapter state. While CTAE had a historical role in development of skill standards (and still engages in some development), most of the activity in Ohio has centered around adaptation of national skill standards for purposes of prioritization and curricula integration.

The activity profiles of Ohio education and training providers are provided within the next section of this report. While very detailed, the information reflects the nature of industry skill standard utilization among education and training providers within Ohio. Understanding where Ohio currently stands relative to standards application provides a critical foundation from which strategy development should take form to promote and facilitate the development of a workforce system that is driven by industry requirements.

MAP OF INDUSTRY SKILL STANDARDS UTILIZATION AMONG OHIO EDUCATION & TRAINING PROVIDERS

Initiative	Industry Skill Standards Utilization	Employer Engagement (Local Verification & Prioritization)	Curricula & Instructional Material Development & Integration	Individual Assessment & Credentialing	Quality Assurance (Program/Instructor Certification or Accreditation)
Science and Math Achievement Required for Tomorrow (SMART Consortium)	**No:** National and state academic standards only	**No:** Employers participate on governance structure only (Management Council)	**Yes:** Developed a Science Course of Study	**No**	**No:** Established criteria for grant funding to SMART member school districts only
Career-Technical & Adult Education Ohio Competency Analysis Profiling (OCAP) System	**Yes:** Nearly all NSSB industry skill standards used as the foundation	**Yes:** As many as 63 different industry committees (more than 700 state employers) were convened to develop work-related competencies	**Yes:** Ohio Competency Analysis Profiles published in 1990, currently being updated	**No:** Some activity with WorkKeys (Ohio as pilot state)	**No**
Office of Career-Technical & Adult Education	**Yes:** 1. National Restaurant Association Education Foundation 2. American Culinary Federation (ACF) 3. Hospitality Business Alliance 4. Air-Conditioning and Refrigeration Institute (ARI) 5. HVAC Excellence 6. National Center for Construction Education & Research 7. Automotive Service Excellence (ASE) 7. Council on Aviation Accreditation (CAA) 8. Federal Aviation Administration (FAA) 9. National Center for Construction Education & Research (NCCER) 10.American Design Drafting Association (ADDA) 11.Electronics Technician	**Yes:** Business and industry verification process currently used for "fast track" Integrated Technical and Academic Competencies (ITACs) and Technical Competency Profiles (TCPs). TCPs engage a visioning panel of business/industry; another panel of B & I to i.d. essential compentencies and stakeholder panel inclusive of B & I to finalize curriculum guides	**Yes:** Skill standards are the curriculum framework for all career and technical programs.	**Yes:** **Industry Competency Examinations:** 1.Industry Competency Examination (ICE) for residential, light commercial, and commercial 2.HVAC Electrical & Air Conditioning 3.ASE in Multiple specialty areas 4.Council on Aviation Accreditation in multiple specialty areas 5.Electronics Technician Association Multiple Certification Examinations 6.NIMS	**Yes:** **Program Certifications include:** 1. Pro-start 2. Access ACF 3. American Hotel and Lodging Association 4. Partnership for Air-Conditioning, Heating & Refrigeration (PAHRA) 5. HVAC Excellence 6. National Automotive Technicians Education Foundation (NATEF) 7. Federal Air Regulations 147 8. Council on Aviation Accreditation

	Association (ETA) 12.Printing Institutes of America (PIA) 13.National Institute for Metal Working Skills (NIMS) 14.American Welding Society 15.Ohio State Board of Cosmetology (OSBC)			Multiple Certification Examinations **Career Passport is mechanism of official documentation of learner accomplishments as well.**	9. ADDA Program Certification 10. Electronics Technician Assoc Flexible Pathways 11. Printing Institutes of America Program Certifications 12. NIMS, Inc. 13. American Welding Participation Review, Administrative Review, & Audit Team Review **Instructor Certifications**: 1. NCCER-Certified Craft Instructor 2. Automotive Service Excellence (ASE) 3. ADDA Instructor certification 4. Certified Welding Educator (CWE) & Certified Welding Inspector (CWI) Are also many statewide articulations in place.

Ohio Tech Prep	**Yes:** 1. National IT Industry Skill Standards 2. Far West Laboratory Health Skill Standards	**Yes:** Initial industry research conducted (including identification of national industry standards); "futuring" panel of B & I are convened to identify work related competencies and recommend final competencies to be included for Tech Prep	**Yes:** Educators translate competencies into teaching and learning context. Tech Prep curriculum at high school and college level developed and implemented	**No:** Assessment group formed to develop on-line assessment tools but has not yet been accomplished	**Yes:** Program approval standards exist for the 26 local Tech Prep Consortiums
EnterpriseOhio Network (54 community colleges & regional campuses) SkillsMAX Resource Center	**Yes:** 1. Northwest Center for Emerging Technologies IT Skill Standards 2. Far West Laboratory Health Care Standards 3. Hospitality Industry Standards 4. Private Vendor Standards (e.g., IBM, Oracle, etc)	**No:** Not for purposes of local "validation". The business community is the primary clientele for this initiative. Intent is to provide services for making sound worker recruitment, retention, training, promotion, and succession decisions.	**No**	**Yes:** Assessment of individuals is a primary emphasis. Seven companies working with SMRC include Prometric, Saba, SHL, ETS, iLearning, Chauncey, and Brainbench. On-line assessments have been developed to match worker skills with company/job requirements.	**No**
AIM Center Sinclair Community College	**Yes:** Society of Manufacturing Engineers (SME) Machining & Metal Working Skill Standards (National Institute for Metalworking Skills (NIMS) National Tooling and Machining Association (NTMA)	**Yes:** Project included industry validation of 800 competency lists (primary, secondary, and tertiary levels). Validation by industry professionals reduced the list to 175 competencies.	**Yes:** Competencies were organized into 9 clusters for the purpose of developing instructional modules. Currently there are 31 instructional modules. Is described as industry-driven, competency-	**No:** Some learning outcomes and scenario based assessments are incorporated into the instructional modules only.	**No:** The AIM Center is seeking program accreditation through TAC/ABET.

	American Electronics Association Skill Standards for the High Tech Industry National Photonics Skills Standards for Technicians		based, modularly structured, integrated curriculum. All 4 terms are defined.		
NSF IT Across Cluster Initiative in Health Services **Lorain County Community College in partnership with the Education Development Center, et al.**	**Yes:** Far West Laboratory Health Care Standards	**No:** No local validation process. Work is being driven by the National Health Services Advisory Board (U.S. DOE Career Cluster/Standards work). NSSB and NAB are also partners in this work.	**Yes:** Intent is to develop scenario based lessons for integrating IT learning into health curriculums. Resource guides will be web-based and disseminated for use by community college faculty across the nation.	**No:** Scenario based assessments are being developed for application among community college faculty but there is no individual credentialing involved.	**No**
Youth Opportunities Unlimited	**No:** Development of Manufacturing Technician I skill standards occurred simultaneous to national work	**Yes:** Literature reviews Occupational analyses Employer task force meetings Focus group discussions with employers	**Yes:** Cleveland State University Dept. of Ed was hired to integrate skill standards into curriculum for use at the high school level	**No**	**No**

ACTIVITY PROFILES

ELEMENTARY & SECONDARY EDUCATION
SMART SCIENCE COURSE OF STUDY

Interview Date: 2/26/02
Key Informant: Terry Krivak, Director of SMART Consortium at the Ohio Aerospace Institute; www.oai.org/SMART

Background/Impetus: The SMART Consortium (Science and Math Achievement Required for Tomorrow) is an outgrowth of a leadership retreat in August of 1997 with DOE (primarily State School Superintendents) and the Jennings Foundation where science and math proficiency in Ohio was considered a priority. In the spring of 1998, the SMART Consortium was established as an outcome of the retreat. The goals of SMART include:

- Establish higher expectations of science and math education and amass the support needed to achieve those expectations.
- Provide outstanding professional development by focusing on best practices, leveraging collaborative internal and external resources, and offering opportunities for teacher networking.
- Build a regional model for improvement of science and math education to produce smarter, abler, and more highly achieving students.
- Enable the collective group to take a higher degree of risk in change.
- Bring in business, industry, and communities as full partners.
- Provide alignment of curriculum, instruction, assessment, and professional development to world-class standards.
- Improve the willingness of teachers and administrators to bring about change.
- Change our beliefs about learning (Who, What, When, Where, How).
- Develop and maintain buy-in and support from the public, parents, students, school boards, businesses, industries, and communities for significant improvement.
- Improve teaching and learning, district by district, using proven research-based education techniques.

SMART has developed and published a science course of study which is currently in implementation (i.e., orientation workshops and integration into elementary and secondary curriculum).

Partners: The collaborative nature of the SMART Consortium makes this initiative somewhat unique. Members include 30 school districts throughout Cuyahoga, Lake, Summit, Lorain, and Erie counties and 2 educational service centers serving multiple local districts (1 in Cuyahoga County and 1 in Lake County). In addition to the SMART Consortium, spin offs include RAISE (Regional Alliance for Informal Science) which is comprised of not only elementary/secondary schools but also nature centers and museums – entities with non-traditional science education programs. SUCCESS is another spinoff of the northeast Ohio SMART Consortium which engages higher education in the SMART Science Course of Study integration work. SUCCESS is being organized through the Northeast Ohio Council on Higher Education (NOCHE). PRISM is yet another organization which has organized in Summit County to begin implementation of

the SMART Science Course of Study under the direction of Vince Martino at Tallmadge Public Schools. The SMART Consortium of northeast Ohio has also assisted with the development of similar consortia in other areas of Ohio including Cincinnati (HIGH AIMS – Bob Yearout), Columbus (TIMS Consortium – Pat Barren), and a southeast Ohio initiative in Athens.

Resource Commitments: Dedicated staff to the SMART Consortium include 1 full-time director and 2 full-time administrative assistants. In addition, SMART employs 1 math expert, 1 science expert, 1 grant writer, and 1 workshop coordinator on an as need basis. The annual budget for this initiative is approximately $325,000. Sources of funding include Ohio DOE, Jennings Foundation, National Science Foundation, Discovery, and the Public Broadcast System. There is a separate grant function whereby approximately $200,000 are awarded annually to SMART members.

Governance: SMART is governed by a Management Council comprised of employers (TRW, Lubrizol), representatives of DOE, the Ohio Board of Regents, and Engineering Societies, and approximately 19 school superintendents. Overall, the Council is comprised of approximately 35 individuals. The Ohio Aerospace Institute serves as fiscal agent for the initiative and the three full-time staff are housed here.

Standards Development & Utilization:
Curriculum: The SMART Consortium has developed a science course of study which is currently in the implementation/application stage. Integration into curriculum will occur through consortium members and the spin-off collaboratives of RAISE, SUCCESS, and PRISM. The course of study builds upon the National Science Standards and the American Association for Advancement of Science Project 2061. It is endorsed by the National Science Teachers Association as well. The resource guides have been developed (i.e., the course of study is completed by age/grade level and has been distributed). The next stage is orientation workshops and implementation into curriculum at elementary, secondary, and post-secondary levels. While built from national science standards, the course of study is also aligned with Ohio Proficiency Test standards. Incorporated within the science course of study are intended student learning outcomes.
Student Assessment: While not yet completed, development of assessment tools is planned as a separate process. The assessments will be aligned with Teaching Integrated Math & Science assessment at the national level and the new high school achievement test of Ohio DOE currently in development.
Educational Accountability: While program approval/educational accountability are not the primary emphasis, the science course of study establishes criteria for grant funding to SMART members.

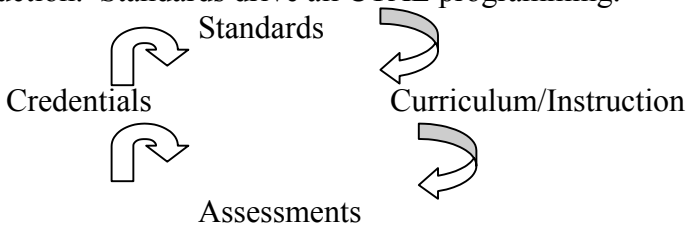
SMART Accomplishments:
- SMART is a considered a model for collaboration – among elementary, secondary, post-secondary educators, and informal providers like nature centers and museums.
- According to the Director, teachers who are champions for math and science improvement within the region are now more connected and can offer greater support to other teachers.

- The initiative represents multiple districts coming together. The alignment across school districts puts more educators on the same page, especially small districts which don't have as great of resources but can successfully connect to the work.
- Superintendents are involved at the leadership level which is a key element to success.
- The SMART leadership academy has already trained and provided professional development to over 300 school principals.
- In addition to collaboration and training, the science course of study builds on national standards and at the same time aligns with state educational proficiency standards.
- Organization and implementation (educator training and curriculum integration) is emphasized at regional levels for maximum impact.

CAREER - TECHNICAL AND ADULT EDUCATION
OFFICE OF CTAE WITHIN THE OHIO DEPARTMENT OF EDUCATION

Interview Date: 3/6/02
Key Informants: Bob Bowermeister, Assistant Director, Industrial & Engineering Systems and Health Careers; Rick Mangini, Assistant Director, Business, Marketing, and IT; Ike Kershaw, Assistant Director, Environmental and Agricultural Education; Sharon Enright, Assistant Director, Family and Consumer Sciences; Gayle Parlin, Assistant Director, Skill Standards; Barb Nicol, Assistant Director, Adult Workforce Education, Julie Novel, Consultant, Tech Prep.

Background: Ohio is organized by career-technical planning districts (CTPDs). The career centers and career compacts within these districts serve 11th-12th grade high school students, adult learners, and employers through customized training and other service delivery. The mission of Career-Technical and Adult Education (CTAE) in Ohio is to "provide quality programs and services to meet the lifelong career education needs of Ohio's youth and adults, as well as the ever-changing demands of the present and future workplace." In meeting this mission, career and technical programs for youth and adults acknowledge and include all industry based skill standards and incorporates these into all curriculum, assessment, and program standards. This mission is based on the belief that standards drive curriculum and instruction. Curriculum and instruction are measured by a variety of assessments, including industry-based assessments. Assessments lead to program/individual credentials. Credentials then feed into the job market and validate CTAE standards instruction. Standards drive all CTAE programming.



Impetus: CTAE programs (for high school students, adult learners, and incumbent workers) have traditionally been organized with identified business-industry standards. The reason is skills required for work are increasingly complex and diverse from employer to employer. Decisions about whom to hire and what training to provide are more challenging than in past years. Individuals moving between jobs/industries need a way to communicate their qualifications to potential employers. To keep pace with fast and ever-changing technologies and strategies, individuals need a road map of what they have learned, what they need to learn, and a strategy for future learning. CTAE's Integrated Technology & Academic Competencies (ITAC) and TCP, and/or industry standard can demonstrate achievement of an individual's learning. This combination of standards identification offers industry, education, and individuals documented and demonstrated mastery to agreed upon standards. To be accountable for local, state, and federal resources, Ohio's CTAE programs are mandated to follow the state generated competency lists. By developing courses of study approved by local boards of education, programs with input from program advisory committees can customize program content. Ohio's investment in workforce development has continued due to the emphasis on quality curriculum.

Maximizing state and federal resource efficiency is achieved by developing state program content standards.

CTAE views standards as a method for determining that a school program meets or exceeds all established standards and requirements of academic excellence and curriculum, student facilities, placement services, training facilities, safety and instructor credentials. The primary purpose of CTAE standards implementation through ITACs, TCPs, or industry standards is to improve the quality of education and to establish a standard that is developed and supported by educators and industry.

Partners: Local partners include 93 career-technical planning districts (CTPDs) and 26 Tech Prep consortia which implement the standards, become accredited if possible, deliver instruction based on the standards, assess and compile credentials for 86,000+ secondary workforce development students and 160,000+ post-secondary adult workforce development students.

As a critical partner, business and industry participates with the Office of CTAE to identify and communicate industry need. The partnership is based on formal and informal partnerships with includes any or all of the following:

- Participate in CTAE professional development and teacher standards,
- Participate on panels to identify and/or review and verify competency lists for ITACs and TCPs,
- Identify measures and credentials important to employment in Ohio,
- Participate at national, state, and school levels in the implementation of standards,
- Recommend and often donate appropriate technology and equipment,
- Assist in the documentation of skills through student performance assessment, and
- Serve on state and local career center program advisory committees.

CTAE adult education programs typically have intensive participation of the private sector in the identification of need, competencies and appropriate standards, instruction and credential, and appropriate program accreditation(s) for the local labor market. Often times adult CTAE programs may customize the standards into units or modules of targeted instruction to fulfill local labor market need.

Aligned with the Office of CTAE, partners in skills standard implementation currently include those at national, state, and local levels. At the national level, CTAE closely aligns with the US Department of Education in measuring the technical and academic performance, completion, and placement of students. Annual reports of performance are a federal requirement to continue funding. Currently there are 60+ credential providers at the national level who are identified as partners in Ohio's skill standards initiative. Although there are many others, some examples of these partners and their roles are as follows:

> *Construction:* National Center for Construction Education and Research (NCCER) provides curriculum, national registry for students and instructors and a portable transcript recognized throughout the industry. Air Conditioning/Refrigeration Institute (ARI) provides standards assessed upon completion of instruction and provides three air

conditioning/heating competency examinations (ICE) in residential, light commercial and commercial.

Manufacturing: National Institute for Metal Working Skills (NIMS) provides program certification with possible student credential in eight entry level areas of machining. Printing Institute of America (PIA) provides program certification in nine possible areas.

Hospitality and Lodging: National Restaurant Association provides curriculum, instructional materials and assessments for ProStart and ProManagement programs. American Culinary Federation (ACF) provides program certification and curriculum and individual credential.

Aviation: Council on Aviation Accreditation (CAA) provides program certification, curriculum, assessments, and individual credential. Federal Aviation Administration (FAA) provides program certification in accordance with Federal Air Regulation 147, certification examination through an FAA three year program.

Another national partner is ACT. The CTAE adult education programs use the ACT/Work Keys System as a tool to identify local employer standards related to applied math and locating information via a job profile. Accompanying assessments measure and document the achievement of adult students and incumbent workers and identify the necessary academic knowledge and skills needed to succeed or advance on the job market.

State partners include numerous state boards and licensing agencies that provide operating standards, curriculum and assessment, and/or articulation. Examples include but are not limited to Ohio State Apprenticeship Council, State Board of Cosmetology, Ohio Police Officer Training Academy, Ohio Nursing Board, Ohio Medical Board, Ohio Dental Board, Ohio Department of Public Safety Services, Department of Commerce Board of Building Standards, Ohio Department of Job and Family Services Workforce Development Bureau, Ohio Board of Regents Community College System (articulation agreements), and numerous statewide trade associations like the Ohio Manufacturers' Association, Ohio Restaurant Association, Ohio Hotel and Lodging Association, Ohio Travel Association, Ohio Associated Building Contractors, etc.

The Ohio State University/Center on Education and Training for Employment is one of the contractors developing the ITACs, TCPs and correlated assessments, and identifying exemplary and promising programs for national recognition.

Resource Commitments: The Office of CTAE is organized in three major strands – system planning, improvement, and analysis; pathways programs and services; and adult learning services. Nearly all staff have a connection to skill standards integration into the secondary and adult workforce development programs. Primary staff include all key informants included in this interview plus one intermittent employee and two contract consultants. The federal Carl Perkins career technical funds provide $49 million plus for Ohio's CTAE secondary and adult education programs. The 10% leadership and 5% administration funds contribute as does the 5% state administration match. Since skill standards are integrated into the professional development, curriculum, instructional design, resource development, assessment and performance accountability systems, it is difficult to determine the costs of isolating a current annual budget

for the skill standards. However, the fast track ITAC development for FY02 will require approximately $60,000. The TCP development at OSU has a budget of $170,000.

Governance: The Office of Career Technical and Adult Education within the Ohio Department of Education, Center for Curriculum and Instruction has primary management responsibility: Office of Career Technical and Adult Education, 25 South Front Street, 6th Floor, Columbus Ohio 43215-4183 (Phone: 614-466-3430; Fax: 614-644-5702; Email: vicki.melvin@ode.state.oh.us). As a condition of federal funding, the US Department of Education and the Ohio DOE requires all states to complete a state plan and develop performance measures. The Office of CTAE negotiates measures of performance for all secondary and post-secondary career-technical workforce development programs. The State Board of Education provides oversight and governance to the Office of CTAE. The State Board of Education approves state performance measures that have been recommended by the Committee of Practitioners. The Committee of Practitioners typically meets quarterly to recommend appropriate measures of performance for all career-technical programs.

Standards Development & Utilization:
Curriculum Standards: As a result of legislation in the early 1990s which called for the modernization of vocational (now called career-technical) education, all curriculum development efforts involved specific industry panels devoted to the task of identifying and verifying competencies necessary for employment in a given occupational area. These competency lists were called Ohio Competency Analysis Profiles (OCAPs) and were later termed Occupational Competency Analysis Profiles. At that time approximately 65 OCAPs were completed, some of which are still being used for some occupational areas. [See interview with Dr. Darrell Parks regarding development of OCAPs.]

Ohio's competency verification process has evolved. Career-technical pathway programs require broad transferable industry knowledge and skills. The pathway begins at the 9th grade in foundation courses and uses cluster based Integrated Technical and Academic Competencies (ITACs) found on the website. ITACs were derived by using a national database of academic, technical and employability competencies. Skill standards are currently incorporated into the "fast track" lists which are provided for each program. The intent is to update the OCAPs with the "fast track" ITACs and through a business and industry verification process then update them annually. Refer to the CTAE website for available lists. Ten are under construction during FY02.

Skill standards are also incorporated into the Technical Competency Profile (TCP) associated with the Tech-Prep program. This is accomplished with skill standards incorporated into a competency list that is then verified by a panel of educators and business, industry, and association representatives. These competency lists become the framework for all career and technical programs at the secondary and post-secondary levels. [See interview summary with Lavonna Miller regarding the Tech Prep Program.]

The development of comprehensive competency lists (OCAPs, TCPs, ITACs, Fast Track ITACs) identify providers of industry credentials. The process also engages business and industry representatives in determining assessment strategies and student competency expectations of

Ohio's CTAE program levels. The ITACs and TCPs encompass skill standards that are dynamic. Their development is ongoing and dependant upon emerging and changing technologies and industry and labor market need. Four TCPs and ten fast track ITACs are underdevelopment in FY02. Standards incorporated in the OCAPs, ITACs, and TCPs are implemented in all of Ohio's 93 career technical education planning districts which includes 49 joint vocational school districts and 43 comprehensive school districts or career compacts.

Curriculum Assessment Alignment: Skills standards via the ITACs and TCPs are the curriculum framework for all career and technical programs. Standards achievement is assessed using performance and knowledge based assessments including the technical assessment, formerly called the Ohio Vocational Competency Assessment (OVCA), a test specifically designed to correlate with the competency lists. CTAE programs also support performance based assessments; industry assessments leading to credentials; and, in some cases, vendor specific credentials (i.e., A+, MOUS, etc.) Career and technical programs that are regulated by partnering agencies or boards must be approved by that entity and must incorporate all standards, including curriculum dictated by the entity. These include programs related to the medical field, public safety, and cosmetology.

Student Credentialing: Skills standards achieved through a CTAE program are currently documented through the Career Passport. The Career passport is an individual summary of knowledge gained, skills mastered, and supporting documentation for a potential employer. The passport is a useful tool for the individual in matching his/her skills to specific jobs, thus making them more marketable. Included in a Career Passport are specific credentials earned through education and training. Industry credentials assist individuals in securing employment, advancing on the job, increasing salary, enhancing job satisfaction, refining skill sets, and increasing earning power.

Program Standards: An application process for new or expanded programs must document the appropriate standards incorporated via the advice of a specific advisory committee, delineate curriculum and facility design and secure an appropriately licensed of credentialed teacher prior to state approval for funding. Staff members from the Office of CTAE carefully review each application to ensure that requirements are met and then provide technical assistance to local districts to incorporate standards, implement the program and secure appropriate accreditation. For the application for preliminary approval, a VE-26 application is available on the CTAE website.

Program Accreditation: Program accreditation is a value-added component to all career-technical education programming and a required component of some programs. The following goals are applied to accreditation:

- Utilize the continuous input of industry peers
- Seek industry guidance on change/technology affecting training needs
- Provide documented mastery of industry standards
- Support the portability of those documented standards mastered

National Linkage/Leadership: The Office of CTAE is represented at the national level through committee involvement with the National Skills Standards Board (NSSB) and with the US

Department of Education. Participation in national standards development includes information technology, environmental, logistics, health care, retail, teaching professions, transportation and hospitality.

Other Performance Standards: Both adult and secondary workforce development programs have State Board of Education approved and US DOE negotiated performance standards. Technical performance is reported via the technical assessment benchmark or industry credential attainment.

CTAE Accomplishments: The Office of CTAE provides leadership in incorporating standards into curriculum, instruction, and assessment applied to each USDOE career cluster. Some of CTAE education programs built upon business-industry standards are now evolving into nationally recognized standards, curriculum, and measures. For example, Ohio's Information Technology Curriculum has been adopted by the USDOE cluster project. In addition, in cases where standards exist CTAE often goes beyond to incorporate additional standards. Case in point, the National Institute for Metalforming Society (NIMS) has established standards; however, CTAE has worked with Ohio's industry to enhance that standard by incorporating additional detailed competencies and curriculum guidelines. The benefit of this leadership is that the national curriculum is customized to Ohio's specific metal working industries.

With the integration of skills standards, career-technical and adult education achieved the following results:

- Enhanced program standards
- Focused and targeted curriculum
- Aligned curriculum and assessment
- Industry recognition and accreditation of career-technical programs
- Culminating student credentials which are portable across geographic boundaries
- Enhanced partnerships at national, state, and local levels
- Accountability of resources

Skill standards provide the basis for workforce development curriculum and give validity to instructional content and assessment. Credentialing students provides value added to instructional design and the culminating documentation of skill achievement. Utilization of skill standards provide additional opportunities to partner with business and industry to assure workforce development programs are preparing students to meet the labor force's demands.

CAREER - TECHNICAL & ADULT EDUCATION
OCCUPATIONAL COMPETENCY ANALYSIS PROFILING (OCAP) INITIATIVE

Interview Date: 2/15/02
Key Informant: Dr. Darrell Parks, Interim Director, Ohio Association for Career and Technical Education

Background: Dr. Darrell Parks was State Director for Career and Technical Education in Ohio from 1982-1994. He had both experience and interest in skill standards utilization and application. Dr. Parks was engaged in national skill standards dialogue, served on the National Automation Technician Foundation, and was actively involved in ASE program certification work - particularly Ohio being the 1st state to mandate ASE program certification in 1983 (along with Florida and Minnesota). Dr. Parks described the automotive service scandal of 1972 where Sears Automotive was hiring non-qualified technicians and providing the industry with a bad reputation. He indicated that supply became the issue, specifically where technicians were getting their training and the quality of that training. While intimately involved in the establishment of ASE certification, his primary contribution in Ohio was the development and application of Ohio Competency Analysis Profiles (OCAP), which are still utilized for some programs throughout career and technical education (both secondary – 11-12th graders and adult learners).

Impetus: Not only was (and is) Dr. Parks passionate about the value of skill standards and credentialing given the positive outcomes with ASE certification, he led the charge to get the OCAP initiative off the ground given significant dollar investments in education/training producing limited results. In 1989 Ohio adopted a bill which was intended to accelerate career and technical education. This translated into "Ohio's Future at Work". While utilization of skill standards was not specifically articulated within the legislation, it became Dr. Parks "back door" authority to infuse skill standards across career/technical education. The OCAPs identified critical occupational and academic skills necessary for success in the workplace. The effort was not intended to duplicate national efforts. In fact, national skill standards served as the foundation from which OCAPs were developed. More than 60 occupational competencies were developed through this initiative.

Partners: The initiative was driven primarily by employers. As many as 63 different industry committees were convened (more than 700) employers/workers (e.g., owners, contractors, workers). Organized labor was invited to the table. While representation was not strong among organized labor there was also no resistance. Language arts, math, and science high school teachers were engaged –but as consultants only. The intent was not to disrupt the work of the employer community in articulating work-related competencies. The Curriculums Material Service at Ohio State University facilitated, compiled, and published the OCAPs through a sub-contract from the State Office of Career and Technical Education. Dr. Parks attributes much of the success to Ms. Cathy Scruggs, formerly of OSU, who provided the leadership for this work.

Resource Commitments: There was dedicated staff to manage the work, primarily from the Curriculums Material Service at OSU and the Career and Technical Education Division of the Department of Education at the state level. Information regarding number of full/part time staff,

annual budget, and sources of funding can be obtained from Kathy Scruggs (now VP and Group Editorial, Workforce Education Group, Glenco/McGraw Hill Co. 1-800-447-0682 ext. 3288 or Cathy_Scruggs@McGraw-Hill.com). Dr. Parks indicated that staffing was minimal as Kathy facilitated all employer groups herself and organized the compilation and publication of OCAPs.

Governance: Dr. Parks described the Ohio General Assembly as the governance body for this initiative since it became the career/technical education response to the Futures at Work legislation. Progress reports were delivered in-hand to President of the Senate and Speaker of the House by Dr. Parks himself regarding the status of the initiative. Because neither the initiative, nor skill standards utilization were specified in the legislation, there was no authority to mandate OCAP use. While standards-driven curriculum could not be imposed, it was used as evaluation criteria for federal/state funds and the "Ohio's Future at Work" was continuously cited by the state Career/Technical Education office as reinforcement for standards based curriculum development.

Development & Utilization:
Skill Standards: Through the OCAP initiative, employers were engaged in the development of skill standards. Impressively, employer committees met all day for 2-3 days only. Ohio Competency Analysis Profiles were published in 1990, building on national skill standards work. The outcome was competency profiles and curriculum resource guides developed primarily for 11th and 12th grade career/technical high school students.

Student Assessment: In the early to mid-90s the next step was the development of assessment instruments. Committees of teachers were brought in to translate the information into student learning outcomes. They then contracted with test writers to assess validity, etc. Emphasis of assessments was on what students could do (not traditional grades). Idea was that some learners could master five things (for example) and some 25 things (for example). This became a part of the Career Passport which was a part of Ohio's Future at Work as well.

Job Profiling: OCAPs were used to drive curriculum for adult learners at Ohio's career centers as well. It was the adult level that drove job profiling. In approximately 1991, Ohio became a pilot state for WorkKeys. ACT came to Ohio and trained career/technical educators on profiling and then linked them to the OCAP Occupational profiles.

OCAPs were therefore used to develop curriculum/instructional materials, to inform establishment of student learning outcomes, for assessment purposes, job profiling, and credentialing/certification of learners. The OCAPs are currently being updated through the "Fast Track ITAC work."

OCAP Accomplishments include:
- Greater sense of accountability
- Enhanced credibility with business community

In addition to OCAPs, Dr. Parks described two things that made ASE program certification successful: a willingness of education/training to take business on/make them feel important; and, after some encouragement, business/industry playing their role (e.g., increased pay rates for credentialed individuals/reward system).

The OCAP Initiative had momentum, focus, leadership, priorities, and funding. Initially, roles among career/technical education staff were threatened. Dr. Parks held weekly staff meetings which were voluntary. With approximately 100 staff people, 60-70 attended weekly. Constant communication was critical to success. CTAE staff felt engaged.

CAREER - TECHNICAL & ADULT EDUCATION & HIGHER EDUCATION TECHPREP INITIATIVE

Interview Date: 2/19/02
Key Informant: Lavonna Miller, Tech Prep Curriculum Services, Center on Education & Training for Employment (CETE)

Background/Impetus: Lavonna Miller is with Tech Prep Curriculum Services. Tech Prep is a 2+2+2 career program in Ohio accountable to the Ohio Board of Regents (higher education) and the Department of Education (secondary education). The mission of Ohio Tech Prep Curriculum Services is to provide technical assistance in curricular issues to the Ohio DOE and Ohio Board of Regents – a primary strategy for educational change in Ohio. The Center on Education & Training for Employment at Ohio State University is the fiscal agent. Grant dollars flow through DOE. Emphasis of Tech Prep is on grades 11-16.

The Ohio Tech Prep Curriculum Services project is intended to provide statewide guidance in curriculum development activities. Key project components include coordinating the development of a curriculum base for Tech Prep programs, reviewing program curriculum pathways, and maintaining a collection of curriculum materials for Ohioans. Ohio's Tech Prep curriculum base is being developed through a three-part process involving business, industry, and labor representatives as well as secondary and associate degree educators which results in State Tech Prep Technical Competency Profiles. These profiles form the foundation for Tech Prep curriculum by delineating the essential skills needed for entry-level employment at the end of the associate degree for occupations in such areas as engineering, health, environmental, and business technologies.

Partners: Partners in Tech Prep include business/industry, DOE (10-16 education), organized labor, and higher education through the Ohio Board of Regents. Panels of business/industry were instituted early on (early 1990's). Currently there is an annual review process with employers. DOE has primary responsibility for Tech Prep (state line item for DOE making Ohio a leader within this realm).

Resource Commitments: Dedicated staff for Tech Prep include 1 full-time project manager, 1 full-time fiscal person and 26 local consortia coordinators, all staffed through DOE. Current annual budget for Tech Prep is approximately $11 million. Both federal and state funds support this state-wide effort.

Governance: A Joint Council of OBOR and DOE serves as the governance body for Tech Prep. In addition, there are 26 Advisory Boards at the local level consisting of representatives from two and four year post-secondary education, secondary education administrators and teachers, organized labor, and business/industry.

Standards Development & Utilization:

Curriculum: Tech Prep has established rigorous curriculum in Information Technology (TCPs), Health Services, and other technical career areas. All resource tools have been built upon industry standards. For example, the Far West Laboratories Health Services skill standards are serving as the foundation for 2+2+2 curriculum programs in Health Services. The Tech Prep curriculum process is as follows:

- Initial industry research is conducted.
- A "futuring" or "visioning" panel of business and industry are convened to build upon market trends as established through initial research.
- The industry trends/nature of work are translated into a draft document of competencies.
- Another business panel is convened to identify essential competencies that transcend industry functions nationally and to recommend final competencies to be included.
- A team of secondary and post-secondary teachers/educators translate the industry competencies into an educational/curriculum context.
- Stakeholder panel is then convened to finalize the curriculum guides. The stakeholder panel consists of business/industry, educators, and training vendors (e.g., in IT CISCO and others are brought in to cross-walk their training certification programs with the Tech Prep curriculum).

Assessment: While the Tech Prep IT curriculum is tied to A+ , CISCO certification, no other assessments have been developed. An assessment group was formed to develop on-line assessment tools, but this has been two years in the works and a very "cumbersome" task. No on-line assessments have been produced as of yet.

Program Approval: There are standards for program approval (i.e., for the 26 local Tech Prep consortiums). [SEE OFFICE OF CTAE INTERVIEW.]

Tech Prep Accomplishments:

- Tech Prep curriculums encompass technical skills, academic skills, and soft skills necessary for success in the workplace.
- The Joint Council of DOE and OBOR had been a good efficient way of organizing the work. The Joint Council and Tech Prep are described as a model for cross-institutional collaboration.
- In addition, the Tech Prep IT TCP is being used nationally for standards development.

TWO-YEAR SYSTEM OF HIGHER EDUCATION (ENTERPRISEOHIO NETWORK) SKILLSMAX RESOURCE CENTER

Interview Date: 2/16/02
Key Informant: Judith Crocker, Ed.D., Project Administrator, EnterpriseOhio Network SkillsMAX Resource Center

Background/Impetus: The mission of the EnterpriseOhio Network SkillsMAX Resource Center (SMRC) is to improve the success of Ohio companies by assisting them with identification and acquisition of workers with necessary skills to increase success. Through an array of skills match services, the intent is to enable companies and individuals to make informed decisions about acquiring and applying knowledge and skills. The initiative was established by the Ohio Board of Regents EnterpriseOhio Network (the consortium of 54 community colleges and regional campuses across Ohio) to maximize Ohio's human capital through development of cutting edge performance improvement, skill-based services. SMRC, and its 10 SkillsMAX Centers (business delivery units) at Columbus State Community College, Lakeland Community College, Lima Technical College, Lorain County Community College, North Central State College, Northwest State Community College, Ohio University Southern Campus, Sinclair Community College, University of Akron Wayne Campus, and University of Toledo College Campus, provide services for making sound worker recruitment, retention, training, promotion, and succession decisions. The SMRC was established given a lack of affordable, systematic services of this nature available to public and private employers across the state. This initiative brings fortune 500 kinds of corporate and human capital development services to the doorstep of Ohio companies and citizens through cost effective, accessible means.

Partners: The Ohio Board of Regents is the executive sponsor of this initiative. Partners in SMRC include the primary Resource Center, which is housed at Lorain County Community College to provide research and development, project management, budget administration, and training and partner support. Ten campuses of EON act as individual service units operating under the guidelines of the SMRC. These business units are the service providers to employers and workers. The business community has been engaged in this work in a couple of ways. First, OBOR funded a year and a half long comprehensive research endeavor to assess human resource needs of employers. The research was focused on ability of employers to match skills of workers with jobs and the demand for information technology workers. Approximately 15 focus group discussions with employers were convened statewide by industry sector to assess market demands. Second, private sector vendors work in partnership with the two-year campuses in management roles, delivery of content, and setup of technological infrastructure for the delivery of skill match services. These vendors act as business partners in the development of the program and its alignment to program needs. There are seven private sector firms currently working with the campuses including Prometric, Saba, SHL, ETS, iLearning, Chauncey, and Brainbench. Third, the business community is the primary clientele for this initiative.

Resource Commitments: The EON SMRC employees three full-time staff and three part-time staff at Lorain County Community College. These individuals provide leadership and expertise in areas of service delivery including training, assessment, learning management, certification, organizational development practices, etc. This does not include all staff at each of the other 10

campus business units throughout Ohio. The current annual budget for the SMRC is $800,000. Sources of funding come from the Ohio Board of Regents under various line items.

Governance: The initiative has its own advisory board. In addition, the program receives guidance and input from the Ohio Board of Regents Workforce Advisory Board.

Standards Development & Utilization: Unlike other initiatives/efforts across the state of Ohio, the primary intent of SMRC is *not* curriculum based. In addition, the work is guided by existing skill standards. No skill standards development has occurred. Skill standards that have been utilized include: IT standards developed by the Northwest Center for Emerging Technology, National Adult Literacy Standards, Hospitality Industry Standards, Healthcare Industry Standards, Private Vendor Standards (e.g., IBM, Oracle, etc.), and company defined skill standards relating to job types validated locally for that company. The latter is included given the intent to provide customized skill-based services to employers. On-line assessments will be launched in May 2002 to better match individual skills with company and job requirements.

SMRC Accomplishments: SMRC is a relatively new initiative. The value of skill standards utilization to companies includes:

- Improvement in workflow
- Promotion of the company and their products as compliant with standards
- Means to upgrade and improve the business climate and overall performance of workers
- Increased acquisition in knowledge and skill among workers
- Means of acquiring ISO status

Accomplishments made through SMRC include:

- Promotion of national standards across Ohio
- Opportunity to utilize skill standards in an affordable and easy way for employers
- Increase in accessibility to standards based services for individuals
- Increase use of, and benefit from various services providing better information for companies seeking a match between their skill needs and what applicants or incumbent workers have to offer
- Tracking of learning and skill acquisition from various sources such as job profiles, assessment, certification, etc and those skills acquired through academic programming such as courses, seminars, etc.
- Real world learning is also translated into skills that can be tracked through the system for use by the company or by the individual for further employment, succession planning, pay for skill programs, corporate sizing decisions, etc.

HIGHER EDUCATION
AIM CENTER AT SINCLAIR COMMUNITY COLLEGE

Interview Date: 2/19/02
Key Informant: Dr. Bonnie Coe, Vice President and Dean at Ohio Technical College in Newark; formerly a partner on the establishment of the AIM Center at Sinclair Community College in Dayton Ohio.

Background/Impetus: The University of Dayton originally led the charge to get the AIM Center off the ground with leadership from Dr. Bob Mott (retired from the University of Dayton, very knowledgeable and published on the subject of integration of skill standards into curriculum, a national consultant, and still consulting with the AIM Center in Ohio). Funding was provided in part by the National Science Foundation's Advanced Technological Education program (NSF/ATE). "The programs primary goals are to:

- Develop a new competency-based, occupationally verified, seamless curriculum beginning in grade 11 through the Associate of Applied Science degree, culminating with the Bachelor of Science degree using advanced manufacturing as the focus; with gateways to and from industrial employment throughout.
- Write, pilot test, and publish curriculum materials (lab manuals, video, software, and other ancillary materials) to improve mathematics, science, and manufacturing engineering technology instruction.
- Disseminate the curriculum, curriculum materials, and model program nationally."

"The competency-based, occupationally-verified approach to the program's curriculum development process ensures that the skills acquired by students will enable them to become quick contributors to the companies that employ them. The curriculum materials emphasize hands-on problem solving activities throughout, enabling participants to build a strong foundation of analytical skills required for career-long technical growth."

The impetus for development of the AIM Center in Ohio was to provide life long opportunities for individuals with standardization in teaching, learning, and assessment. Experience of the AIM Center demonstrates that a national foundation of skill standards is necessary, as is the process of localizing standards.

Partners: Partners in the initiative included the University of Dayton, Sinclair Community College, and the National Center of Excellence for Advanced Manufacturing Education (NCE/AME). The program is accredited by the Technology Accreditation Commission of the Accreditation Board for Engineering and Technology (TAC/ABET). Other partners/resources were engaged in the curriculum development process including:

- The Society of Manufacturing Engineers (SME)
- National Science Education Standards
- National Council of Teachers on Mathematics
- U.S. Department of Labor Secretary's Commission of Achieving Necessary Skills (SCANS)
- National Skills Standards Board, particularly Advanced High Performance Manufacturing, Computer-Aided Drafting and Design, and Machining.

- Washington State Manufacturing Technology Standards as developed and promulgated by the Manufacturing Technology Advisory Group, Seattle, Washington.
- Machining and Metalworking Skill Standards as promulgated by the National Institute for Metalworking Skills (NIMS) and the National Tooling and Machining Association (NTMA)
- American Electronics Association Skill Standards for the High Tech Industry
- National Photonics Skills Standard for Technicians
- Miami Valley Tech Prep Consortium

Resource Commitments & Governance: The AIM Center is located at Sinclair Community College.

Standards Development & Utilization:
Curriculum Development: Actual curriculum development began in 1994. The process is described as "industry-driven," "competency-based," "modularly-structured," "integrated curriculum." These terms are carefully defined by the AIM Center. Competencies were developed at three levels: primary (general level), secondary (what people should be able to do in a fairly specific topic), and tertiary level (quite specific and might be used to plan a specialized learning activity). These levels of competencies are very similar to the framework established by NSSB. The project included external validation of the competency lists. Originally 800 competencies were developed. After external validation with industry and academic professionals, the final list included 175 competencies. A committee was then organized to arrange the competencies into nine clusters for the purpose of developing instructional modules. Modules were completed by recruiting "cluster captains" who had responsibility for finalizing the instruction. An integrated manufacturing experience was then developed and added to the curriculum. This is described as one of the "keystones" of the curriculum. There are currently 31 instructional modules. Modules currently available include Basic DC Circuits, Basic Material Removal, Basic Statistician Variation, Computer Numerical Control, Conceptual Design, Consistent Work Methods and Build to Demand, Customer Satisfaction, Describing Position, Velocity, and Acceleration, Electrical and Electronic Controls, Forces and Their Effects, and others. The modules incorporate authentic learning tasks.

Assessment: Both learning outcomes and scenario based assessments are included with the instructional modules.

Program Accreditation: The AIM Center in Ohio has sought program accreditation through TAC/ABET.

Articulation from the associate degree to the bachelor degree is a component of the manufacturing engineering program.

AIM Accomplishments:

- The University of Dayton and Sinclair Community College have structured a process for developing industry-driven, competency based curriculum.
- The Center's work builds upon the foundation provided by national skill standards.
- Ohio has individuals with expertise who are published and provide consultation at the national level regarding competency-based education and integration of skill standards.

HIGHER EDUCATION
NSF IT ACROSS CAREER CLUSTERS INITIATIVE

Interview Date: 2/16/02
Key Informant: Joyce-Malyn Smith, Education Development Center, Boston, Roy Anderson, Director Allied Health & Nursing, Lorain County Community College

Background/Impetus: The initiative is a result of a NSF/ATE grant awarded to the Education Development Center in Boston and pilot community colleges across the U.S., one of which is Lorain County Community College in Ohio. The rationale for the initiative includes a so-called "disconnect" between the education system and the IT world as well as a fragmented career pathway for learners (creating an unreliable IT pipeline for employers). The goal of the initiative is to develop a common approach to teaching of IT applications across the 16 career clusters identified by the U.S. Department of Education. Key steps to develop this approach include:

- Develop a bank of languages to describe IT applications by career cluster
- Validate this bank of languages with cluster professionals
- Provide resource guides for teachers/faculty
- Provide assessments for students/learners
- Disseminate the scenario-based lesson/assessment guides nationally

Partners: Partners in the initiative include the U.S. Department of Education, National Association of State Directors of Career and Technical Education, the Information Technology Association of America, the National Skills Standards Board (NSSB), and the National Alliance of Business (NAB). In addition, community colleges are serving as pilot and demonstration operations for each of five separate career clusters. Lorain County Community College is the pilot and demonstration site for the Health Services Career Cluster.

Governance: The Education Development Center is fiscal agent for the initiative and oversees all partner work.

Standards Development & Utilization:
Employer Engagement: Unlike many of the initiatives in Ohio, the Across IT Career Cluster initiative does not engage *local* employers in a validation process. Instead, the existing National Cluster Advisory Groups have been asked to provide input on the range of IT applications that are used both at foundation and pathway levels. The IT application information provided by each Advisory Group (in this case the Health Advisory Group) has been used to create an online survey of employers. The on-line survey is intended allow industry professionals the opportunity to "validate" what one needs to know and be able to do to be successful apply information technology within Health Care.

Curriculum Development: A team of faculty from the Division of Allied Health and Nursing at Lorain County Community College are using the IT applications identified and validated by national employers to create 2-4 examples of scenario based lessons and assessments at the Foundation level and 1-2 examples for each Pathway. Once the instructional and assessment material is drafted (in the form of resource guides), faculty at LCCC will pilot the guides across

the division. All community college faculty are engaging in professional development prior to their development of the resource guides. Once piloted and modified, the resource guides will be disseminated nation wide. As a value-added, the work is also intended to help assess what motivates, and how to motivate/engage community college faculty in new methods for teaching/learning and new methods for assessing student achievement/accomplishments.

Individual Assessment: As indicated, included in the resource guides are scenario based assessments for students/learners.

Accomplishments: The program is in initial stages of development. Input has been gathered from national advisory boards and on-line surveys are being created. Community College faculty are scheduled to attend an "Institute" in June 2002. This will lead to the development of resource guides this coming summer for pilot in the classroom next fall (2002).

NOT-FOR-PROFIT SECTOR OF EDUCATION & TRAINING: YOUTH OPPORTUNITIES UNLIMITED PROJECT SMART

Interview Date: 2/20/02
Key Informant: Craig Dorn, Youth Opportunities Unlimited, Cleveland, Ohio

Background/Impetus: The overall impetus for Project SMART came from the need to address retirement from manufacturing in the early 1990's and the need to fill these positions with higher skilled persons. A vision was shared by the Principal of West Tech High School in Cleveland and the YOU Executive Director. The intent was to create a program open to any student in grades 9-12 with many components including work based learning opportunities. In order to design this program, leaders felt they needed to clearly articulate the duties, tasks, skills, knowledge and attributes required of workers to succeed in that industry. An end-product of this initiative was the first set of locally developed industry skill standards for manufacturing in Cleveland, Ohio. The standards were developed to provide the foundation and the framework for the School for Manufacturing and Related Technologies (Project SMART). The publication was finalized in 1995 and determined "consistent with the nation's effort to develop Voluntary Industry Skill Standards."

Partners: Education Development Center in Boston, BP America, Cleveland State University, CAMP, West Tech High School, and Youth Opportunities Unlimited.

Resource Commitments: In the first year of initiation, YOU contributed a full-time Career Coordinator. At the school level there was a team of teachers engaged (1 English, 1 Math, 1 Science, and 1 Social Studies) per grade level to serve these program students only. BP also funded an individual from Cleveland State University's School of Education to work on curriculum integration and a summer teacher training institute. YOU and CSU later added staff to the project. The resource commitment was strong. A couple hundred thousand dollars were spent annually to implement this program. Sources of funding included the YOU General Fund, BP America, two Government Grants, School-To-Work support and, in the latter stages of work, a Fair Chance Grant from DOL supported initiative work.

Standards Development & Utilization:
Employer Engagement: "Project SMART created standards for the learning occupation Manufacturing Technician I, structured on a solid DACUM driven foundation of skills and knowledge required for success of workers entering the manufacturing industry . . . To ensure the standards accurately reflected workplace situations, they were based on worker and employer input and collaborative discussion between school and work personnel. The process used to assemble the information included extensive literature searches, occupational analyses, employer task force meetings, focus groups, and scenario development sessions between January 1992 and February 1994. The Center for Education, Employment & Community at EDC held initial meetings with members of Cleveland's manufacturing community to determine the scope and nature of skills required for individuals to succeed within their first five years of a manufacturing career. Focus groups held with manufacturers then reviewed existing occupational and DACUM analyses and discussed the skills, knowledge, and attributes needed for success once a worker begins his/her career. The activity concluded with a two-day scenario development session in

which frontline workers identified criteria for task mastery and generated skill standards scenarios commonly faced by manufacturing workers within their first five years of employment."

Curriculum Development: Translation and integration of the local industry standards was subcontracted to Cleveland State University. The curriculum also incorporated a work-based learning experience for youth. In fact, employers engaged in up front processes also became mentors for students in the program.

Accomplishments: The initiative was described as a model school to career program built on the foundation of industry skill standards. The program evaluation also demonstrated impact on proficiency test scores, attendance, graduation rates, and post graduation success among low achievers (which were intentionally targeted by the program). While this local development of skill standards was occurring simultaneous to efforts of the NSSB, there were many requests for the Cleveland Manufacturing standards from across the country. In fact, most requests for the information were from outside the region. In addition, Career-Technical Education (then Voc Ed) was in the process of creating the OCAPs. By the end of project SMART, even Max Hayes High School (a program partner) was utilizing OCAPs. Program expense was described as the primary reason the program is no longer functioning. Also, representatives believe that unless you tie your work to Career-Technical Education in Ohio, sustainability will always be difficult. While no longer in place, this initiative published a comprehensive set of skill standards within Ohio which can be updated. The lesson learned is the process is not replicable given the expense. YOU recommends that Ohio find a "non-complicated" and more efficient way to adapt standards for purposes of curriculum development.

HIGHER EDUCATION
INDUSTRY BASED PROGRAM ACCREDITATION

Industry-based program accreditation has been a traditional mechanism for developing greater alignment of post-secondary education/training programs with business/industry needs. Functions include:

- Accreditation of Ohio's two and four year degree programs by industry associations entails formal assessment and documentation of program alignment with industry standards.
- Some industry associations provide examinations for individual assessment and credentialing offering official documentation of skill achievement.

In addition, many higher education programs partner with state boards and licensing agencies which provide operating standards and individual credentialing opportunities. While not a complete list of industry and state credentialing associations/agencies, the following provides examples of adherence to industry standards by Ohio's system of higher education.

INDUSTRY	ACCREDITATION ASSOCIATION
Health Services	Accrediting Commission on Education for Health Services Administration Accrediting Commission for Graduate Medical Education American Association of Medical Assistants American Dental Association Commission on Dental Accreditation American Dental Association American Dietetic Association American Heart Association Health Care Provider certification American Medical Association & Association of American Medical Colleges & Liaison Committee on Medical Education American Medical Association Committee on Allied Health Education and Accreditation American Occupational Therapy Association, Inc American Ophthalmic Society Commission on Education American Ophthalmic Society American Physical Therapy Association American Society of Hospital Pharmacist Commission American Society of Clinical Pathologists (ASCP) Board of Registry American Speech-Language-Hearing Association Association for Gerontology in Higher Education Commission on Education Association of Surgical Technologists Committee on Accreditation for Respiratory Care (CoARC)

	Commission on Accreditation of the Allied Health Education Program Commission on Accreditation of Physical Therapy Education Commission on Optician Accreditation Council on Education for Public Health Joint Review Committee for Radiological Technology National Accrediting Agency for Clinical Laboratory Sciences National Certifying Agency for Medical Laboratory Personnel (NCA) & national certifying examination National League of Nursing National Certifying Agency for Medical Laboratory Personnel (NCA) & national certifying examination Ohio State Board of Nursing Education & Nurse Registration Ohio Division of Emergency Medical Services State Medical Board of Ohio
Legal Services	American Association for Paralegal Education American Bar Association Association of American Law School Schools
Education Services	ODOE Pre-Kindergarten Association Ohio Department of Education National Academic of Early Childhood Programs National Council for the Accreditation of Teacher Education (NCATE)
Manufacturing & Engineering Technology	Technology Accreditation Commission of the Accreditation Board of Engineering and Technology (ABET)
Business Management	Association of Collegiate Business Schools and Programs American Assembly of Collegiate Schools of Business AACSB Accounting Accreditation Accrediting Commission of Education for Health Services Administration (ACEHSA
Physical Sciences	American Chemical Society
	Commission on Accreditation in Clinical Chemistry
Music	National Association of Schools of Music
Journalism	Accrediting Council on Education in Journalism & Mass Communication
Social Sciences	Council on Social Work Education
	American Psychological Association
	Council for Accreditation of Counseling and Related Educational Programs (CACREP)
	National Association of Schools of Public Affairs and Administration

Other	American Library Association Foundation for Interior Design Education Research National Association of Schools of Dance American Culinary Federal American Veterinary Medical Association

CHALLENGES ASSOCIATED WITH SKILL STANDARDS UTILIZATION IN OHIO

The following were specified as challenges to skill standards utilization by Ohio education and training providers. These comments have been organized by each of the four applications of skill standards utilization.

Employer Engagement (for purposes of local verification/prioritization):

- "In serving the business community, we have found that existing skill standards must be translated or cross-walked with real jobs performed by real people. This 'local validation' of more broad and generally accepted skill standards needs to occur to make the most practical use of them."
- "Labor market information has severe limitations and it is expensive/time consuming to convene the business community by sector and occupational focus on an ongoing basis."
- "Skill standard efforts require a lot of research/work to develop curriculum. It is difficult to keep pace with business/industry needs and the evolution of work."
- "The state should focus on an efficient way to enlist business/industry in Ohio."

Curriculum Development:

- "Placing a time frame on learning is difficult (i.e., what can/should be mastered at secondary level vs. post-secondary level)."
- "Entities have multiple goals for programming and participants. For example, a specific registered apprenticeship program will utilize content standards in a far different way than a high school foundation course serving a student in a broad career cluster."
- "Integration of skill standards is time consuming and costly. Industry standards must be translated into educational terms using education language."

Individual Assessment & Credentialing:

- "Challenges related to individual credentialing include the expense to students and the expense to programs and education districts."
- "Assessment should emphasize individual ability to perform. . . But, standards are not applicable to everyone. For example, industry standards are the same for a high school student and an incumbent worker with 15 years of experience. This has to be considered when standards are used for assessment purposes."
- "Business/industry must be engaged on the back end. Recognition of the 'value-added' to the prospective or current employee is necessary to assure that standards are recognized, valued, and meaningful to the employer."

Quality Assurance:

- "We currently lack standard models of implementation; Mentors and professional development for instructors to implement standards; Resource allocation for staffing, facilities, and equipment in standards and implementation; and Follow-up technical assistance to assist programs with differing accreditation."

Lack of Common Language:

- "Every entity seems to want to develop its own specialized set of standards. In the IT realm, for example, there are national industry skill standards, Ohio industry standards,

and some still want to develop new standards. This is a common occurrence which begs the question: What standards do we use?"

- "Challenges related to standards include: Multiple definitions of "standard". Who has the responsibility for the "direction of" standards implementation? There are differing standards by industry, differing standards by education, and no standardized formatting of such standards."

CONCLUSIONS AND EMERGING POLICY CONSIDERATIONS

Industry Skill Standards: An Organizing Tool

Are industry skill standards a tool for establishing greater coherence between business/industry requirements and education/training systems? This is an overarching question for Ohio. Based on existing activities among education/training providers, it appears the answer is "Yes." While progress in skill standards utilization varies across different segments of the workforce development system, use of documented industry skill requirements has been, and is now a key component of educational program design. This is evident by wide spread efforts to adapt nationally validated skill standards for purposes of curriculum development and integration in Ohio. While not as widespread, there are also pockets of progress in using skill standards to inform individual assessment/credentialing and enhance quality assurance in educational systems. Given the experiences of providers, there seem to be questions about the array of available standards-based resources and efficient processes for translating and tying these resources to Ohio educational opportunities. The question from an education/training perspective seems to be how we can do this in more efficient ways, not whether we should do this at all. The challenges specified by providers represent a critical need to help the education community with skill standards utilization and application. As one key informant said,

> *"Ohio should strive to accelerate adoption of national skill standards. They are resources that deter educators from starting with a blank piece of paper. Skill standards are a valuable tool for organizing education/training and linking it to business and industry for the benefit of all learners."*

Adopting Common Language

The lack of common language surrounding skill standards is a significant barrier and impediment to broader skill standards applications and greater cohesiveness between business and education communities in Ohio. In conducting the state-wide interviews the interview team was continuously confronted with questions like "What standards are you referencing?" or "How are you defining skill standards?" The confusion seems to stem from multiple sources. First, education reform in the K-12 system has emphasized academic proficiency and accountability (i.e., standards in reading, writing, math, science, etc.) and the term "standards" often triggers an academic mindset among providers. Second, when defined as *industry* skill requirements, many providers indicated there are differing standards within each industry sector and asked for clarification. Third, terms like "credentialing," "certification," and "accreditation" were used simultaneously by providers for different applications. For example, in a quality assurance context, higher education typically references industry "accreditation" of degree programs. Career-technical education, on the other hand, has adapted the term "certification" to describe its industry validated programs. Both segments of the workforce development system recognize the term "certification" in relation to Information Technology due to the increasing availability of vendor certification programs (like CISCO). In addition, documented/demonstrated verification of individual skill achievement is often described as both "credentialing" and "certification." Promotion of a common language in ways that meet the needs of the entire workforce development system is a necessity if industry skill standards are to be effectively promoted and used in Ohio.

One-Stop Resource

The qualitative assessment of education/training providers revealed that nearly all initiatives have engaged Ohio employers in a process of local adaptation of national skill standards, sometimes referred to as a local "validation" process. Verifying the importance of work related "competencies" with local employers and prioritizing which competencies should be targeted for integration into instructional materials are the primary reasons employers are convened and engaged in early stages of initiative work. While Ohio educators perceive this local prioritization as a necessity for skill standards application, the process is described by some as time intensive and costly. Educators listed such challenges of skill standard utilization as keeping pace with business/industry trends, evolution of work, and skill requirements and availability of standards-based materials.

There is no evidence that Ohio has been able to establish a one-stop resource for standards-based materials – or if one exists, it is not being utilized to the fullest extent by the education community. Many providers recommended that the state play a role in the establishment of a centrally located one-stop for information and referral. The one-stop should encompass not only resources for industry skill requirements but also better research and data support around broader industry trends (i.e., Most describe the current state labor market data as inadequate). Better organization of information and resources could dramatically reduce time/effort currently spent researching business trends and skill requirements. In addition, *criteria for adapting nationally validated skill standards to local levels could improve efficiency of skill standards application within Ohio.* (Many providers have used the bulk of their resources on local employer engagement and prioritization of competencies for integration into curriculum and by the time the instructional materials are developed and published the process needs replicated to keep pace with changing environments and skill requirements). Another entity to keep pace with industry skill requirements and the availability of resources is needed. A state process to identify and continuously re-visit industry skill requirements in ways that build upon national efforts of NSSB and US DOE is recommended.

Streamline Curriculum Development Processes

In Ohio, the greatest share of activity around skill standards utilization has been in the integration of standards into teaching and learning via strong curriculum development processes. In fact, there is considerable expertise and experience in Ohio regarding translation of industry requirements into curricula/instructional material. The Career-Technical Education process used to develop OCAPs was efficient and is replicable. However, if skill standards are to be taken to broader levels (i.e., to inform individual skill assessment and credentialing), the state might consider ways to reduce costs associated with translation of standards into curricula/instructional materials. *Investigation of ways to make the curriculum integration process more efficient would be of great benefit to the education community.* One voice from the field said,

> *"In addition to industry research, a primary role for the state of Ohio is to develop and facilitate the acceptance or modification of national skill standards throughout Ohio."*

More Individual Assessment & Credentialing

Like states reviewed in the companion study by the *Institute for Education Leadership*, there is less activity in Ohio around systemic utilization of skill standards for purposes of individual assessment and credentialing than in other aspects of skill standards implementation. Few education/training providers have taken their work to this level. Some, however, believe this is a primary skill standards application which deserves more attention in Ohio. As one provider said, "Competency-based education has been around since the 1960s, what has lagged is the individual assessment piece . . . assessment of individuals is traditional and not yet competency-based . . . this is an area for Ohio to build upon." The EnterpriseOhio Network's SkillMAX Resource Center represents a step in this direction with its newly established skill matching business units across the state. In general, education/training providers provided two overall thoughts or recommendations around individual assessment and credentialing. First, providers believe there is a need for funding to support individual credentialing costs. This concern stems from recent experiences with vendor certification programs like CISCO where providers have found it somewhat expensive to meet vendor facility, equipment, instructor, curriculum alignment, and other specifications without an investment in resources. Second, if individual assessment and credentialing becomes a focus for the state of Ohio, the education community would like to see business and industry engaged in the work so that individual credentials are "recognized," "valued," and "meaningful" to the employer (e.g., increased pay for individuals who hold the certification or credential).

Industry Focus

Because Ohio will have to decide which industries and occupations are most important to Ohio's economy and organize work around those key clusters, it may be helpful to understand where the greatest emphasis has been relative to skill standards application in Ohio. The following represents key industry areas for which nationally validated skill standards have been utilized in Ohio (primarily for curriculum integration):

Manufacturing
Information Technology
Health Care
Construction Trades
Hospitality, Lodging, and Food Service
Automotive Services
Personal Services: Cosmetology
Aviation

Building on these industries might provide a good starting point for the state since work has already been done to translate the standards for educational purposes.

Structural Recommendations:
If a state level entity is established to promote the use of nationally validated skill standards, the education community has two primary recommendations:

1. Responsibility for standards-based work should rest with a neutral body, especially if it is to transcend all of the workforce development system.

2. Clear and distinct roles should be identified and established for the business community and the education community in all areas of skill standard application.

Some providers recommended that Ohio have a "master plan" with direction for each state division of education and training. Most believe there should be widespread opportunity for input into the development of a master plan so that a common vision is established.

PART V

GETTING STARTED

GETTING STARTED
PHASE I: FISCAL YEAR 2003

The Governor should establish a cabinet-level Skills Standards Working Group to complete Phase I of implementing nationally recognized performance-based Skills Standards.

> ***Skills standards describe what someone needs to do on the job (the work-oriented component) and the knowledge and skills he or she needs to perform in this way (the worker-oriented component). (National Skills Standards Board)***
>
> ***Skills standards establish the agreed-upon, industry-identified knowledge, skills, and abilities required to succeed in the workplace. (National Alliance of Business)***

This working group should be composed of two or more members of the Workforce Policy Board, including strong representation from the business community**,** a representative from organized labor, and the current interagency taskforce [a representative from the Governor's Office and the department heads of the Department of Development, the Department of Education, Department of Jobs and Family Services, and the Board of Regents].

The Governor should charge this body with the following duties consistent with the project recommendations.

1. **Review the Skills Standards Project Report and related issues and make recommendations for the 04-05 state budget.**

2. **Determine an appropriate administrative structure for design and implementation of a comprehensive Ohio skills standards initiative.**

3. **Immediate and extensive efforts must be made to involve and educate key employers and business associations' leadership to mobilize support for a comprehensive performance-based skills standards system.**

    a. *An initial and extensive outreach effort must be made to educate employers about skills standards and the benefits of adopting them.*

    b. *Employers must be involved at the inception of any skills standard initiative and consulted about their needs and about what is feasible to accomplish the implementation of such a program from their perspective. Industry associations within Ohio should be considered important participants in this process.*

    c. *During Phase 1, efforts should be concentrated on Manufacturing. In Phase II, industries and occupations that are most important to Ohio's economy should be*

targeted and work on standards organized around those key clusters. Consideration should be given to the 12 priority industry sectors targeted by the Governor's Workforce Policy Board, especially those industries for which standards have been adapted to Ohio needs and progress has been made in development of effective curricula. [Recommendation X]

4. **Examine Programs and Lessons Learned of Other States.** While Ohio may want to look at several states, invitations should be extended to, and visitations should occur with, the appropriate personnel from *"Tier One"* benchmark/reference states [Florida, Georgia, Illinois, Indiana, Michigan, Pennsylvania, Texas, Virginia, Washington]. This process should be conducted in such a way to build support for skills standards in Ohio's state government and the business community.

5. **Identify steps necessary to bring about coordination and collaboration among the four agencies and between them and employers regarding workforce development efforts and recommend a Phase II plan.**

6. **Build a one-stop resource on skill standards, including an Ohio Skills Standards Initiative Web Site that will provide electronic communication of information, activities, and programs and strongly reflect inter-agency cooperation/coordination and strategic partnerships with the business community.**

7. **Develop a plan for using the Ohio Skills Standards Initiative as a centralizing focus for, and strengthening of, the Ohio Workforce Investment Agencies and Boards.**

7.5 Draft a vision, mission and clear goals for implementing skills standards for approval by the Governor's Workforce Policy Board.

8. Develop a Medallion and Gold Medallion Program.

9. **Establish an evaluation framework for the development and implementation of the Ohio Skills Standards Initiative. A core component of this ongoing evaluation should address the benefits/payoffs to employers in terms of productivity gains and workforce quality.**

10. **Create the Phase II Agenda**

Phase II will begin with the start of the 04/05 biennial budget, July 1, 2003. It is therefore important that the Skills Standard Working Group make recommendations to the Governor as he develops his 04/05 operating budget. These budget-related recommendations should be made no later than October 2002.

In FY 2003, the core responsibility of the working group and the Governor's Workforce Policy Board must be to plan the Phase II agenda— implementing a crosscutting, multi-agency program of performance-based skills standards as a central component of an integrated world-class workforce development system in Ohio.

Recommended Timeline: The working group should be constituted by July, 2002 and present a preliminary report to the Governor and the Governor's Workforce Development Board within 90 days of its being convened.

RECOMMENDED PHASE I FUNDING
[FY 03 BUDGET]

Listed below are the responsibilities of the skills standards working group requiring funding and an estimated range of funding for implementing Phase I. One of the four state agencies involved in the Skills Standards Working Group will serve as fiscal agent. Funding estimate assumes:

a) a limited realignment of existing agency resources; and
b) that expenses are WIA-eligible

Working Group's Key Responsibilities:

A. Planning
   - Examine Other State Experiences
   - Develop Strategic Plan for Phase II
   - Develop an Evaluation Plan
   - Develop a WIB Plan

B. Employer Education and Outreach
C. Skills Standards Website Planning and Development
D. Development of Medallion Program

FY 2003 Total……..……$350,000 -$450,000

APPENDICES

A. GLOSSARY

B. (WIA) OVERVIEW OF SKILL STANDARDS

C. KEY STAKEHOLDER OUTREACH

D. SKILL STANDARDS LIST

E. NIMS CREDENTIALS

A. GLOSSARY

SKILLS STANDARDS GLOSSARY

Definitions are never static; they take on new meaning with time and experience. However, this does not lessen the need to have some common understanding of terms. The following attempts to capture the essential ingredients of generally understood usage. Some of the definitions are specific wording developed by a particular organization, while others are a synthesis of one or more sources.

Skills Standards: There is a core set of concepts that are common to all definitions of skills standards. The term skills standard focuses on work related competencies and includes (often embedded in the skills statement) academic knowledge and skills. A standard includes two key factors.

The Content: What does a person need to know?

The Performance: What does a person need to be able to do? This can include levels of achievement or competency within a content area (e.g., advanced, proficient, and basic). Performance can be set either for an individual content standard or across groups of content standards.

Standard Types: There are several different types of skills standards, one building upon the other: *core academic, generic workplace readiness, industry core, occupational family, and occupational or job specific*.

Core academic standards cover those subject matter areas such as mathematics, language arts, and science that are necessary to function as a member of society and help develop career-related skills.

Generic workplace readiness standards cover those skills and qualities that workers must have to learn and adapt to the demands of *any* job. These include personal attributes, interpersonal skills, thinking and problem solving, communication, and use of technology.

Industry core standards apply to most of the occupations in a particular industry. Thus, there are core standards for the hospitality industry that are distinct from core standards for the electronics industry. Industry specific standards are critical to career-preparation programs (e.g., career majors and programs of study).

Occupational family standards specify the knowledge and skills that are common to a related set of occupations or functions within an industry or across industries. For example, within the health care industry, occupations in medical laboratory, imaging, and radiography can be thought of as belonging to a larger diagnostic family (or cluster) of occupations. The occupations in this diagnostic family focus on creating a picture of patient health at a single point in time. Whereas individual job-specific requirements may change, depending on changes in the job market as well as changes in the structure of the workplace, occupational family level standards provide a broad base of skills for individuals.

Occupational or job specific standards address the skill expectations of a specific occupation. This is the level on which most certification systems focus.

Education providers need to incorporate all of these levels of standards when preparing programs of study and curriculum.[24]

Voluntary Skills Standards: The term voluntary skills standards is a "term of art" derived from the National Skills Standards Act of 1994. The term voluntary was used to show that neither the public nor the private sectors would be mandated to use the products endorsed by the National Skills Standards Board. However, units of government or an individual business can (and many do) choose to mandate the use of skills standards for a variety of purposes. One key purpose of the National Skills Standards Act is to facilitate the development and use of standards for broad clusters of occupations due to the recognition that it is in the public and private interest to establish broad-based standards to meet the needs of a whole industry in order to promote career advancement.

Process for Establishing Standards: Skills standards are established through a variety of job analysis processes that involve documentation and validation by a wide range of workers and work place supervisors. In the case of certification programs that attest to the competencies of an individual the courts have upheld these various processes if there is proof the organization responsible for conducting the work has complied with national requirements of civil rights laws and followed procedures established by the American Psychological Association. If a certification program desires to be national in scope a key requirement is that the job validation process must show proof that all regions of the country have been included in the activity. This proof allows recognition and portability of credential being recognized across state lines.

Certification

1) The process by which a non-government agency or association grants recognition of competence to an individual who has met predetermined qualifications specified by the agency or association. (National Organization for Competency Assurance)
2) The type or name of particular state license or professional or technical certification programs required for given jobs or possessed by an individual. (US Department of Labor)

Credentialing

1) Encompasses both the certification of individuals who have been found to meet criteria of competence and the accreditation of academic institutions that have been approved as meeting quality standards. Credentialing activities can include:
   a) prescribing education and experience qualifications for certification candidates;
   b) establishing curriculum, faculty, and faculty qualifications for potential accredited institutions;
   c) administering competitive examinations; and

[24] See Part III further definitions of terms used by the National Skill Standards Board that build upon this contextual set of definitions.

d) conducting assessment visits. (American Society of Association Executives)

2) The recognition of professional or technical competence. The credentialing process may require registration, certification, licensure, professional association membership or the award of a degree in the field. (National Organization for Competency Assurance)

   When the focus on credentialing is centered on the institution the term accreditation is used predominately by institutions of higher education; for programs that are focused on secondary education institutions the term of art is program certification.

Adapter States: States that import skill standards and adapt them for recognition and use in their respective states. The sources of imported skill standards are most likely to be nationally recognized industry groups such as NIMS. At a minimum, adapter states must crosswalk the imported standards content (matching element by element) with the state's endorsed standards for standards—format, elements, and nomenclature. Adapter states may or may not undertake a statewide validation of imported skill standards. When a content validation process is performed, the original skill standards content will be amended to reflect those skills and knowledge determined to be different. An adapter state is most likely to also be a developer.

Adopter States: States that import skill standards developed by other states or by industry groups for use in their respective states. They disregard the difference in structural format, elements, and nomenclature, using the content to inform education and training in a variety of ways. Because these states have not determined a "standard" (including format, elements and nomenclature) for standards in their states, they typically are not developers nor adapters. These states may or may not slightly modify the standards content to "fit" state needs. (9)

Complexity Rating Scales: intended only for rating the level of complexity required in a particular knowledge and skill based on what the work requires.

Curriculum Alignment: links academic and vocational curricula so that course content and instruction dovetail across and/or within subject areas. (6)

Curriculum Framework: Document published by a state education agency or board of education that generally includes desired subject content or standards for a core academic subject in K-12 education and written by a team of content experts, state agency personnel, and local educators. A state framework often serves as a bridge between national profession standards and local curriculum and instructional strategies. (4)

Curriculum Standards: include industry-validated knowledge, skills, and abilities that a student is expected to learn in a program of study or specific course. (3)

Developer States: States that develop skill standards that reflect the skill and knowledge needs of industry and business in their states. All these states have specific skill standards nomenclature and formats, as well as development protocols. Developers are usually not adopters, although they may be adapters. (9)

Integrated Curriculum Standards: integrates occupational/industry related material with academic standards that may or may not be validated at the worksite. (3)

On-demand assessment: are activities administered on specific dates under secure conditions. (8)

Pathway: set the scope and sequence of courses required for various jobs within a career cluster, ranging from entry-level to management. (2)

Performance standards: indicate level of achievement, of competency within a content area (e.g., advanced, proficient, and basic). (3)

Portability: To enable individuals to move between jobs and industries more easily. (1)

Program Standards: are established by national trade, professional associations or certification organizations for the purpose of recognizing education or training institutions. The standards can include references to instructional services, facilities, qualification of staff, equipment, and administrative processes. (3)

Scenarios: are examples of issues and problems found in worksites and validated by industry representatives. The scenarios can be composites of several job specific situations. The scenarios can be used in a variety of ways by education and training providers such as becoming a part of the instructional process as well as being used with on-demand assessments. (3)

Specialty skill standards: The knowledge, skills, and performance, which are unique to a particular job or occupation, to an individual industry, or to a specific company. (1)

Voluntary Partnership: The Voluntary Partnerships are coalitions of employers, employees, educators, and community and civil rights organizations that will be developing core and concentration skill standards for different industry sectors. (1)

Worker-oriented component: This aspect of the skill standards describes the knowledge and skills an individual needs to possess in order to perform in this way. It's called *worker*-oriented component because it focuses on the knowledge and skills a worker needs to perform competently. (NSSB) (1)

> **Academic knowledge and skills:** Knowledge and skills associated with the academic disciplines of reading, writing, mathematics, and science. (1)
>
> > **Mathematics:** Understand, interpret, and manipulate numeric or symbolic information; solve problems by selecting and applying appropriate quantitative methods such as arithmetic, quantitative reasoning, estimation, measurement, probability, statistics, algebra, geometry, and trigonometry. (1)

Reading: Understand and use written information that may be presented in a variety of formats, such as text, tables, lists, figures, and diagrams; select reading strategies appropriate to the purpose, such as skimming for highlights, reading for detail, reading for meaning, and critical analysis. (1)

Science: Understand and apply the basic principles of the physical, chemical, biological, and earth sciences; understand and apply the scientific method, including formulating and stating hypotheses and evaluating them and experimentation or observation. (1)

Writing: Express ideas and information in written form clearly, succinctly, accurately, and in an organized manner; use English language conventions of spelling, punctuation, grammar, and sentence and paragraph structure; and tailor written communication to the intended purpose and audience. (1)

Employability knowledge and skills: Applied knowledge and skills used to perform effectively across a broad range of occupations, such as teamwork, decision-making, and problem solving. (1)

Adaptability: Change one's own behavior or work methods to adjust to other people or to changing situations or work demands; be receptive to new information, ideas, or strategies to achieve goals. (1)

Analyzing and solving problems: Anticipate or identify problems and their causes; develop and analyze potential solutions or improvements using rational and logical processes or innovative and creative approaches when needed. (1)

Building consensus: Build consensus among individuals or group by facilitating agreements that involve sharing or exchanging resources or resolving differences in such a way as to promote mutual goals and interests; by persuading others to change their point of view or behavior without losing their future support; and by resolving conflicts, confrontations, and disagreements while maintaining productive working relationships. (1)

Gathering and analyzing information: Obtain facts, information, or data relevant to a particular problem, question, or issue through observation of events or situations, discussion with others, research, or retrieval from written or electronic sources; organize, integrate, analyze, and evaluate information. (1)

Leading others: Motivate, inspire, and influence others toward effective individual or teamwork performance, goal attainment, and personal learning and development by serving as a mentor, coach, and role model and by providing feedback and recognition or rewards. (1)

Listening: Attend to, receive, and correctly interpret verbal communications and directions through cues such as the content and context of the message and the tome, gestures, and facial expressions of the speaker. (1)

Making decisions and judgments: Make decisions that consider relevant facts and information, potential risks and benefits, and short- and long-term consequences or alternatives. (1)

Organizing and planning: Organize and structure work for effective performance and goal attainment; set and balance priorities; anticipate obstacles; formulate plans consistent with available human, financial, and physical resources; modify plans or adjust priorities given changing goals or conditions. (1)

Self and career development: Identify own work and career interests, strengths, and limitations; pursue education, training, feedback, or other opportunities for learning and development; manage, direct, and monitor one's own learning and development. (1)

Speaking: Express ideas and facts orally in a clear and understandable manner that sustains listener's attention and interest; tailor oral communication to the intended purpose and audience. (1)

Using information and communications technology: Select, access, and use necessary information, data, and communications-related technologies, such as basic personal computer applications, telecommunications equipment, Internet, electronic calculators, voice mail, email, facsimile machines, and copying equipment to accomplish work activities. (1)

Using social skills: Interact with others in ways that are friendly, courteous, and tactful and that demonstrate respect for individual and cultural differences and for the attitudes and feelings of others. (1)

Working in teams: Work cooperatively and collaboratively with others to achieve goals by sharing or integrating ideas, knowledge, skills, information, support, resources, responsibility, and recognition. (1)

Work-oriented component: This aspect of the skill standards describes what needs to be done and how well. It's called the *work*-oriented component of the standards because it focuses on the requirements of work. (NSSB) (1)

Critical work functions: the major responsibilities of work covered by a concentration. (1)

Key activities: the major duties or tasks involved in carrying out a critical work function (1)

Performance indicators: information on how to determine when someone is performing each key activity competently. (1)

Occupational and Technical Knowledge and Skills: Occupational and technical skills include such things as the use or operation of tools, machines, and equipment. Occupational and technical *knowledge* encompasses knowledge of methods or theories; particular products or services; and languages other than English. Occupational and technical knowledge may also include other elements, such as knowledge of computer software programs and applications, general business and industry knowledge, and an understanding of workplace systems, culture, and policies. (1)

Source

(1) National Skill Standards Board (NSSB)
(2) Department of Education (DOE), Office of Vocational & Adult Education (OVAE)
(3) Anada & Rabinowitz, 1995
(4) Council of Chief State School Officers (CCSSO), 1996
(5) Secretary Commission and Necessary Skills (SCANS), 1991; CCSSO, 1993
(6) National School-to-Work Office, 1996
(7) Metropolitan Education Research Consortium (MERC), 1997
(8) National Research Center for Education, (West Ed), 1995
(9) Institute for Educational Leadership (IEL) National Overview of Skill Standards Report, 2002

B. OHIO WORKFORCE (WIA) OVERVIEW OF SKILL STANDARDS

OHIO WORKFORCE (WIA) OVERVIEW OF SKILL STANDARDS

The Ohio Workforce (WIA) Area overview was conducted by Cleveland State University to identify agency initiatives throughout the state, which are using standards based materials in some capacity.

This report provides the overview of the current "state of practice" with WIA agencies in the state. The protocol (Appendix A) addressed policies and views related to funding of any organizations involved in the development and/or use of industry/occupational skill standards or credentialing/certification. In addition, agencies were asked how Ohio could better organize around skill standards and improve the "current state" on using skill standards.

The results of the survey are contained in four areas: the survey itself, the policy on funding, funding organizations involved in development and use of skill standards, and agency views on the role of the State of Ohio.

SURVEY

- Eighty-four county/city agencies administrating programs were contacted by email, fax, letter, and phone during February, 2002.
- There were eight WIBs in Ohio contacted but none responded.
- Eighteen agencies replied for a 21% response rate.

POLICY ON FUNDING

- Three agencies indicated a policy requirement in place for organizational funding. One agency funded only training that provides necessary skills. WIA participants of the other agency are given standardized tests that assist in determining skills and educational level for appropriate training.
- Five agencies hold a view that skill standards and credentialing/certification are of some consideration for WIA training providers and trainees and does influence their funding decisions to organizations. The agencies cite skill standards and worker credentialing/certification as good for quality training and necessary for a good workforce base. Also, curriculum should be structured to meet today's demands of industry by providing knowledgeable competent employees.

ORGANIZATIONS INVOLVED IN DEVELOPMENT AND USE OF SKILL STANDARDS

- Four agencies fund organizations that use job qualification preference or requirements (i.e., industry certification required).
- Four agencies fund organizations that use standards as a tool to educate or encourage education/training providers to use the standards for curriculum content, student assessment, credentialing, or to inform them of employers' needs.

AGENCY VIEWS ON THE ROLE OF THE STATE OF OHIO

If the State of Ohio were to better organize around skill standards and establish an entity to serve as a resource, the agencies indicated the most worthwhile role of this entity would be:

- Broad education/promotion of skill standards utilization. (6)
- Technical assistance for curriculum development. (4)
- Technical assistance around assessment and/or credentialing. (8)
- Networking/connecting business community with education/training providers. (6)

The agencies indicated that the State of Ohio could improve the "current state" on using skill standards by:

- ***Encourage*** education and training providers to use nationally accredited skill standards to prepare workers. (12)
- ***Require*** education and training providers to teach nationally accredited skills. (8)
- ***Establish*** a credentialing system that would insure consistency in mastering work skills. (12)
- ***Require*** education and training providers to retrain, free of charge, graduates who fail credentialing tests. (8)

CONCLUSION

The survey indicates a minimal agency activity across the State of Ohio regarding policy and funding of organizations involved in skill standards and worker credentialing/ certification. However, the responding agencies indicated that the State of Ohio can play a positive role to promote a quality workforce development system using nationally accredited skill standards and credentialing/certification to prepare workers.

C. KEY STAKEHOLDER OUTREACH

KEY STAKEHOLDER OUTREACH

Efforts were made to inform key stakeholders about the nature of the Skills Standards Project to help refine the project, ascertain how they currently perceive workforce development issues, and make them aware of the myriad issues involved with implementing a system of voluntary national skills standards statewide. To that end, representatives of the agencies and organizations most directly involved with any such initiative were interviewed; a project advisory committee was established consisting of the executive directors of major employer associations and a representative from the Governor's Workforce Development Board; and the project team participated in presentations to a regional and state conference. The information gleaned from these informal sessions helped to shape project work. In general, all stakeholders contacted were supportive of the direction the project was taking and interested in the development of a skills standards initiative for Ohio.

The original intent was to especially engage the employer community to determine the extent of their involvement with, and interest in, initiating skills standards as a tool to improve Ohio's workforce development system. It was thought that this particular outreach was important as on the one hand we could learn from them as employers could relay first-hand knowledge about what is needed, and on the other hand, we could help to inform them about skills standards as relatively little is known in Ohio about skills standards efforts. The plan was to conduct a statewide survey of employers, as well as hold focus groups with them, to gain information about their knowledge of, involvement with, and attitudes towards skills standards. It turned out, however, that employers' knowledge in this area was so minimal and the demands on their time, so great, that such activities were not feasible within the scope of this project. This experience points to the strong need to educate and involve the employer community if their support for skills standards is to be gained, a critical component of any successful skills standards effort.

KEY STAKEHOLDERS CONTACTED

Appropriate staff in the following agencies and organizations was contacted:

Ohio Department of Development
Ohio Department of Job and Family Services
The Governor's Workforce Development Board
The Ohio Board of Regents
The Ohio Association of Community Colleges
Ohio Department of Education
The Ohio Manufacturers' Association
The National Federation of Independent Businesses/Ohio
The Ohio Business Roundtable
The Ohio Chamber of Commerce
The Ohio Farm Bureau Federation
The Ohio County Commissioners Association
The Governor's Senior Staff

The Northeast Ohio Regional Workforce Partnership
The Greater Cleveland Growth Association

INTERVIEW QUESTIONS FOR KEY STAKEHOLDERS

This project is concerned with improving coherence among Ohio's business and industry needs and available job training. On the national level, skill standards specifications, credentialing, and assessments* are being established for the purpose of aligning job training more closely with actual skills required for successful employment. Even though numerous employment and job training programs exist, there is not always clarity about exactly which skill standards should be provided to train participants so that they can meet the demands of today's workplace. Ohio's Workforce Policy Board is addressing this issue.

The following questions are designed to facilitate a deeper understanding of how Ohio's workforce development stakeholders -- state policy and program leaders in both the executive and legislative branch, local workforce development program staff, and employer and employee representatives -- currently perceive workforce development issues.

1. Has your business experienced difficulty hiring competent employees because of what you perceive to be inadequate education and training programs? Are there particular problems in certain skill/occupational areas?

2. Do you agree with the assumption that specific skills needed for various employment categories should be more clearly communicated to and used by employment and training providers? On a scale of 1-10, with 10 being high and 1 being low, how do you think Ohio is doing in this regard?

3. Are you aware of any companies or associations engaged in skill standard setting, credentialing, or assessment? If so, do you perceive such activity to be an important part of their business success?

4. This skill standards project is targeting the following career clusters:

   Tier One:
   a) Manufacturing;
   b) Information Technology;
   c) Health Sciences;

---

* Skill Standards Setting - Deciding what specific skills are necessary for specific clusters of jobs
Credentialing - Certifying workers who have met specific requirements for a position
Assessment - Testing potential employees to determine whether or not they have the necessary skills for a particular cluster of jobs

d) Business and Administration Services; and

Tier Two:

a) Human Services;
b) Educational and Training Services;
c) Transportation; and
d) Wholesale and Retail Sales and related services.

Are there other clusters that you would target?

5. What are your major concerns in regard to employment and training in Ohio?
    a) entry-level skills of applicants;
    b) training of low-income Ohioans;
    c) availability and quality of training for incumbent workers as well as their ability to benefit from on-the job training;
    d) effective marketing of publicly financed training programs to employers;
    e) objective evaluation of these training programs to determine which ones are quality programs
    f) other, including your experiences with local Workforce Investment Board

6. What barriers exist to addressing your primary concerns?

7. What has been your experience with employees having necessary skills from:

    - Vocational education
    - Workforce development (employment and training) Programs;
    - Regular K-12;
    - Tech Prep;
    - Community Colleges; and
    - Higher Education?

8. What aspect of this skills standards project would be of most use to you?

EMPLOYER SURVEY AND COVER LETTER

February 12, 2002

Dear Association Member,

We are all well aware that it has become increasingly difficult to find good workers with the skills to do the job and help make our businesses run more smoothly and profitably. But how do we improve the situation?

The Governor's Workforce Policy Board, a state-level group composed primarily of business representatives, is taking steps to address this problem by looking at how to achieve greater coherence between industry needs and education and training services. It is undertaking a project to assess the development and voluntary use of nationally validated, skill standards and worker credentialing in Ohio.

This skills standard assessment is being conducted in an effort to improve employment and training programs so that specific occupational skills can be clearly identified and more effectively taught.

Establishing skill standards can be key to meeting the needs of industries as these standards can inform job seekers and employees about the requirements of the work place, provide more consistency in skill preparation, help to measure results and monitor programs, lead to portable credentials, and reduce business costs.

Your input as an Ohio employer is necessary to provide accurate data for this project and to insure that the voice of Ohio's employer community will be heard and considered in the design of Ohio's workforce development policies and services.

Attached is a survey that will take approximately 15 minutes to complete. Your cooperation will be greatly appreciated.

The surveys should be faxed back to _____ no later than February 21.

Thank you.

Sincerely,

STATE REVIEW OF SKILLS STANDARDS

EMPLOYER QUESTIONNAIRE

The Governor's Workforce Policy Board has commissioned a study on the use of skill standards throughout Ohio. The intent is to assess how standards-based materials are (or are not) utilized by employers and the workforce development system and what role employers are playing in industry skill standards development and applications. Your company was identified as a member of a trade association important to this study. All information provided will remain confidential.

Results of the study will be used to identify ways standards-based tools can be used to develop greater coherence between industry and education/training providers and will assist the state's workforce development system in better meeting the needs of companies like yours. Your participation is, of course, voluntary, but your help is crucial to this effort.

Company Description

1. Please describe the nature of goods produced/services provided by your company. ___

_____

_____

2. What is the total number of employees at this business address?
   # Full-time workers: _____ # Part-time workers: _____

3. What association(s) is your company currently a member of or affiliated with? _____

_____

Development & Application of Skill Standards

Skill standards are intended to detail what workers need know and be able to do, and how well they need to be able to do it within an industry, set of occupations, or a specific occupation. There are industry based and verified performance specifications that identify the knowledge, skills, and abilities an individual needs to succeed in an industry.

4. Has your company participated in the **development** of industry/occupational skill standards?

□ Yes → 4a. What organization was primarily responsible for developing these skill standards? _____

4b. What mattered most in being able to develop the standards (leadership, union-cooperation, employee demand, or what)? _____

_____

4c. Describe the nature of these skill standards (i.e., what is the industry, occupational, and skill emphasis of the standards?)

Industry	**Occupational**	**Skill(s)**
_____	_____	_____
_____	_____	_____

[PLEASE USE BACK OF THIS PAGE FOR FURTHER DESCRIPTION OR ATTACH ANY AVAILABLE INFORMATION TO THIS QUESTIONNAIRE.]

5. Has your company engaged in the **use and application** of skill standards?

□ No

□ YES → 5a. Why has your company chosen to support industry-based skill standards?

_____

_____

_____

5b. Indicate whether or not your company has used skill standards in the following ways: **Yes** **No**

1. Job qualification preference or requirement (i.e., industry certification required)	□	□
IF YES: Do applicants/new hires receive additional pay if they are certified?	□	□
2. Basis for testing/assessing skills of job applicants or new hires	□	□
3. Basis for in-house training of new and existing workers	□	□
4. To select or certify your training suppliers	□	□
5. As a tool to educate or encourage education/training providers in your community to use the standards for curriculum content, student assessment/ credentialing, or to inform them of employers' needs – to better communicate with them.	□	□
6. To guide job matching	□	□
7. For certifying existing workers	□	□
8. To assess performance of workers	□	□
9. For determining salary and/or incentive pay	□	□
10. For quality assurance processes/purposes	□	□

5c. For what jobs in your company do you use standards?	5d. What is the source of the standard?	5e. Is it industry- or professional-association verified?		5f. Length of time this standard has been used?
JOB	SOURCE	NATIONALLY VALIDATED? Yes	No	TIME
_____	_____	☐	☐	_____
_____	_____	☐	☐	_____
_____	_____	☐	☐	_____

5g. Approximately what % of your workforce is covered by standards? __%

5h. What have been the benefits, if any, of using skill standards within your company? _____

_____

5i. What have been the greatest challenges or barriers to using skill standards within your company (e.g., reluctance of workers to undertake study, reluctance of union to support, cost of training, cost for certification, etc?)

_____

_____

☐ NO IN-HOUSE USE OF SKILL STANDARDS

Additional Questions

6. Based on your knowledge and/or use of skill standards, indicate your level of agreement with the following:

	Agree	**Strongly Agree**	**Disagree**	**Strongly Disagree**
a. Skill standards help education/training providers identify and develop worker skills that employers need for their company to be successful.	☐	☐	☐	☐
b. Using industry standards as a basis for skill training and acquisition will help individuals succeed in their careers.	☐	☐	☐	☐
c. Industry skill standards are difficult to translate into curriculum/training content or assessment tools.	☐	☐	☐	☐

d. Industry skill standards greatly enhance partnerships between employers and education/training providers.	□	□	□	□	
e. The state of Ohio should adopt policies related to the use and application of industry skill standards among education and training providers.		□	□	□	□
f. Industry standards are a good tool for establishing accountability/performance standards for education and training providers.		□	□	□	□
g. I am satisfied with the academic preparation of my new hires:					
i. who have a regular high school diploma		□	□	□	□
ii. who have had vocational training	□	□	□	□	
iii. who have received a GED	□	□	□	□	
iv. who have had tech prep		□	□	□	□
v. who have two-year college degree	□	□	□	□	
h. Service providers have communicated with my company about our needs or how effective their training is.		□	□	□	□
i. Our industry needs to do more to promote the use of skill standards.		□	□	□	□

7. What are your greatest concerns regarding nationally recognized, voluntary skill standards?

- □ Effort to set them up
- □ Quality that will emerge
- □ Cost
- □ How and how well they will be assessed
- □ Don't understand need for, benefit of, or how they will be used
- □ Other_____

8. Would your company be willing to participate in promoting the use of voluntary skill standards in Ohio? Yes □ No □

D. SKILL STANDARDS LIST

LISTING OF SKILL STANDARDS

As part of the overall examination of skill standard for the state of Ohio, standards were collected around the 16 career clusters used by the U.S. Department of Education. Those 16 clusters are:

1. Agriculture and Natural Resources
2. Arts, A/V Technology and Communication
3. Business and Administration
4. Architecture and Construction
5. Education and Training
6. Finance
7. Health Science
8. Hospitality and Tourism
9. Human Services
10. Information Technology
11. Law and Public Safety
12. Manufacturing
13. Government and Public Administration
14. Retail/Wholesale Sales and Service
15. Scientific Research/Engineering
16. Transportation, Distribution and Logistics

The array of standards information went deeper on specific occupational areas of interest to the state of Ohio. These categories were determined by the Cleveland State University team as being most relevant to the economy of the state of Ohio and include:

(1) Business and Administration;
(2) Health and Human Services;
(3) Manufacturing,
(4) Information Technology,
(5) Education and Training, and
(6) Hospitality and Tourism

Standards can be found in a variety of sources. One can check organizations and associations that represent specific industries and occupations. Licensing organizations within states can guide one to standards. Others are available through directories and through specific organizations such as the National Organization for Competency Assurance, which is a membership organization for credentialing organizations, i.e. organizations that create standards and conduct assessments on those standards. Few publications exist with this information, but one such directory is, the *Guide to National Professional Certification Programs*, published by the Human Resource Development Press in Amherst, MA.

While no one source exists, two organizations are trying to capture as many standards as possible. They are:

The Clearinghouse of the National Skill Standards Board. One of the responsibilities of the NSSB specified in the legislation creating them was that they identify and maintain a catalog of

skill standards used by other countries, by states, and leading firms and industries in the United States. The NSSB Clearinghouse in addition to having standards also includes summaries of reports and other publications on skill standards. It includes international standards because standards endorsed by the NSSB are to consider other countries' assessments and certifications.
http://www.nssb.org/

Repository of the National Dissemination Center for Career and Technical Education and The National Research Center for Career and Technical Education which is collecting and displaying standards for educators. The repository currently has 135 entries. Their information is not as detailed as found in the NSSB clearinghouse and the entry is so indicated by repository instead of the producer of the standards found in the NSSB entries.
http://www.nccte.com/

These two sources were used exclusively. There is a little overlap between the two but not much. There is overlap in that some standards are listed in more than one cluster because they are broad. There are four notebooks to cover the career clusters in the U.S. Department of Education's (ED) organizational schema. Two clusters, identified as being important to the state of Ohio, Information Technology and Manufacturing, are in their own notebooks.

This resource material tells the reader what exists or, more to the point, what either the clearinghouse or the repository has found. Collection of standards is never-ending, .For example, the NSSB continues to support voluntary partnerships, which are developing standards in additional areas. Organizations that offer certifications based on standards are coming forward to the NSSB for recognition. Information on these efforts will be added to the clearinghouse. As seen in the report, Overview of Standards, some states are developing standards.

Each notebook lists in front the standards within the notebook. The list also follows here. Information on a total of 329 standards is within these notebooks. As seen by the attached list, Information Technology has the most with 100 and anyone with a cursory knowledge of computers and education knows that the field is rife with specific company certifications that are added and dropped very quickly. Only one certification was found for two of the clusters, Human Services and Law and Protective Services.

AGRICULTURE & NATURAL RESOURCES

1. Irrigation Association –*Agricultural Irrigation Specialist*
2. Irrigation Association -- *Irrigation Contractor*
3. Irrigation Association –*Irrigation Designer*
4. Irrigation Association –*Landscape Irrigation Auditor*
5. Irrigation Association – *Certified Irrigation Designer*
6. American Association of Professional Landmen – *Professional Landman*
7. American Association of Professional Landmen – *Professional Landman/Environmental Site Assessor*
8. American Association of Professional Landmen (AAPL*)*--*Certified Professional Landman / Environmental Site Assessor (CPL/ESA) Certification Program-*
9. National Environmental Health Association –*Hazardous Substances Specialist*
10. National Environmental Health Association – *Certified Environmental Health Technician*
11. National Environmental Health Association – *Registered Environmental Health Specialist/ Registered Sanitarian*
12. Apprenticeship – *Agricultural Service Workers*
13. Apprenticeship Food Production Industry – *Farm Operations – Farm Workers:*
14. *The Repository–Environmental & Agricultural Systems Career Cluster Integrated Technical and Academic Competencies (ITAC)*
15. The Repository – *Master Beekeeper Certification Program*
16. The Repository – *Standards for Agricultural Education in PA*
17. The Repository – *Agricultural Biotechnology Technician, National FFA Foundation*
18. The Repository – *Floristry, Illinois Occupational Skill Standards and Credentialing Council*
19. The Repository – *Greenhouse / Nursery Cluster, Illinois Occupational Skill Standards and Credentialing Council*
20. The Repository – *Landscape Technician Cluster, Illinois Occupational Skill Standards and Credentialing Council*
21. The Repository – *Retail Garden Center, Illinois Occupational Skill Standards and Credentialing Council*

ARTS, AV TECHNOLOGY AND COMMUNICATIONS

1. Computing Technology Industry Association – *Document Imaging Architect*
2. The Repository -- *Integrated Technical and Academic Competencies (ITAC)*
3. The Repository – *Code of Ethics for Business Educators and Writers*
4. The Repository – *Commercial Radio Licenses*
5. The Repository – *Ethics in Journalism*
6. The Repository – *National Press Photographers Association Code of Ethics*
7. The Repository – *Radio &Television News Directors Association Code of Ethics*
8. The Repository -- *The National Educational Technology Standards (NETS)*
9. The Repository – *Webmaster and Website Designer*

ARCHITECTURE AND CONSTRUCTION

1. American Concrete Institute International – *Concrete Transportation Construction Inspector*
2. American Concrete Institute International – *Concrete Strength Testing Technician*
3. American Concrete Institute International – *Concrete Field Testing Technician*
4. National Commission for the Certification of Crane Operators – *Crane Operator*
5. Brainbench – *Computer aided drafters and designers* (*Pro/Engineer 2000i Certification)*
6. Board of Certified Safety Professionals – *Safety Trained Supervisor in Construction*
7. Board of Certified Safety Professionals – *Construction Health and Safety Technician*
8. North American Technician Excellence, Inc. – *Oil Furnace Technician*
9. North American Technician Excellence, Inc. – *Heat Pump Technician*
10. North American Technician Excellence, Inc. – *Gas Furnace Technician*
11. North American Technician Excellence, Inc. – *Air Distribution Technician*
12. North American Technician Excellence, Inc. – *Air Conditioning Technician*
13. National Glass Association – *Glazier*
14. Concrete Sawing and Drilling Association – *Concrete Sawing and Drilling Operator*
15. The Repository – *Architectural Drafting (CAD), Illinois Occupational Skill Standards and Credentialing Council*
16. The Repository – *Measurement Criteria for Entry Level Electronics Technician*
17. The Repository –*Construction Sub-cluster of the Industrial and Engineering Systems Career Cluster Integrated Technical and Academic Competencies*
18. The Repository – *Core Standards for Construction Craft Laborers*
19. The Repository – *Electrical Construction Skill Standards Project*
20. The Repository – *The National Center for Construction Education and Research (NCCER)*

BUSINESS AND ADMINISTRATIVE SERVICES

1. National Association of Legal Secretaries –*Professional Legal Secretary; Accredited Legal Secretary*
2. Institute for Records Managers –*Records Managers Program*
3. Institute for Certified Professional Managers –*Administrative Manager*
4. Project Management Institute – *Project Management Professional*
5. National Society of Fund Raising Executives –*Fund Raising Executive*
6. American Payroll Association –*Payroll Professional*
7. American Society for Quality –*Quality Auditor*
8. International Publishing Management Association –*Mail Manager*
9. Microsoft – *Microsoft Office User Specialist Certifications*
10. American Hotel and Motel Association –*Government Property Technician*
11. American Hotel and Motel Association –*Property Manager*
12. American Hotel and Motel association –*Government Property Supervisor*
13. American Institute for Chartered Property Casualty Underwriters and Insurance Institutes of America –*Advisor in Insurance*

14. National Association of Purchasing Management, Inc. *–Purchasing Manager; Accredited Purchasing Practitioner*
15. Institute of Management Accountants – *Certified in Financial Management*
16. Insurance Institute of America – *Associate in Risk Management*
17. National Association of Credit Management – *Credit Business Fellow*
18. National Association of Business Management – *Credit Business Associate*
19. National Association of Business Management – *Credit Executive*
20. Insurance Institute of America – *Association in Fidelity and Surety Bonding*
21. Insurance Institute of America – *Associate in Management*
22. American Institute of Chartered Property Casualty Underwriters and Insurance Institute of America – *Accredited Advisor in Insurance*
23. Insurance Institute of America – *Associate in Premium Auditing*
24. American Institute of Chartered Property Casualty Underwriters and Insurance Institute of America – *Personal Insurance Specialist*
25. Life Office Management Association – *Associate in Reinsurance Administration*
26. American Institute for Chartered Property Casualty Underwriters and Insurance institute of America – *Associate in Underwriting*
27. Life Office Management Association – *Fellow, Life Management* Institute
28. Life Office Management Association – *Underwriting Life and Health Insurance*
29. Insurance Institute of America – *Associate in Insurance Accounting and Finance*
30. Insurance Institute of America - *Associate in Claims*
31. The Repository – *Administration Support, Illinois Occupational Skill Standards and Credentialing Council*
32. The Repository – *Business and Management Career Cluster Integrated Technical and Academic Competencies (ITAC)*
33. The Repository – *Court Reporter Captioner, Illinois Occupational Skill Standards and Credentialing Council*
34. The Repository -- *Information Processing, Illinois Occupational Skill Standards and Credentialing Council*
35. The Repository – *Legal Office Cluster, Illinois Occupational Skill Standards and Credentialing Council*
36. The Repository – *Medical Office, Illinois Occupational Skill Standards and Credentialing Council*

EDUCATION AND TRAINING

1. NSSB- *Education and Training Voluntary Partnership*
2. Council for Early Childhood Professional Recognition – *Child Development Associate*
3. American Culinary Federation – *Culinary Educator*
4. The Chauncey Group International – *Technical Trainer*
5. The Chauncey Group International – *Professional Development Trainer*
6. American Welding Society - *Welding Educator*
7. The Repository – *ASTD Human Performance Improvement Certificate Program*
8. The Repository – *Certified Family Life Educator*
9. The Repository – *Guidelines for the Preparation of Early Childhood Professionals*
10. The Repository – *Professional Teaching Standards*

FINANCE

1. NSSB-*Certifications in Finance and Insurance*
2. The Repository – *Certified Banker*
3. The Repository – *Certified Financial Planner*

HEALTH SCIENCE

1. American Board of Pediatrics – *Pediatric Rheumatology Certification*
2. American Board of Pediatrics – *Pediatric Gastroenterology*
3. American Board of Pediatrics – *Adolescent Medicine Certification*
4. American Board of Pediatrics – *General Pediatric Certification*
5. American Board of Pediatrics – *Pediatric Sports Medicine Certification*
6. American Board of Pediatrics – *Pediatric Pulmonology Medicine Certification*
7. American Board of Pediatrics – *Pediatric Nephrology Certification*
8. American Board of Pediatrics – *Pediatric Toxicology Certification*
9. American Board of Pediatrics – *Pediatric Infectious Diseases Certification*
10. American Board of Pediatrics – *Pediatric Hematology-Oncology Certification*
11. American Board of Pediatrics – *Pediatric Cardiology Certification*
12. American Board of Pediatrics – *Pediatric Neonatal-Perinatal Medicine Certification*
13. American Board of Pediatrics – *Pediatric Endocrinology Certification*
14. American Board of Pediatrics – *Pediatric Critical Care Certification*
15. American College of Sports Medicine – *Health/Fitness Instructor*
16. American College of Sports Medicine – *Clinical Exercise Program Director*
17. American College of Sports Medicine – *Health/Fitness Director*
18. American College of Sports Medicine –*Exercise Specialist*
19. National Board of Certification of Hospice Nurses – *Certified Hospice and Palliative Nurse*
20. The Repository – *Clinical Lab Science/Biotechnology Cluster, Illinois Occupational Skill Standards and Credentialing Council*
21. The Repository – *Health Services Career Cluster Integrated Technical and Academic Competencies*
22. The Repository – *National Health Care Skill Standards*

23. The Repository – *Nurse Aide*
24. The Repository – *Nursing Cluster, Illinois Occupational Skill Standards and Credentialing Council*
25. The Repository – *Physical Therapist Assistant, Illinois Occupational Skill Standards and Credentialing Council*
26. The Repository – *Surgical Technologist, Illinois Occupational Skill Standards and Credentialing Council*
27. The Repository – *Child Care Worker*
28. The Repository – *Ethical Standards of Human Service Professionals*
29. The Repository – *Human Resources/Services Career Cluster Integrated Technical and Academic Competencies*
30. The Repository – *Human Service Workers in direct service positions*

HOSPITALITY AND TOURISM

1. The American Culinary Federation – *Culinary Educator*
2. American Hotel and Motel Association – *Certified Engineering Operations Executive*
3. Meeting Professional International – *Certified Meeting Professional*
4. American Hotel and Motel Association – *Certified Lodging Security Supervisor*
5. Hospitality Financial and Technology Professionals – *Certified Hospitality Technology Professional*
6. American Hotel and Motel Association – *Certified Hospitality Housekeeping Executive*
7. American Hotel and Motel Association – *Certified Hospitality Supervisor*
8. American Hotel and Motel Association – *Skill Certifications for Front Desk Agents, Room Attendants, Restaurant Servers*
9. National Restaurant Association Educational Foundation – *Foodservice Management Professional*
10. Hospitality Business Alliance –*Foodservice Management Program, Prostrate Passport High School*
11. American Culinary Federation – *ACF Certification Programs: Chefs and Cooks*
12. The Repository – *Foodservice, Illinois Occupational Skill Standards and Credentialing Council*
13. The Repository – *Hospitality and Tourism Specialization Integrated Technical and Academic Competencies (ITAC)*
14. The Repository – *Lodging Cluster, Illinois Occupational Skill Standards and Credentialing Council*
15. American Culinary Federation – *Chefs and Cooks*, *ACCESS (High School Culinary Program)*
16. Hospitality Business Alliance – *Lodging Managers Lodging Management Passport (High School Lodging Management Program)*
17. International Executive Housekeeper Association – *Certified Executive Housekeeper*
18. Aquatic Fitness Professionals Association (AFPA) –*Instructor Certification*
19. Aquatic Exercise Association – *Aquatic Kickboxing Instructor*
20. International Festivals and Events Association – *Certified Festival Executive*

21. Club Managers Association of America – *Certified Club Manager; Master Club Manager*
22. National Recreation and Park Association – *Leisure Professionals Certifications*

HUMAN SERVICES

1. American Association of Direct Service Personnel (AADHSP)—*Certified Human Service Provider, Certified Service Facilitator*

LAW AND PUBLIC SAFETY

1. The Repository --*Standards and Guidelines for Legal Assistants*

GOVERNMENT AND PUBLIC ADMINISTRATION

1. American Hotel and Motel Association -- *Certified Government Property Technician*
2. American Hotel and Motel Association – *Certified Government Property Manager*
3. American Hotel and Motel Association – *Certified Government Property Supervisor*
4. The Repository – *State Points of Contact for Fire Marshals, EMS, Hazardous Material*

RETAIL / WHOLESALE SALES AND SERVICE

1. NSSB - *Customer Service and Sales Skill Standards*
2. Professional Picture Framers Association – *Picture Framers*
3. National Parking Association – *Certified Parking Facility Manager*
4. National Association of Purchasing Management, Inc. – *Certified Purchasing Manager; Accredited Purchasing Practitioner*
5. Sales and Marketing Executives International – *Marketing Executive*
6. Sales and Marketing Executives International – *Sales Executive*
7. Sales and Marketing Executives International -- *Professional Salesperson*
8. National Institute for Automotive Service Excellence – *Parts Specialist*
9. National Association of College Stores – *Store Professional*
10. The Repository – *National Council for Interior Design Qualification*
11. The Repository – *Real Estate Appraiser*
12. The Repository – *Real Estate License*

SCIENTIFIC RESEARCH / ENGINEERING

1. American Society for Quality – *Quality Technician*
2. American Society for Quality – *Mechanical Inspectors*
3. National Association of Industrial Technology – *Certified Industrial Technologist; Certified Senior Industrialist Technologist*
4. Society of Manufacturing Engineers – *Certified Manufacturing Engineer; Certified Manufacturing Technologist; Certified Enterprise Integrator*
5. American Society for Quality – *Reliability Engineer*
6. American Society for Quality – *Quality Engineer*

TRANSPORTATION DISTRIBUTION AND LOGISTICS

1. National Association for Fleet Administrators – *Certified Automotive Fleet Manager*
2. The Repository – *Transportation Sub-Cluster of the Industrial Engineering Systems Career Cluster Integrated Technical and Academic Competencies (ITAC)*
3. The Repository – *Trucking Cluster Entry Level*

INFORMATION TECHNOLOGY

1. Microsoft Office User Specialist Certifications
2. Information Systems Audit and Control Association – *Information Systems Auditor*
3. American Society for Quality—*Software Quality Engineer*
4. Institute for Certification of Computing Professionals – *Certified Computing Professional*
5. Institute for Certification of Computing Professionals – *Associate Computing Professional*
6. Brainbench – *xDSL Certification*
7. Brainbench – *COM/DCOM*
8. Brainbench – *Asynchrnous Transfer Mode Certification*
9. Brainbench – *Data Warehousing Concepts Certification*
10. Brainbench – *IMS 6.0 Certification*
11. Brainbench – *Oracle Forms 6.0 Certification*
12. Brainbench – *Oracle PL/SQL Certification*
13. Brainbench – *Oracle Developer 2000 Certification*
14. Brainbench – *Corel Draw 9.0 Certification*
15. Brainbench – *Corel Paradox 9.0 Certification*
16. Brainbench – *Corel Ventura 8.0 Certification*
17. Brainbench – *Corel WordPerfect 9.0 Certification*
18. Brainbench – *Microsoft Access 2000 Fundamentals Certification*
19. Brainbench – *Microsoft Excel 2000 Certification*
20. Brainbench – *Microsoft PowerPoint 2000 Certification*
21. Brainbench – *Microsoft Publisher 2000 Certification*
22. Brainbench – *Microsoft Word 2000 Certification*
23. Brainbench – *Adobe FrameMaker 5.5 Certification*
24. Brainbench – *Checkpoint Firewall – 1 Administration Certification*
25. Brainbench – *Java 2 non-GUI Certification*
26. Brainbench – *Java 2 GUI Certification*
27. Brainbench -- *Java 1 Certification*
28. Brainbench – *Enterprise Java Beans Certification*
29. Brainbench – *Macromedia Freehand 9 Certification*
30. Brainbench – *Quark Xpress 4 Certification*
31. Brainbench – *Network Security Certification*
32. Brainbench – *Microsoft Visio 5.0 Certification*
33. Brainbench – *3D Studio Max Certification*
34. Brainbench – *Adobe Illustrator 8.0 Certification*
35. Brainbench -- *Apache 1.3.12 Administration Certification*

36. Brainbench – *PHP Certification*
37. Brainbench – *Perl Certification*
38. Brainbench – *MPEG Certification*
39. Brainbench – *Microsoft Frontpage 2000 Certification*
40. Brainbench – *MS Visual InterDev 6.0 Certification*
41. Brainbench -- *Internet Technology Fundamentals Certification*
42. Brainbench – *Internet Security Certification*
43. Brainbench – *Internet Industry Knowledge Certification*
44. Brainbench – *Internet Concepts Certification*
45. Brainbench – *HTML 4.0 Certification*
46. Brainbench – *UNIX Programming Certification*
47. Brainbench – *Unix Korn Shell Scripting Certification*
48. Brainbench – *RPG IV Certification*
49. Brainbench – *Python 1.5 Certification*
50. Brainbench – *On-Line Analytical Processing Certification*
51. Brainbench – *Active Server Pages Certification*
52. Brainbench – *Adobe PageMaker 6.5 Certification*
53. Brainbench – *Act 4.0 Certification*
54. Brainbench – *Fireworks 3 Certification*
55. Brainbench – *Cold Fusion 4.5 Certification*
56. Brainbench – *CGI Scripting Certification*
57. Brainbench – *SEI Capability Maturity Model Implementation Certification*
58. Brainbench – *Programming Concepts Certification*
59. Brainbench – *Software Configuration Management Certification*
60. Brainbench – *Software Analysis Certification*
61. Brainbench – *Smalltalk Certification*
62. Brainbench – *Programmer / Analyst Aptitude Certification*
63. Brainbench – *PowerBuilder 7.0 Certification*
64. Brainbench – *MUMPS Certification*
65. Brainbench – *PowerBuilder 6.0 Certification*
66. Brainbench – *CICS Certification*
67. Brainbench – *CORBA 2.3 Java Certification*
68. Brainbench – *CORBA 2.3 Certification*
69. Brainbench -- *C++ Certification*
70. Brainbench – *Software Testing Certification*
71. Brainbench -- *JCL – Certification*
72. Brainbench – *FORTRAN 77 Certification*
73. Brainbench – *Microsoft Project 2000 Certification*
74. Brainbench – *LotusScript R5 Programming Certification*
75. Brainbench – *Lotus Domino R5 Programming Certification*
76. Brainbench – *Assembly Language Certification*
77. Brainbench – *Lotus Notes 4.0 Programming Certification*
78. Brainbench – *CICS Certification*
79. Brainbench – *Software Quality Assurance Certification*
80. Brainbench – *C Certification*
81. Brainbench – *CORBA 2.3 C++Certification*

82. Brainbench – *COBOL I Certification*
83. Brainbench – *Client – Server Concepts Certification*
84. Brainbench – *00 Concepts Certification*
85. Brainbench – *Macromedia Director 7 Certification*
86. Brainbench – *Lotus Freelance Graphics 9.5 Certification*
87. Brainbench – *General Information*
88. World Organization of Webmasters – *Web Administration Certification*
89. ProsoftTraining.com – *Certified Internet Webmaster: CIW Associate*
90. Cisco Systems -- *Certified Design Professional – SNA/IP Integration*
91. Cisco Systems – *Certified Design Professional – Routing and Switching*
92. Cisco Systems – *Cisco Certified Design Associate – Routing and Switching*
93. Cisco Systems – *Cisco Certified Internetwork Expert – Communications and Services*
94. Cisco Systems – *Certified Design Professional – WAN Switching*
95. Cisco Systems – *Cisco Certified Internetwork Expert – Routing and Switching*
96. Cisco Systems – *Cisco Certified Internetwork Expert – ISP Dial*
97. Cisco Systems – *Cisco Certified Internetwork Expert – WAN Switching*
98. American Institute for Chartered Property Casualty Underwriters and Insurance of America – *Associate in Information Technology*
99. Electronics Technicians Association, International – *Associate Certified Electronics Associate; Certified Electronics Technician*
100. Electronics Technicians Association, International – *Consumer Electronics Certification, Journeymen Option*

MANUFACTURING CLUSTER

1. NSSB - *The MSSC Skill Standards System*
2. American Institute of Baking – *Certified Baker Program*
3. American Institute of Baking – *Maintenance Engineering*
4. American Institute of Baking – *Baking Science and Technology Certification*
5. American Society for Quality – *Quality Technician*
6. American Society for Quality – *Quality Engineer*
7. American Society for Quality – *Reliability Engineer*
8. American Society for Quality -- *Mechanical Inspectors*
9. American Welding Society – *Certified Welder Program*
10. American Welding Society – *SENSE Training Program: Entry Level Welder, Level I; Advanced Welder, Level II, Level III Certifications*
11. American Welding Society – *Welding Inspectors*
12. American Welding Society – *Nondestructive Evaluation Inspector*
13. American Welding Society – *Welding Educator*
14. Board of Certified Safety Professionals -- *Certified Safety Professional*
15. Board of Certified Safety Professionals – *Occupational Health and Safety Technologies*
16. Fluid Power Society – *Fluid Power Specialist*
17. Fluid Power Society – *Fluid Power Mechanics*
18. Fluid Power Society – *Fluid Power Technicians*

19. Instrument Society of America – *Control Systems Technicians*
20. National Association of Industrial Technology – *Certified Industrial Technologist : Certified Senior Industrialist Technologist*
21. North American Technician Excellence, Inc. – *Air Conditioning Technicians*
22. North American Technician Excellence, Inc. – *Air Distribution Technicians*
23. North American Technician Excellence, Inc. – *Gas Furnace Technicians*
24. North American Technician Excellence, Inc. – *Heat Pump Technicians*
25. North American Technician Excellence, Inc. – *Oil Furnace Technicians*
26. National Association of Service Managers – *Associate service Executive; Certified Service Executive; Re-certified Service Executive; Lifetime Service Executive*
27. National Glass Association – *Auto Glass Technician; Master Glass Technician Certifications*
28. National Institute for Automotive Service Excellence – *Automobile Technician*
29. National Institute for Automotive Service Excellence – *School Bus Technicians*
30. National Institute for Automotive Service Excellence – *Medium and Heavy Truck Technicians*
31. National Institute for Automotive Service Excellence – *Engine Machinists*
32. National Institute for Automotive Service Excellence – *Damage Estimator*
33. National Institute for Automotive Service Excellence – *Collision Repair and Refining Technicians*
34. National Institute for Automotive Service Excellence – *Advanced Engine Performance Technician*
35. National Institute for Metalworking Skills – *Machining Level I Certification*
36. National Society of Professional Surveyors – *Survey Technician*
37. National Tooling and Machining Association – *Machining Skill Standards*
38. Society of Manufacturing Engineers – *Certified Manufacturing Engineer; Certified Manufacturing Technologist; Certified Enterprise Integrator*
39. The Repository – *The National Institute for Metalworking Skills, Inc. (NIMS)*
40. The Repository – *Chemical Press Operator*
41. The Repository – *Automotive Technician*
42. The Repository – *Standard for AWS Certification of Welding Inspectors*
43. The Repository – *Imagining/Pre-Press Skill Standards*
44. The Repository – *Press Operations*
45. The Repository – *Metal Stamping Skills*
46. The Repository – *Advanced High Performance Manufacturing*
47. The Repository – *Certified Welding Engineer*
48. The Repository – *Computer Aided Drafting and Design (CADD) Skill Standards*
49. The Repository – *Machining Skills*
50. The Repository – *Manufacturing Sub- Cluster of the Industrial and Engineering Systems Career Cluster Integrated Technical and Academic Competencies (ITAC)*
51. The Repository – *Mechanical Drafting Cluster*

E. NIMS CREDENTIALS

NIMS CREDENTIALS

The National Institute for Metalworking Skills (NIMS) credentials certify an individual's skill as measured against the NIMS standards. Earning of NIMS credentials requires both performance and theory tests. The performance requirements and theory exams are drawn from the NIMS standards and are written and piloted by industry. There are currently 41 credentials.

- Metalforming Level I
- Stamping Level II: Operate with Single Hit Tooling
- Stamping Level II: Operate with Compound Dies
- Stamping Level II: Operate with Progressive Dies
- Stamping Level II: Operate with Deep Draw Dies
- Stamping Level II: Operate with Transfer Dies
- Stamping Level III: Parts Inspection and Quality Control
- Stamping Level III: Set Up Single Hit Tooling
- Stamping Level III: Set Up with Compound Dies
- Stamping Level III: Set Up with Progressive Dies
- Stamping Level III: Set Up with Deep Draw Dies
- Stamping Level III: Set Up with Transfer Dies
- Press Brake Level II: Operate Non-CNC Mechanical
- Press Brake Level II: Operate CNC Drive
- Press Brake Level III: Set Up and Operate Non-CNC Mechanical
- Press Brake Level III: Set Up and Operate CNC Drive
- Slide Forming Level II: Operations
- Slide Forming Level III: Set Up and Operations
- Screw Machining Level II: Operate with Single Spindles
- Screw Machining Level II: Operate with Multiple Spindles
- Screw Machining Level III: Set Up and Operate with Single Spindles
- Screw Machining Level III: Set Up and Operate with Multiple Spindles
- Machining Level I: Measurement, Materials and Safety
- Machining Level I: Job Planning, Benchwork, and Layout
- Machining Level I: Manual Milling
- Machining Level I: Manual Turning Between Centers
- Machining Level I: Manual Turning with Chucking
- Machining Level I: Surface Grinding
- Machining Level I: Drill Press Operations
- Machining Level II: Manual Milling
- Machining Level II: Manual Turning
- Machining Level II: Drill Press Operations
- Machining Level II: Surface Grinding
- Machining Level II: CNC Milling
- Machining Level II: CNC Turning
- Machining Level II: EDM – Wire
- Machining Level II: EDM – Plunge
- Machining Level III: CNC Turning

- Machining Level III: CNC Milling
- Machine Building Level II: Mechanical Assembly
- Machine Building Level III: Mechanical Assembly