Status of Manufacturing Skills Certification in Washington

Final Report to the National Association of Manufacturers/ The Manufacturers Institute

December 2011

Workforce Training and Education Coordinating Board
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Purpose

In June 2011, the Washington Workforce Training and Education Coordinating Board (Workforce Board) signed a Letter of Agreement with The Manufacturing Institute (the Institute), an affiliate of the National Association of Manufacturers (NAM). The primary deliverable of the contract is to advance opportunities for statewide deployment of the NAM-Endorsed Manufacturing Skills Certification System (NAM-Endorsed Certification System) into appropriate community and technical college for-credit programs of study. This final report provides an update on progress toward that long-term, multifaceted goal.

Background

For the past two years, Washington has been engaged with the Institute to consider implementation of the NAM-Endorsed Certification System. This initiative began in May 2009, with a grant from the Institute to Shoreline Community College, as one of four pilot sites across the country funded by a grant from the Bill and Melinda Gates Foundation. Shoreline Community College accomplished a number of early stage goals under that initial grant (as described in the Interim Report submitted by the Workforce Board in September 2011).

Also in 2009, Washington's State Board for Community and Technical Colleges (SBCTC) received a grant to create an asset map of the two-year college system, which described the landscape for manufacturing education and training across the state. The asset map, completed in the spring of 2010, included an inventory of manufacturing- related resources and promising practices which could potentially be leveraged to support implementation of the NAM-Endorsed Certification System.

The Letter of Agreement signed in 2011 built on and expanded these earlier investments. Under the contract the Workforce Board agreed to work with key stakeholders, such as the SBCTC, the Center for Excellence in Aerospace and Advanced Manufacturing, the Association of Washington Business Institute, manufacturing employer organizations, interested employers and community and technical college leadership, to explore opportunities to advance a NAM-Endorsed Certification System in Washington.

Key activities included providing information to major stakeholders; ascertaining employer interest in aligning hiring practices with the certification system; engaging interested colleges in planning for integrating the NAM-Endorsed Certification System into their programs of study; and identifying opportunities and challenges/barriers affecting deployment across the state.

In August 2011, the Workforce Board submitted an interim report to the Institute that outlined a five-part plan to make the NAM-Endorsed Certification System an organizing factor in various manufacturing programs of study within the community and technical college

system. The strategy built off the successful implementation of one component of the NAM system at Shoreline Community College and included the following major tasks:

- Establish industry buy-in
- Identify community and technical colleges with an interest in the NAM system
- Facilitate a learning community of community college administrators and faculty undertaking implementation of NAM related programming
- Market the value of NAM system to all colleges and regional Skill Centers with a manufacturing program of study option.
- Undertake a feasibility analysis for a state "hub" for NAM system student testing.

The interim report established a critical baseline of effort on which additional key activities have been built over the past few months. The report also highlighted several key fiscal, structural and political realities that have framed the work of the Workforce Board as implementation efforts have continued:

- **Funding Levels**: While community and technical colleges exhibit a growing willingness and interest to consider the NAM-Endorsed Certification System, they are under severe budget constraints and facing further cuts in the next few months. The interim report underscored the critical importance of building innovative and effective partnerships with industry to ensure sustainability of the certification system over time.

- **Aerospace Industry**: The greatest proportion of revenue generation and new business growth in Washington has been related to aerospace industry activity, and specifically Boeing. The state Aerospace Council and the Governor's Project Pegasus are both working to channel the state's resources in support of the industry's worker replacement needs and the state's transportation and logistics infrastructure in support of the industry. The interim report established that reports from both initiatives have recommended the aerospace talent pipeline be aligned with a single framework for industry endorsed skill standards and certifications.

- **Industry Buy-In**: Because of the critical importance of industry buy-in to the ultimate success of statewide adoption, the interim report outlined a two-part approach for assessing and supporting industry engagement. One approach involved working with manufacturing association partners to hold regional forums with a diverse group of manufacturers to ascertain the likelihood of advancing the NAM-Endorsed Certification System. Another involved working with Project Pegasus and the Aerospace Council talent pipeline development teams to advocate that the NAM-Endorsed Certification System serve as an organizing framework for discussion and exploration.

- **Decentralized College "System"**: Washington's 34 community and technical colleges are decentralized , with each institution governed by its own local Board of Trustees. The interim report outlined a strategy whereby the Workforce Board would partner with the SBCTC and its Center of Excellence in Aerospace and Advanced Materials Manufacturing to convene manufacturing and/or workforce deans and faculty to negotiate a system-wide roll-out of the NAM-Endorsed Certification System.

- **Manufacturing Programs of Study**: The Workforce Board serves as the lead agent for federal Carl Perkins funding for Washington and has long been an advocate for programs of study. In 2007, the Workforce Board a template for programs of study to be identified at the local level. When Congress eliminated the Carl Perkins funding that supported Tech Prep, which was a robust program in the state, the Workforce Board enacted an initiative to create model programs of study in targeted sectors, including aerospace and advanced manufacturing. The interim plan outlined an intention to design a career pathway model that will take students from the secondary level to two- and four-year college degrees and/or journey level apprenticeship and be aligned with stackable industry-valued credentials and certificates.

Structure of Final Report

Against the backdrop of these realities, this final report reflects work accomplished by the Workforce Board since the submission of the interim report in August, 2010. Much has been accomplished and will be reported using nine key questions as the organizational framework:

1. What is the current state climate for supporting implementation of a skills certification system? What are perceived benefits?

2. How is the aerospace industry impacting the certification discussion and planning?

3. What is the role of the Center of Excellence for Aerospace and Advanced Materials Manufacturing in advancing a certification system?

4. Is any portion of the current education and training system using skill standards and certifications within the NAM umbrella? Which educational institutions or programs have expressed interest in incorporating the NAM-endorsed certifications? Are data available that capture the current output of certifications?

5. What is the level of interest and/or current utilization of certifications in the registered Apprenticeship system?

6. What specific information or case studies are available that "tell the story" of the integration of the NAM-endorsed skills certification in existing manufacturing programs of study?

7. Have any agencies or colleges received any external grants that might support certification implementation efforts? If so, what role might they play in scaling up of the NAM-Endorsed Certification System?

8. What is the industry's perspective on the current education and training system? Do manufacturers currently use national certifications in their hiring protocols? Would they be likely to incorporate NAM-endorsed certifications?

9. How will the state evaluate the overall effectiveness of the NAM programs in regards to continuous improvement of educational institutions?

1. State Climate: *What is the current state climate for supporting implementation of a manufacturing-related skills certification system? What are perceived benefits?*

In the spring of 2011, two critical events converged which broadened the range of partners involved in the NAM-Endorsed Certification System initiative. The Institute asked the Workforce Board to assume a coordination role for the grant-funded project. About the same time, the Workforce Board was asked to assist with development of a Governor's initiative on aerospace manufacturing, Project Pegasus. (NOTE: The next section discusses proposals and legislative initiatives related to Project Pegasus.)

Because the concept of industry-recognized credentials arose quickly in the aerospace discussions, the two efforts were aligned. The Workforce Board has partnered with a number of organizations in this endeavor, including the SBCTC, Center of Excellence for Aerospace and Advanced Materials Manufacturing, Association of Washington Businesses, Impact Washington, and the International Association of Machinists.

A general consensus has been reached among the partners, the Governor's Office and the Department of Commerce that Washington needs a statewide credentialing system that affords portability and communication among educators, students and employers. The partners agree that middle-skill jobs should be the focus of such a credentialing system, and also that certifications should be on a pathway from K-12 to baccalaureate and beyond. Certifications then would serve as momentum points along a career continuum; transferable, stackable credentials would align with a structured program of study, college credits and degrees.

In the past, the state has left it to the individual institutions to make decisions about the inclusion of credentialing in professional technical programs. There is agreement that this approach is no longer sufficient to meet the workforce needs of the state. While no statewide agreement currently exists to build a NAM-Endorsed Certification System, there is a commitment to explore and evaluate the system and determine whether the anticipated benefits manifest.

The Workforce Board sees a certification system as way to build on the state's success in aligning the state's training with industry skill needs, benefiting workers and employers. Short-term training options tied to certifications will allow individuals the ability to work and learn; to upgrade skills as needed, and to build skill portfolios that lead to promotion and wage progression. In addition, over time, with better engagement of industry, and a relevant performance accountability system, a skilled workforce in sufficient quantity will be available to employers for the long term.

A certification system is capable of communicating these benefits in ways that employers are willing to recognize and value. Employers will be able to communicate current and future job vacancies in terms of competencies and skills needed, in addition to job titles. Because of the improved dialogue with education, government, policymakers and community organizations, employers will be better engaged in the development of the talent pipeline.

2. Impact of the Aerospace Industry: *How is the aerospace industry impacting certification discussion and planning?*

The role of aerospace in the state's manufacturing sector should not be underestimated. Several major events have occurred in the past few months which impact the attention to the aerospace manufacturing workforce:

- Boeing landed the tanker contract with the Air Force to initially build 179 of its 767-based tankers to replace the Air Force KC-135 tankers.
- Boeing delivered the first 787 Dreamliner, beginning its production.
- American Airlines ordered 200 additional aircraft from the 737 family, with options for another 100 aircraft
- Boeing announced that it will build its next-generation 737 in Washington.
- Boeing recently revealed that 25 percent of its regionally employed skilled workforce of 25,000 employees is eligible for retirement. Furthermore an additional 25 percent of this same workforce may be eligible for retirement in the near term.
- Boeing predicts it will need 3,500-5,000 workers in the next three to five years and Boeing suppliers anticipate similar workforce needs. (This prediction was prior to the announcement of the American Airlines order and the location of the next-generation 737 assembly.)

Washington has an estimated 500 - 600 firms closely connected to the aerospace industry and almost all of them have yet to quantify their workforce needs. Recent data show an upward trend in aerospace industry hiring, exceeding the most recent forecasts of traditional economic models. The combination of a cycle of expanded production of commercial aircraft with a substantial wave of retirements would likely sustain this trend of demand exceeding forecasts.

The recent deep recession has altered many workers' retirement plans, increasing the uncertainty about short-term retirement rates, but the wave of baby boom retirements is inevitable. The workforce training system needs to be prepared for a flexible response to the changing industry requirements, in the face of technological change in the industry and uncertainty about retirement timing.

Pegasus: Governor's Proposal for Aerospace Manufacturing Training and Education

Governor Chris Gregoire made a commitment to the state's aerospace industry to develop the talent pipeline and economic infrastructure needed to support continuous growth, innovation, and competitiveness in the global marketplace. She established Project Pegasus as a mechanism to convene all likely partners. Pegasus built on a three-year history of Governor-led investments and policies in support of Washington's aerospace industry.

The Talent Pipeline Subcommittee of Project Pegasus, which included representatives from K-12 and postsecondary public education, business, labor, economic development, and workforce development, came quickly to consensus on three key areas and an overarching theme. These set the stage for solution-finding discussions which led to a set of proposals for the Governor's consideration, and eventually to Governor-request legislation. Key needs to focus on included:

- A need to focus on both the manufacturing production and technical engineering skill areas - Boeing alone will need 3,500-5,000 workers for next three to five years to address production needs and retirement. Other suppliers have additional needs.

- A need to avoid the periodic urgent search for machinists and engineers by developing a long-term robust pipeline of students and future workers with foundational skills in a range of manufacturing areas.

- A need to innovate and effectively implement innovations in products and production processes. This means ensure that engineering students and technical workers are prepared to participate in this evolving environment as researchers, design scientists, engineers and production workers, especially in the areas of composite technology and fuel efficiency.

Proposed Strategic Plan for Aerospace Workforce Development

Washington is planning to develop an Aerospace and Advanced Manufacturing Skills Framework and a capacity plan that is aligned with the specific current and projected needs of the state's aerospace industry and that provides a variety of pathways into aerospace jobs for any Washingtonian seeking entry into the field. The Framework will include specific skill standards, industry-recognized certifications and credentials tied to those skill standards and the number of job vacancies projected that require these skills.

Implementation of the Framework will inform strategic deployment of education and training resources from grades 10 to 16 and for the retraining of dislocated and incumbent workers, as well as the hiring practices of Washington's aerospace and manufacturing employers. Aerospace manufacturers will benefit from knowing the specific competencies of each new applicant for employment and from knowing with confidence that the talent development pipeline is adequate to meet their needs. They will have access to an educational infrastructure that will facilitate the continual upgrading and modernization of the skills of their workers.

For the job seeker and/or student, the Framework, when implemented, will provide a clear road map of how relevant education and training connects to available jobs and progress along a career pathway. While state and industry partners have made tremendous headway towards such alignment in recent years, the steps outlined below will potentially move the state substantially to the goal of significant alignment.

While many different proposals to the governor emerged during these discussions, industry-recognized credentialing and industry engagement in the development and delivery of relevant curriculum was a mainstay throughout. Significantly, the NAM-Endorsed Certification System has become a proxy for a state aerospace and advanced manufacturing credentialing system.

As Governor Gregoire considered all the Pegasus proposals in light of the current budget situation, she narrowed the list down to policy requests that require little to no new funding and a few items that she deemed important enough to request new resources. One of those funding requests aligns with progress towards a state credentialing system.

Governor Gregoire has made a proposal to the Legislature that includes development of aerospace manufacturing curriculum into 12 high schools and two skills centers. This curriculum is based on curriculum co-developed with Boeing for the Washington Aerospace Training and Research Center (WATR). The WATR Center is currently working to align its curriculum with NAM-endorsed certifications. This will influence the K-12 curriculum that is currently under development.

The Governor also submitted an important policy proposal, which will likely advance the NAM discussion. The proposal directs the Center of Excellence for Aerospace and Advanced Materials Manufacturing to serve as a repository for up-to-date information about aerospace and advanced materials manufacturing training programs. The proposal directs the Center of Excellence to coordinate and facilitate methods for training programs to obtain industry certification and meet industry standards. This will be a major step forward for the state in developing a statewide approach to industry certification.

Also within this legislation, the Workforce Board will work with the Center of Excellence to analyze skill gaps in aerospace and advanced materials manufacturing. The Workforce Board will also collaborate with the SBCTC to evaluate the outcomes of aerospace and advanced materials manufacturing training programs.

The Governor has also proposed establishing a policy for common, shared course numbering and course credit transferability for aerospace manufacturing courses. The effort creates the opportunity to align the common course curriculum to NAM-endorsed certifications. The common course numbering process is funded by the $20 million DOL grant which was awarded in October of 2011, and is already underway by the Center of Excellence for Aerospace and Advanced Manufacturing.

3. Center of Excellence for Aerospace and Advanced Materials Manufacturing (CoE): *What is the role of the Center of Excellence for Aerospace and Advanced Materials Manufacturing in advancing a certification system?*

The Center of Excellence for Aerospace and Advanced Materials Manufacturing, housed at Everett Community College, will play a significant role in the broad application of the NAM-Endorsed Certification System, regardless of whether the Governor's legislation passes. The Center of Excellence is funded and overseen by the SBCTC.

The Center of Excellence convened meetings in the spring of 2011 to bring together major stakeholders including Boeing, the Workforce Board, Shoreline Community College, the SBCTC and the Office of Superintendent of Public Instruction (OSPI) to discuss the merits of third-party certification, and the NAM-endorsed certification in particular. Stakeholders generally agreed that in the past there has been considerable resistance to systemwide adoption of third-party certification. It was left to the individual institutions to make decisions about adopting them.

Budget cuts to education and an increased willingness of community and technical colleges, state agencies and manufacturing employers to work together are beginning to shift thinking that the old paradigm is neither applicable nor sufficient in today's economy. An agreement was made to explore whether an industry recognized credentialing system would be appropriate for Washington. The Center of Excellence is currently driving a number of initiatives and projects that relate to NAM-endorsed certification:

- Aerospace Curriculum Alignment Committee: This is a group of 40 or more representatives from community and technical colleges, K-12 (including OSPI), Boeing, Boeing suppliers, other businesses in manufacturing, apprenticeship, state agencies (including SBCTC and the Workforce Board), Workforce Development Councils, the Manufacturing Industrial Council of Seattle, for-profit universities, K-12 Skill Centers, the WATR Center and others.

This organization has been meeting since June 2010 to discuss the workforce needs of aerospace and advanced manufacturing employers, which included a discussion of the NAM-Endorsed Certification System. The Center of Excellence will continue to disseminate information and provide a forum for open discussion of questions and concerns.

- The Center of Excellence is tasked with developing a rigorous program of study for aerospace. The Center is working on identifying KSA's (knowledge, skills & abilities) and aligning Career and Technical Education (CTE) programs with community and technical college programs in aerospace manufacturing. The Center of Excellence plans to incorporate skills certification to that process, with particular focus on the National Career Readiness Certificate and the Manufacturing Skills Standards Council certifications.

- The Center of Excellence is beginning a several year process to arrive at core curriculum and common course numbering for manufacturing programs offered by the state's community and technical colleges. One of the steps to attaining common course numbering will be to identify common KSAs and assessment benchmarks. The NAM-Endorsed Certification System offers a common language for the process.

- The Center of Excellence has been working with the CTE division of Office of the Superintendent of Public Instruction to explore embedding NAM-endorsed certifications into K-12 CTE courses. Boeing has provided curriculum to the K-12 Skill Centers and is working with them to develop curriculum in aerospace manufacturing and there is legislation, discussed earlier, to fund two Skill Centers to run those programs.

  These three lines of activity are converging and creating more buy-in from CTE Directors. The Center of Excellence will continue to work with K-12 to build capacity in manufacturing training and education and to examine the benefits of the NAM-Endorsed Certification System.

The Center of Excellence for Aerospace and Advanced Materials Manufacturing has been and will continue to be a resource for dissemination of information and opportunity for discussion of the NAM-Endorsed Certification System. Center personnel are actively engaged in discussions with the Institute and other national leaders in framing a national plan of action regarding advancing the Aviation and Aerospace workforce, and will participate in and help inform an important national dialogue on this issue in the spring.

4. Current Utilization and Future Potential: *Is any portion of the current education and training system using skill standards and certifications within the NAM umbrella? Which educational institutions or programs have expressed interest in incorporating the NAM-Endorsed certifications? Are there data available that capture the current output of certifications?*

In November 2011, in preparation for this report, the Workforce Board, through the Center of Excellence for Aerospace and Advanced Materials Manufacturing, surveyed colleges and high schools to assess current utilization of the industry-based certifications that comprised the initial NAM-endorsed certification (National Career Readiness Certificate - **NCRC**), Manufacturing Skills Standards Council (**MSSC**) Production Technician Certification, American Welding Society (**AWS**) various certifications, National Institution for Metalforming Skills (**NIMS**) machining and metalforming, and Society for Manufacturing Engineers (**SME**) Engineering Technologist.

Community and Technical Colleges

Washington's community and technical college system is comprised of 34 community and technical colleges and three vocational training centers. Twenty-nine community and technical colleges and all three vocational training centers responded to the survey. None of the five non-responding colleges has a manufacturing program.

Four of the respondents do not have manufacturing programs but indicated an interest in the NCRC. The survey responses of the colleges are the source of data for the following information. In general, the commitment level of colleges with respect to the NAM-Endorsed Certification System is high, with the caveat that industry expresses an interest in using the certifications in their hiring practices.

A total of 23 programs already have NAM-endorsed certifications embedded as follows:

NCRC (2)	MSSC (3)	NIMS (3)	AWS (12)	SME(3)
Lake WA TI Regional Training Center at Satsop	Lake WA TI Green River CC	Clark College Lake WA TI Shoreline CC	Big Bend CC Centralia CC Clark College Lake Washington TI Peninsula College Renton TC Skagit Valley CC South Puget Sound CC South Seattle CC Spokane CC Walla Walla CC Wenatchee Valley C	Edmonds CC Lake WA TI Pierce College
TI = Technical Institute CC = Community College TC = Technical College C = College				

Twenty-eight (28) institutions (including vocational centers) expressed an interest in exploring at least one of the NAM-endorsed certifications not already embedded as follows:

NCRC (21)	MSSC (20)	NIMS (19)	AWS (5)	SME(13)
Bellevue College	Bellingham TC	Bellingham TC	Bellingham TC	Big Bend
Bellingham TC	Big Bend CC	Big Bend CC	Clover Park TC	Clark
Big Bend CC	Clark College	Centralia College	Columbia Basin C	Clover Park TC
Centralia College	Clover Park CC	Clark College	Lake WA TI	Everett CC
Clover Park TC	Edmonds CC	Clover Park TC	Lower Columbia College	Lake WA TI
Edmonds CC	Everett CC	Columbia Basin College		Olympic College
Everett CC	Green River CC	Everett CC		Peninsula College
Grays Harbor C	Lower Columbia College	Green River CC		Pierce College
Lower Columbia College	Olympic CC	Lake WA TI		Shoreline CC
North Seattle CC	Peninsula CC	Lower Columbia College		South Seattle CC
Olympic College	Renton CC	Olympic College		Spokane CC
Peninsula College	Shoreline CC	Peninsula College		Yakima Valley CC
Renton TC	Skagit Valley College	Renton TC		RETCS
Shoreline CC	South Puget Sound CC	South Puget Sound CC		
Skagit Valley College	South Seattle CC	South Seattle CC		
South Puget Sound CC	Spokane CC	Spokane CC		
South Seattle CC	Wenatchee Valley C	Wenatchee Valley C		
Spokane CC	Yakima Valley C	PSIEC		
Walla Walla CC	PSIEC	RETCS		
Wenatchee Valley C	RETCS			
PSIEC				

TI = Technical Institute CC = Community College TC = Technical College C = College
RTCS = Regional Education & Training Center at Satsop PSIEC = Puget Sound Industrial Excellence Center

There is approximately equal interest in the NCRC, MSSC and NIMS certifications. The AWS is a lower number primarily because the AWS certification is already embedded in many manufacturing programs.

When asked about level of interest in each of the certifications, the responses overall for each certification were as follows.

	NCRC	MSSC	NIMS	AWS	SME
Not Interested	11%	13%	17%	30%	29%
May be Interested	31%	13%	21%	25%	25%
Interested	34%	42%	28%	25%	29%
Very Interested	23%	32%	34%	20%	18%
Total Interested & Very Interested	**57%**	**64%**	**62%**	**45%**	**47%**

Overall, 59 percent of respondents were interested or very interested in exploring NAM-endorsed certifications. There are very high levels of interest in the MSSC and NIMS, and high levels of interest in the NCRC. All of these have broad application within manufacturing programs. The AWS, as mentioned before, is already used to some degree and the SME certification is more specialized and will apply to a subset of manufacturing programs that have engineering components.

The NCRC is not as well known, which speaks to the higher number of respondents indicating they "may be interested". However, its use by the Spokane Area Workforce Development

Council and the Governor's Best Practices in Workforce & Economic Development Award for the Work Ready Spokane centered on the NCRC are creating more interest across the state.

Most colleges experience some support from industry with respect to the certifications they offer, however 39 percent responded that they have very little support:

Very little support	39%
Provide encouragement	39%
Involved in assessing students for certification	7%
Provide material support	16%

In addition, all manufacturing programs have advisory committees consisting of representatives from industry and employers that hire students who have completed certificates or who graduate from the programs. While the effectiveness and involvement of the advisory committees varies from program to program, the committees do meet with college faculty and staff on a regular basis. Most programs rely on their advisory committees to provide updates on new technology and feedback on the quality of students completing degrees or certificates.

High Schools

The Office of the Superintendent of Public Instruction (OSPI) provides instructional leadership and manages the day-to-day activities in the K-12 school system. The Career Technical Education (CTE) division of OSPI is supportive of the NAM-Endorsed Certification System roll-out. High schools were surveyed in a manner similar to colleges, and the aggregated data provided by the respondents is summarized below.

Of the 453 high schools in the state, 86 high schools and skill centers responded to the survey, for a 19 percent response rate. While the data suggest that the frequency of NAM-endorsed certifications across high schools in the state is not as significant as for colleges, some high school and skill centers do embed certifications in their curriculum. The 86 high schools offer a combined total of twenty-three (23) NAM-endorsed certifications in their existing programs. The distribution of the certifications is in the following table; as with the colleges, the welding certification is by far the most prevalent among high schools.

NCRC (4)	**MSSC (4)**	**NIMS (3)**	**AWS (11)**	**SME(1)**
Chief Sealth HS Colville HS Naselle HS Snohomish SD	Shelton HS Auburn HS Monroe HS Colville HS	Auburn HS Colville HS WNICSC	Auburn HS Battle Ground HS Colville HS Monroe HS Pierce County SC Puget Sound SC Shelton HS Tri-Tech Skill Center WNICSC	Colville HS
HS = High School SD = School District SC = Skills Center WNICSC = WA Network for Innovative Careers Skills Center				

Of the certifications that the high schools do not currently incorporate into their curriculum, high schools responding indicated an interest in exploring the NAM system as follows:

NCRC (27)	MSSC (26)	NIMS (13)	AWS (13)	SME(20)
Arlington HS Auburn HS Auburn Mountainview Auburn Riverside HS Ballard HS Camas HS Centralia HS Chief Sealth HS Clark County SC Franklin HS Granit FallsHS Issaquah HS Lake Quinault HS Lake WA HS Mariner HS New market SC North Thurston HS Port Angeles HS Rainier Beach HS Seattle SC Snohomish SD Tri-Tech SC Walla Walla HS WNICSC West Sound SC Wishkah Valley HS YV-Tech SC	Arlington HS Auburn Mountainview Auburn Riverside HS Ballard HS Chief Sealth HS Clark County SC Ephrata HS Ferris HS Kiona-Benton City HS Lake Quinault HS Liberty Bell HS Naselle HS New Market SC Pierce County SC Port Angeles HS Puget Sound SC Rainier Beach HS Seattle Skills Center Shelton HS Snohomish SD South Kitsap HS Tri-Tech SC Washougal HS West Sound SC Wishkah Valley HS YV-Tech SC	Ballard HS Chief Sealth HS Clark County SC Lake WA HS Monroe HS New Market SC Pierce County SC Rainier Beach HS Seattle SC Snohomish SD Tri-Tech SC West Sound SC YV-Tech SC	Arlington HS Ballard HS Camas HS Ephrata HS Lake WA HS New Market SC Puget Sound SC Seattle SC Shelton HS Snohomish SD West Sound SC Wishkah Valley HS YV-Tech SC	Arlington HS Auburn HS Auburn Mountainview Clark County SC Davis HS Ferris HS Kiona-Benton City HS Lake WA HS Mariner HS Monroe HS New Market SC Prairie HS Puget Sound SC Richland HS Seattle Skills Center Snohomish HS WNICSC Washougal HS West Sound SC YV-Tech SC
HS = High School SD = School District SC = Skills Center WNICSC = WA Network for Innovative Careers Skills Center				

NCRC and MSSC attracted the most interest from high schools and SME was a not-too-distant third. This level of interest is likely the result of an increased state emphasis in STEM (Science, Technology, Engineering and Math) courses in K-12. When asked about level of interest in each of the certifications, the responses overall for each certification were as follows.

	NCRC	MSSC	NIMS	AWS	SME
Not Interested	13%	11%	31%	32%	28%
May be Interested	32%	31%	26%	26%	23%
Interested	30%	31%	26%	19%	30%
Very Interested	26%	27%	17%	23%	20%
Total of Interested & Very Interested	**56%**	**58%**	**43%**	**42%**	**50%**

The strength of interest in the NCRC and MSSC is reinforced by the leveling data with the highest levels interest in the NCRC and MSSC, and SME once again third. This mirrors the distribution of high schools by certification above. Overall, 51 percent of high school respondents were interested or very interested in exploring NAM-endorsed certifications.

This information will be used to inform the NAM-Endorsed Certification System strategy moving forward with K-12. The comments from high school respondents were highly varied, indicating that information about certification may be inconsistent across CTE programs.

Responses to the question regarding industry support were sparse from the high schools. As stated earlier, there are systemic requirements for colleges to maintain relationships with business and industry. This is not the case for high schools and the outreach to business and industry is primarily based on the orientation of the CTE Director or instructor.

Data on Current Output

In general, many high schools have curricula that promote the development of skills and abilities that further their education and training towards the awarding of certificates. At this time, Washington does not collect specific data due to constraints in tracking students. Therefore the state cannot determine how many actually achieve certification later in their education/training program. Many of the certification programs (such as welding and automotive) cannot be achieved at the high school level and students must matriculate to the next level to achieve the full certification. Last year, 218 Washington high school students earned some type of certificate (not limited to manufacturing).

Nearly 1,000 Washington high school students participate in state, regional and national SkillsUSA competitions. According to Tim Lawrence the Executive Director of SkillsUSA, there has been a great deal of cooperation in identifying certifications that can be awarded at the high school level through SkillsUSA competition and course work. OSPI has contacted the State of Virginia which is able to collect data on types of certifications, costs of exams, and number of students who earned them in the following areas: Automotive, Aviation Maintenance, Building Trades, Precision Machining Technology, Carpentry and Welding. OSPI is in the process of investigating options so the state can track student achievement of certifications.

Support of a NAM-Endorsed Certification System in the K-12 system is increasing. Dennis Wallace of OSPI indicates that *"OSPI is in the process of working on incorporating as much of the workforce readiness competencies into its existing framework with the hopes of providing a program of study that ends in at least that credential. OSPI always strives to have students earn or further their potential for achieving certification through the state instruction programs and links to other training/educational partners."*

5. Apprenticeship: *What is the level of interest and/or current utilization of certifications in the registered Apprenticeship system?*

There are two primary aerospace apprenticeship programs in Washington, the Aerospace Joint Apprenticeship Committee (AJAC) and the Machinists Union Apprenticeship program which is proprietary and internal to Boeing.

AJAC offers a four-year apprenticeship training program in which apprentices work full time and are paired with a mentor who provides on-the-job training. In addition, apprentices attend classes at a community or technical college to learn the necessary theory, for which they receive college credit. Upon completing the AJAC apprenticeship program, participants are master machinists, with a journeyman certificate that is recognized throughout the United States.

AJAC is, by law, governed by the Washington State Department of Labor and Industries Apprenticeship and Training Council. The Washington State Apprenticeship and Training Council and the Department of Labor and Industries develop and support apprenticeship training programs. As part of its mandate, the Council ensures high quality and relevance of all apprenticeship training, including the aerospace apprenticeship training program through evaluation of customer needs.

AJAC is similarly customer-oriented, and provides apprenticeship training based on input from the manufacturers in which the apprentices are employed. AJAC has presented the NIMS certification information to some its partnering employers. The feedback has been that the apprenticeship program and journeyman certificate provide a higher level of skill and competency than does the NIMS certification, and this higher level is required for the aerospace industry. Manufacturing firms working with AJAC are not requesting NIMS certification at this time.

AJAC believes that Washington needs a common certification system. If the state system selects NIMS certification and employers request it, AJAC will, without hesitation, include the NIMS curriculum in its training program.

6. Integration Efforts: *What specific information or case studies are available that "tell the story" of the integration of the NAM-endorsed skills certification in existing manufacturing programs of study?*

Each section below provides in-depth information on the five industry-based certifications included in the initial phase of the NAM-endorsed certification system. (NOTE: NAM recently expanded the system to include additional certifications that were not included in this inquiry.)

National Career Readiness Certificate (NCRC)

The NCRC is currently in place in two locations in Washington: Spokane and Centralia College. It is strongest in the Spokane area and just getting started in Centralia. The information for this section of the report was adapted with permission from reports and materials developed by the Spokane Area Workforce Development Council, written by Brian Burrows and Dawn Karber.

Spokane Workforce Development Council (Spokane WDC)

The Spokane WDC has developed a program centered on the NCRC, called Work Ready Spokane. This program was one of four selected by Governor Gregoire as a winner of the 2011 Governor's Best Practice Awards, which recognize programs and projects that create additional jobs and economic activity throughout the state while at the same time helping Washington workers get the training they need to land a job and earn a living-wage.

Work Ready Spokane, led by Spokane WDC, advances the competitive position of the Spokane region in Eastern Washington by providing workplace skill assessments and the NCRC to its workforce. The Spokane WDC has positioned the NCRC as an assessment that serves as a credentialing certificate demonstrating the career readiness level of an individual and also a community. This effort helps to align the interests and needs of job seekers, employers, educators and economic and workforce developers.

On a local level, the Spokane WDC works closely with Greater Spokane Incorporated (the area's combined chamber of commerce and economic development council), Community Colleges of Spokane, K-12, WorkSource Spokane, Career Path Services, Next Generation Zone, and key businesses representing the region's core industry clusters.

Job Seekers: Since 2008, more than 3,000 NCRC assessments have been given throughout Spokane County. Since April 2011, more than 300 national certificates have been earned and awarded to Spokane job seekers and students. Testing centers with trained staff and weekly testing schedules have been established in two locations in Spokane, and NCRC assessments and certificates were made available to all job seekers free of charge through June 30, 2011.

Almost all Spokane job seekers who completed the three assessments scored high enough to receive a national certificate. Only a very small number of individuals assessed did not receive a passing score. Those individuals were offered the opportunity to use the KeyTrain training and tutorial program in order to enhance their skills and test taking ability and retake the assessment. Many of those individuals returned to retake whichever assessment(s) they scored poorly on and earned their certificate.

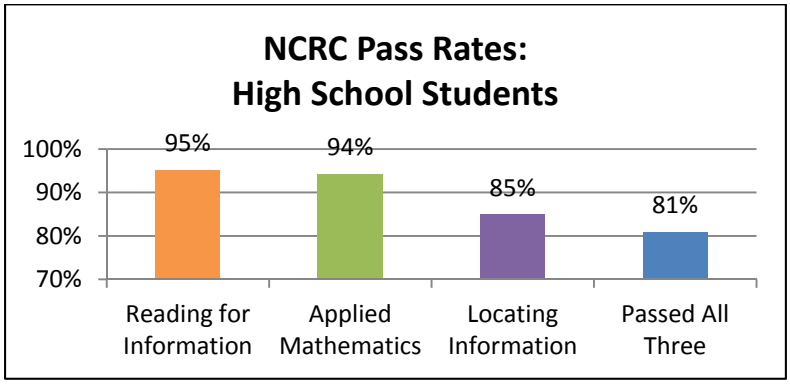
All job seekers who took the assessments were given instructions on how to market their new certification to employers. Many had also been working with a career counselor at WorkSource Spokane.

> *A Success Story*
>
> Spokane resident Andy Pierson, who is a graduate of Havermale High School with no postsecondary education, found his high school diploma and lack of college degree to be a stumbling block, even though he possessed the critical skills for an outstanding employee in manufacturing. After completing the NCRC assessment, Andy used the results to gain employment at a local aerospace manufacturer.#

Employers: Spokane companies using NCRC in their hiring practices say it has decreased hiring and training expenses and has increased employee morale and productivity. Mike Schelstrate, Director of Human Resources at Triumph Composite Systems, says, *"WorkKeys has helped expedite our hiring process, which allows us to reduce our costs. More importantly, we are confident this assessment tool has increased the quality of candidates we interview and ultimately have hired"*

Educators and Students: In the 2010-2011 school year more than 300 students from Ferris High School, Medical Lake High School, and Shadle Park High School completed the three assessments necessary to receive their National Career Readiness Certificate and were instructed on how to use this new credential in their search for summer employment. Of the 316 students assessed:

- 295 students completed the Reading for Information assessment. 281 students, or 95 percent passed it with a score of 3 or higher;
- 298 students completed the Applied Mathematics assessment. 281 students, or 94 percent passed it with a score of 3 or higher;
- 278 students completed the Locating Information Assessment. 236 students, or 85 percent passed it with a score of 3 or higher; and
- 252 students completed all three assessments. 204 students, or 81 percent passed all three assessments with a score of 3 or higher.



Another 300 students are scheduled to complete the assessments in the 2011-2012 school year. Mike Nepean, CTE Coordinator for Spokane Public Schools said of the assessment, *"The National Career Readiness Certificate is a great way to measure the critical skills our students will need for their career path. We want to equip our students with knowledge and skills that are marketable in today's economy and provide every opportunity possible to aid them in the transition from high school to whatever post-secondary path they choose."*

Rural Short Term Aerospace Training Certificate: The Rural Short Term Aerospace Training Certificate program is based on the knowledge, skills and abilities provided by Boeing for the aerospace training project and trains a workforce for rural manufacturers as well as for the Boeing Company and its suppliers. This training provides the skills necessary for workforce readiness in the rural communities and has been well received by the employers in the Colville area. This is a new program, developed early in the fall of 2011 and the first cohort will begin Spring Quarter. Spokane Community College is considering the inclusion of the NCRC in this program.

The following was adapted from the Spokane Community College Catalogue: The Institute for Extended learning, in conjunction with Spokane Community College and the Inland Northwest Aerospace Technology Center, offers the short-term Rural Aerospace certificate at the Colville Institute for Extended Learning Industrial Center.

This program focuses on the knowledge, skills, and abilities needed to perform the typical duties of Precision Machining and Quality Assurance in the manufacturing industry. The program prepares students to work with quality control systems management principles, applicable technical standards, testing, inspection and reporting procedures; as well as preparing student to work in small machine shops or manufacturing firms that produce durable goods such as metalworking and industrial machinery, aircraft parts, equipment, and components for manufactured products.

Centralia Community College

Centralia College was awarded funds from a Gates Foundation grant to the Center for Energy Workforce Development to fund the Get Into Energy Career Pathways Planning Project. This project creates a model for entry into technician level jobs in utilities and pathways to higher-level jobs in a variety of work settings in the energy sector.

The project uses the NCRC as one of three certifications to pre-screen entrance into the two-year degree program in energy at Centralia College. This model is also applied by the Avista pre-apprenticeship program offered at Spokane Community College.

Students interested in enrolling in these programs must complete three pre-enrollment certifications: NCRC (a score of Silver or better); SkillsUSA employability skills assessment; and

Energy Industry Fundamentals (a primarily on-line course). Remediation is available to applicants, and if the individual is still not successful in passing the assessments, he or she is referred to other programs at the institution.

Moving the NCRC Model Statewide

The Spokane WDC is working closely with the Washington State Center of Excellence in Aerospace and Advanced Materials Manufacturing and the Energy Center of Excellence as well as 11 other community colleges and multiple WorkSource centers to replicate the Spokane model in other parts of Washington.

Efforts to take this initiative statewide recently made a large step forward when the Spokane WDC was approved by ACT to serve as parent site to 11 community colleges and four additional career one-stop centers. Testing proctors are currently being trained at each of these community colleges. In particular, Shoreline Community College is poised to implement the NCRC by Fall Quarter 2012, using it to do pre-assessment with students prior to enrollment and post-assessment after completion of a certificate or degree program, beginning with professional technical programs.

Because of the rapid success of the Work Ready Spokane initiative, Dawn Karber, assistant director- Workforce Development, has been asked by ACT to serve on a national committee with representatives of a total of 10 communities where WorkKeys is growing.

Manufacturing Skills Standards Council (MSSC) Production Technician Certification

The MSSC certification is embedded in manufacturing programs at two Washington colleges: Lake Washington Institute of Technology and Green River Community College. Both colleges report that no students from the applicable training programs took the assessment to obtain certification.

However, the MSSC certification had the highest level of interest from colleges in the survey. Until now, the MSSC certification did not have a champion in the state as did NIMS (Shoreline Community College) and the NCRC (Spokane WDC). This has changed with the Center of Excellence for Aerospace and Advanced Materials Manufacturing taking a more active role and the Governor requesting funding. The Center will make use of its various activities to work with colleges and K-12 to explore and adopt the MSSC where appropriate.

Adoption of the MSSC certifications over the next 12 months is expected to grow.

National Institute of Metalworking Skills (NIMS)

Shoreline Community College

Shoreline Community College's CNC Machinist program was accredited by NIMS in April, 2010. Shoreline's manufacturing program is the only NIMS-certified program in Washington, Oregon, Idaho, and Alaska. Funding from NAM and the Bill and Melinda Gates Foundation accelerated the NIMS accreditation process, helped the college expand the number of student slots and supported students both in-class and with job placement.
Shoreline Community College also set about informing colleges in the state community and technical college system about the value of NIMS certification and how to become NIMS accredited. The college reports meeting with a good deal of resistance from other colleges regarding NIMS adoption, including:

- The NIMS process takes over a year for a faculty member to get NIMS certified.
- The college must ensure its shop meets NIMS standards.
- NIMS criteria must be embedded in the existing curriculum, and faculty has resistance to external review of their curriculum.
- The accreditation process is arduous and requires significant planning and multiple stakeholders.
- Some colleges do not have faculty dedicated to machining.
- Some faculty members are highly resistant to change.
- Cost to students if the assessment fees are not covered by financial aid.

Since becoming NIMS certified, Shoreline has had 52 students complete the CNC Machinist program. All 52 students took the NIMS assessment and achieved certification at the basic level. This program has 100 percent employment of graduates. Another 24 students will begin the CNC Machinist program Winter Quarter of 2012.

The CNC Machining Program Advisory Committee is very supportive of third party certification. In particular, Royale Manufacturing is a proponent of the NIMS certification, granting priority interview status to those holding NIMS certification. Royale Manufacturing and other employers have found Shoreline graduates with the NIMS certification to have unexpectedly high ability to adapt from one machine to the next.

Tooling U

Tooling U is a provider of on-line training in manufacturing including machine operators, welders, assemblers, inspectors, and maintenance professionals. Three community and technical colleges have purchased the Tooling U product: Bates Technical College, Lower Columbia College and Lake Washington Technical Institute. Tooling U is aligned to three NAM-endorsed certifications: MSSC, NIMS and AWS.

Currently, no students taking the Tooling U courses are taking the NIMS certification exams. Even though Tooling U is aligned with these certifications, most colleges do not require or test for certification. There is a debate as to the usefulness of the NIMS certification and the high cost of it. The NIMS certification testing is segmented into small sections within the total Tooling U course and even though the certification cost for each segment is relatively small, the total cost of certification for all the segments can add up to a significant amount.

NIMS and the associated certification are desirable, but usually come at a price of maintaining them and getting instructors up to speed and credentialed. Given the budget squeeze, colleges report that they are forced to consider the on-going cost of such programs. The interest in NIMS is being negatively impacted by its associated cost. While there has not been widespread desire for the NIMS certifications in the past, Boeing has recently begun to mention it.

American Welding Society (AWS)

There is a high level of demand for certified welders by employers in Washington. Most certified welding graduates are immediately hired by industry. The need for welders in the state has been, and continues to be, high due to the state's diversified manufacturing base. Certified welders are needed for structural steel utilized in construction and other industrial applications, heavy plate welding for marine use, aluminum welding in aerospace and boat building and stainless steel welding in medical and high technology equipment.

WABO versus AWS: There are two types of welding certifications available in Washington, WABO (Washington Association of Building Officials) and AWS (American Welding Society). The State of Washington requires welders to be certified through WABO (Washington Association of Building Officials). Any structural steel work in the state – "steel the public sees or touches - railing, building, bridge, etc." - has to be done by WABO state certified welders.

However, over half of the college welding programs in the state already provide certification in AWS. The criteria to pass the AWS and WABO assessments "*are identical*," according to Dan Minzel, Chair of the Welding Technologies Program at Everett Community College. He has examined both certifications, and they are "*photo copies of each other*."

Since AWS is accepted in more places (for example, Montana is an "AWS state"), some colleges believe it may be a more useful credential overall. But for current community and technical college students who plan to work in Washington, the WABO is a requirement.

WABO differs from AWS in that WABO only certifies steel; it stopped certifying aluminum welding and focused its certification program on steel in the late 1990s. AWS certifies stainless, aluminum and mild steel welding. The aerospace industry and other advanced technology industries require certified welders in aluminum and stainless steel. Currently

there is a lack of alignment between the state's WABO certification and the needs of these industries.

An approved WABO testing facility requires the shop to be inspected annually for machine calibration, properly cut mill and bend metal specifications; and the presence of WABO certified welder examiners. AWS is similar but may also include ultrasound other radio-oriented calibrations. AWS testing facilities require more varied and numerous tests that at this point are not required by the state.

AWS certified examiners are required to obtain an AWS welding inspector certification (CWI) to conduct assessments for certification. Training and fees for the CWI certification cost approximately $3,000; the certification process culminates in a challenging three-day test.

Some colleges see opportunities to expand their curriculum by including advanced manufacturing welding programs such as the one at Everett Community College, and are considering setting up AWS certified shops and testing programs. There are barriers to implementation, including the cost of faculty certification.

Society of Manufacturing Engineers (SME)

Chapter 39 of the Society of Manufacturing Engineers is the only chapter in Washington (and West Coast) that offers preparatory classes and proctors certification exams. Edmonds Community College provides classroom space for the classes which are provided at no cost to the participants. Courses are offered in-person and in on-line formats. The SME chapter provides materials and preparation text books (which can add up to $400 per student). The SME national office provides funding for the materials, to reimburse instructors for travel and student participation in the classes. Students pay the certification fees.

Over the three years that the classes have been offered, 28 have completed them. In 2011, 16 certifications were awarded in Washington. Classes are arduous, but instructors report that if an individual is diligent, he or she will pass the exam.

Industry is heavily involved in this process. Industry professionals provide input to an annual review of the contents of the exams that lead to certification. Preparatory classes are taught by industry professionals, and they act as proctors for the exams. The senior chapter membership by and large, is made up of manufacturing practitioners.

One of the growth areas for SME certification has been the addition of certification in LEAN, in partnership with the National Institute of Standards and Technology Manufacturing Extension Program by conducting LEAN training under the SME banner.

SME Chapter 39 is working to imitate student chapters at the K-12, college and university levels. They have identified that a primary hindrance to increasing the number of SME

certifications is dissemination of information about the value of certification. Currently, individuals must take the initiative to contact the SME headquarters in Dearborn, Michigan to request information on certification. Ed Halloran, SME Chapter 39 says, "*It requires people on the ground and continuous involvement*."

7. External Grants: *Have any agencies or colleges received any external grants that might support certification implementation efforts? If so, what role might they play in scaling up of the NAM-endorsed system?*

Two external grants to Washington entities will provide some funding to assist with the NAM-Endorsed Certification System roll-out: The Trade Adjustment Assistance Community College and Career Training (TAACCCT) grant from the Department of Labor (DOL) and the Governor's Discretionary Workforce Investment Act (WIA) fund grant.

DOL TAACCCT Grant (Air Washington)

The focus of the DOL grant is on aerospace manufacturing. The purpose is to research, design, develop, and implement comprehensive, current, and innovative education, training, and services necessary to meet Washington's growing workforce demands as identified by employer partners in the aerospace industry sectors of advanced manufacturing/machining, aircraft assembly, aircraft maintenance, composites, and electronics.

Several components of the DOL grant will play a role in the roll out of NAM-Endorsed Certification System: common course numbering, professional development, and pre-employment assessment and curriculum, as described below.

Common Course Numbering: One of the outcomes for the DOL grant is to identify core courses in aerospace manufacturing programs and work collaboratively to develop CIP codes, common names and numbers across the community and technical college system. The Center of Excellence for Aerospace and Advanced Materials Manufacturing is the lead for this outcome.

The methodology will be to identify knowledge, skills and abilities (KSAs) that are covered in each course. KSA's become the common denominator which communicates content and level of competency to business and industry, secondary education, postsecondary education and the military.

Once KSAs for core courses have been identified, the Center of Excellence will compare them with the body of knowledge for the five NAM-endorsed certifications, and identify areas of overlap and gaps to determine the steps that need to be taken (if any) to embed the certifications into the curriculum.

Professional Development: Professional Development provides training to faculty, instructors and administrators. Some professional development will take place in the workshops and discussion groups that will be convened for common course numbering. It is possible that DOL funding could be applied to additional professional development for instructors to become certified or endorsed to provide instruction for NAM-endorsed certifications. This is dependent on the success of the common course numbering process and the assimilation of the body of knowledge for the NAM-endorsed certifications into that process.

Pre-Employment Assessment and Curriculum: The DOL grant funding will support Spokane Community College in developing pre-employment assessments and the Center of Excellence for Aerospace and Advanced Materials Manufacturing in developing pre-employment curriculum for individuals to prepare for the assessment. The pre-employment curriculum and assessment will include introduction to five aspects of aerospace manufacturing. The Center of Excellence plans to encourage inclusion of the NCRC certification as part of the pre-employment assessment, seeking industry involvement in the development process.

Governor's Discretionary WIA Funds

This year, 10 colleges collaborated in their application for WIA funding. Funding went to Shoreline Community College to support other colleges in Washington to incorporate NIMS into their manufacturing programs. A November 17, 2011 workshop provided information to interested colleges. Seven colleges attended, along with the Aerospace Joint Apprenticeship Committee (AJAC) and Yakima Valley Technical Skills Center (K-12). WIA funds will assist colleges and faculty to attain certification from NIMS. Shoreline is committed to supporting all nine institutions in attaining NIMS certification.

While funding of education remains an issue in Washington, considerable resources are being dedicated to the alignment of education and training with the needs of the state's manufacturing industry, both from state funds and grant funding. The NAM-Endorsed Certification System is considered by many to be a valuable tool in this process, and its rollout will benefit greatly from these investments.

8. Industry Perspective: *What is the industry's perspective on the current education and training system? Do manufacturers currently use national certifications in their hiring protocols? Would they be likely to incorporate NAM certifications?*

In October and November 2011, staff from the Association of Washington Business (AWB) conducted a series of focus groups with manufacturers in Moses Lake, Spokane, the Tri-Cities, Vancouver, Everett, and Mt. Vernon. The goal was to hear first-hand from Washington manufacturers about the economic, regulatory and workforce challenges faced by the industry. Over 70 companies representing approximately 5,000 workers participated.

While not specifically focused on issues of credentialing and certification, the focus group process did collect some input on workforce issues and the current perceptions of the industry relative to the education system in general and their general requirements for third-party credentials. The following summarize participating employers' main points about workforce:

- It is not difficult to find entry level workers to train, but it is difficult for small and medium sized businesses to keep them. Once trained they go to larger businesses for more pay and benefits.
- Higher level workers such as management and engineers are difficult to recruit.
- Certifications are important but they need to reflect the needs of the industry
- Business needs to understand the importance of a certification
- Employers see a serious lack of work ethic in the available pool of workers and perceive it as problem with K-12 and government benefits.
- A Manufacturing Industry Awareness and Image campaign would be beneficial to the industry in recruiting the next generation of manufacturing workforce.
- The training system has not kept up with the increasingly high tech and automated manufacturing industry.
- Most retraining is done internally.

With respect to the community and technical college system, industry representatives stated that it met their needs as best as possible given the parameters the colleges work within.

A couple of barriers included funding for up-to-date technology and equipment to train the workers and the requirement that training programs in the colleges must have a certain amount of business located within a specific distance to the college. This is difficult particularly in areas such as the Tri-Cities where industry is spread across a three-city region. Industry indicated that basic skills are being taught in the colleges but certain specialized skills are not. Industry for the most part has taken the position that as long as the basic skills are taught they will teach the specific skills based on their particular machinery and need.

With respect to the K-12 system, industry indicated extreme dissatisfaction with how the future workforce is being trained. They indicated that basic math and reading skills are not being taught and that there is a serious lack of work ethic in the younger generation. Industry stated that they have a large number of applicants failing hiring exams because of a lack of basic math and reading skills. Industry has committed resources to remediation in math and reading when they find applicants who have the skill set they need.

When asked if they use national certifications currently in their hiring process, some manufacturers said that they did, but it varied from business to business as to what certifications they used. Some use basic skills certifications such as WorkKeys and others use specific skills certifications such as those for welders.

While focus group participants were not specifically asked if they would incorporate the NAM-endorsed certifications, participants said they would be willing to accept certifications in their hiring processes as long as they understood fully how that certification could help them and how it applies to their workforce needs.

AWB recommends that a concerted effort be put to promoting the value of industry certifications to both business and the college system. AWB would be willing to provide the business outreach aspect of this should NAM decide to go forward. The organization has over 7,600 member businesses representing 650,000 employees. Of this number almost 2,000 manufacturers are members.

AWB also recommends that the state needs a manufacturing awareness/career campaign. The manufacturing industry is still misunderstood by the new generation of workers and those who influence their post-secondary decisions. One of the things AWB has discussed with its manufacturing members is an image campaign. This would include a career awareness campaign similar to the one at Greater Spokane Incorporated. http://www.greaterspokane.org/careers-and-workforce.html

9. Continuous Improvement: *How will the state evaluate the overall effectiveness of the NAM-Endorsed Certification System in regards to continuous improvement of educational institutions and to employer satisfaction?*

Evaluation is an increasingly important component in the workforce training and education system in Washington. Evaluation involves assessing the strengths and weaknesses the system to improve its effectiveness. There are several initiatives underway in this regard.

Pegasus: The Governor's Project Pegasus proposal includes specific provisions for the Workforce Board to work with the SBCTC to perform annual evaluation of programs identified by the Center of Excellence for Aerospace and Advanced Manufacturing Advisory Board. In addition the Workforce Board will conduct an analysis of the results of the training system for aerospace and advanced materials manufacturing. To the degree that NAM-endorsed certifications have been incorporated into the training and education system, they will be evaluated as well.

Center of Excellence: The Center of Excellence will provide a forum for employers and industry to provide feedback for continuous improvement of manufacturing education and training in preparing the workforce to meet the skill and competency needs of manufacturers in Washington.

Evaluation Capabilities: Since 1996, the Workforce Board has evaluated labor market, educational and other outcomes of community and technical college workforce programs, apprenticeships, and secondary career and technical education programs. Outcomes

evaluated have included employment, earnings, wage rates, further education and participant and employer satisfaction. The Workforce Board has supervised a range of training demonstration projects, including secondary and postsecondary internship programs, industry-specific Skill Panels, and customized job training (Job Skills program), with evaluation responsibility for several of these demonstrations.

This capability is expected to be complemented by the state's new P-20 longitudinal data system operated by the Education Research and Data Center (ERDC). When the ERDC system is fully operational in June 2013, it will offer centralized data access for evaluation. This data will include tracking students across education sectors and into employment, with plans to expand the array of data and provide wider access for analysis. Steps have been taken to protect individual privacy and confidentiality, while improving accessibility.

Conclusion

Since receiving the grant from NAM six months ago, the Workforce Training and Education Coordinating Board has made significant progress against its five-part plan to make the NAM-Endorsed Certification System an organizing factor in manufacturing programs of study within the community and technical college system.
Establishing industry buy-in will be a long term effort. Because nationally recognized skills certification is still new to the state, wholehearted support is difficult to achieve. However, progress made with Boeing can serve as an important catalyst for change among other key manufacturers, particularly the Boeing supply base.

Through its participation with the Center of Excellence for Aerospace and Advanced Materials Manufacturing Aerospace Curriculum Alignment Team, Boeing has been involved in discussions regarding the NAM-Endorsed Certification System and has expressed full endorsement of the creation of a skills certification system and platform for aerospace. This includes all five of the NAM-endorsed certifications and others.

Significant progress has been made in identifying the community and technical colleges that are currently using components of the NAM-Endorsed Certification System as well as those with an interest exploring adoption. This information fosters a learning community of college administrators and faculty undertaking implementation of NAM-related programming. Such a dialogue is already underway regarding aerospace, and can be leveraged to a broader discussion across other manufacturing industries.

Despite early adopters among the colleges and high schools, the educational community will require a long-term investment in marketing the value of industry certifications. College administrators want to see that employers will utilize the certifications in their hiring practices before committing resources.

In addition, some colleges already have full programs and very high employment rates for graduates, and so question the value proposition. Following is an email received from the Dean of Trade and Industry and Apprenticeship at Renton Technical College. It provides an example of the thinking held by some colleges at this time:

> *RTC [Renton Technical College] will be working on our self-study kit for NIMS in 2012, which includes instructor and student credentialing requirements. Currently NIMS credentialing is not available at RTC. I'd like to stress that technical and community colleges in Washington have a credentialing system: award of certificate and AAS degree. NIMS is a product for documenting attainment of a limited variety of skills as verifiable by students taking on-line academic tests provided by NIMS. NIMS method of grading actual machined products is to ask colleges to find volunteers (or find funding to pay someone separate from the instructor) to measure/assess student projects. Results are then forwarded to NIMS to record such results. NIMS provides on-line tests and acts as a recorder—that's it. NIMS is not a magic wand; it is duplicating what Washington State tax payers and students are already paying for: instruction and assessment at CTCs. So what is the point? A limited skill set can be measured at one point in time that is common across the U.S. RTC's Precision Machining Technologies graduates are employed before they graduate. In June 2011, the gold medal winner for the annual national Skills USA contest in Kansas City was from Renton Tech. Please mention this in your report.*

Colleges that align with this point of view will need industry to embrace the use of certifications and need to see that the NAM-endorsed certifications add value for students, without generating a lot of additional cost to students and the college.

The presence of this perspective is an indicator that the state still does not have full agreement to develop a NAM-Endorsed Certification System. However, there is agreement to explore the usefulness of an industry recognized credentialing system, and to start that exploration with the NAM-Endorsed Certification System. This exploration is supported by the Project Pegasus proposals. There is also agreement, validated by the deployment of some of the Workforce Investment Act 10 percent funds, to build on the early work of Shoreline Community College and scale the NIMS certification to multiple colleges in the state.

Washington's renewed focus on aerospace workforce development is fostering greater interest and engagement of the state's education and training system in the development of a skills certification system. This positive trend will spill over to other key industries within manufacturing as more witness the benefits of a certification system in aligning with industry skill needs and achieving the best possible employment outcomes for job seekers and incumbent workers.

Washington is making progress and there is more opportunity still ahead!