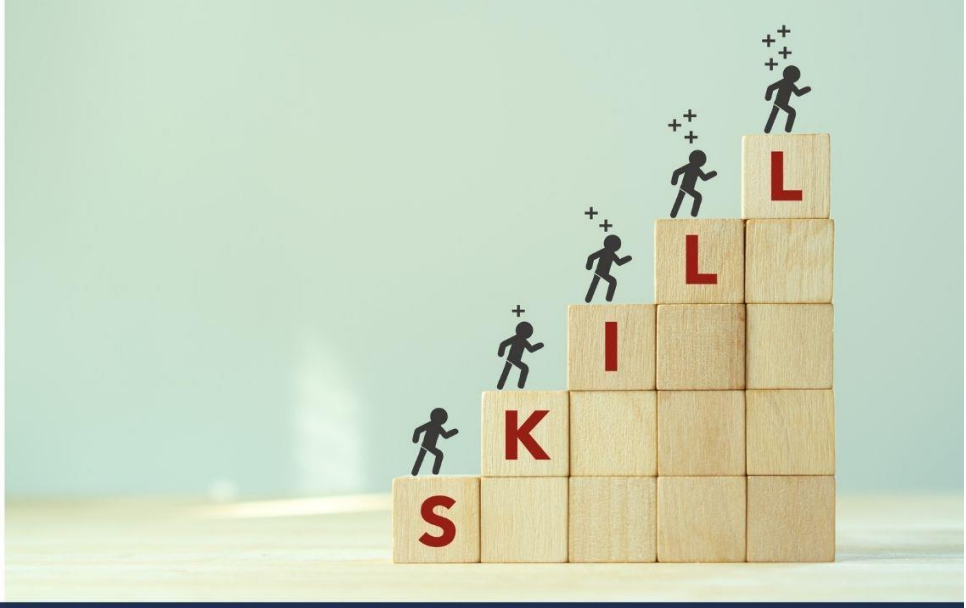
COMPETENCY MODEL CLEARINGHOUSE

U.S. Department of Labor, Employment and Training Administration

Competency Models In Action



Supporting Industry Career Pathways: NIIT's Development of Competency-Based Apprenticeships

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Introduction

The National Institute for Innovation and Technology (NIIT) strategically brings together industry, academia, and government to assess industry needs and identify opportunities for innovation. Working in partnership with the U.S. Department of Labor's Employment and Training Administration (DOL ETA), the founders of NIIT joined with industry partners and accomplished three activities toward strengthening the industry's talent pipeline:

Competency

A competency is the capability to apply or use a set of related knowledge, skills, and abilities required to successfully perform "critical work functions" or tasks in a defined work setting.

- updating and creating a unified Advanced Manufacturing Competency Model,
- developing a talent portal called the National Talent Hub, and
- launching Registered Apprenticeship programs that support nanotechnology and semiconductor supply chains through the Growing Apprenticeships in Nanotechnology and Semiconductors (GAINS) program.

This effort began with development of a unified competency model for advanced manufacturing in partnership with ETA.[1] Subsequently the National Science Foundation (NSF) awarded a $6 million grant in 2019 to use the competency model as a foundational component to the partnership advancing an online talent portal that would be called the National Talent Hub. The National Talent Hub focuses on

[1] https://nsf.gov/awardsearch/showAward?AWD_ID=1939219&HistoricalAwards=false

developing industry-wide talent pipelines, leveraging the "unified" competency approach to enable skill development that provides a broader foundation in support of a multitude of tech-based careers and all forms of advanced manufacturing. Creating technology to support the development of and continued innovation within strategic supply chains within the U.S. – those important to national security and global competitiveness - requires a skilled workforce. The competency model helps advance talent development within the microelectronics design and manufacturing industry, including semiconductors, by using competencies as the common language across individual user profiles, curriculum, and job descriptions.

Competency Model

A competency model is a collection of multiple competencies that together define successful performance in a defined work setting. A model provides a clear description of what a person needs to know and be able to do—the knowledge, skills, and abilities—to perform well in a specific job, occupation, or industry.

Updated in partnership with NIIT, the Advanced Manufacturing Competency Model was relaunched on the Competency Model Clearinghouse (CMC) in 2021 and identifies the common knowledge, skills, and abilities needed by individuals in the industry, thereby widening the job candidate pipeline and creating greater synergies between employers, training providers, and talent.

NIIT utilized the model as a building block of its National Talent Hub, which now supports GAINS Registered Apprenticeship programs designed specifically for nanotechnology-related industries and the semiconductor sector. GAINS (Growing Apprenticeships in Nanotechnology and Semiconductors) and the National Talent Hub are both aimed toward strengthening the nation's talent pipeline for these strategic industry supply chains. After two years of comprehensive industry engagement to validate and update required competencies and eliminate those that were dated and redundant, in January 2022 this work resulted in the identification of 88 competencies specific to semiconductor manufacturing, and over 100 competencies identified that relate broadly across advanced manufacturing.[2]

Workforce Need

Within the advanced manufacturing and semiconductor industry, the need for STEM education and technology career pathways from K-12 and adult education to higher education continues to grow. Access to training and retaining talent is a top priority for many employers, especially in technology-driven industries that require a consistent flow of a qualified talent to keep up with continued economic expansion. "The NIIT's mission is to ensure strategic industry sectors in the U.S. have what they need to prosper, innovate and develop the talent pipeline as a top priority," said Mike Russo, President and CEO of the NIIT.[3] While strategies are being implemented to address the talent shortage, the workforce training system is fragmented, highlighting the need for a national infrastructure.

[2] https://www.youtube.com/watch?v=r2OoWFwj0Zg

[3] https://bit.ly/3NZ18ks

Approach

NIIT launched the National Talent Pipeline Development Initiative to address the need for a national infrastructure. The initiative aims to connect employers, educators/training providers, and job seekers by using competencies to streamline the process of translating between job requirements, educational outcomes, and the skills and experience of potential talent. To do so, NIIT built a competency-based portal called the National Talent Hub, building on the Advanced Manufacturing Competency Model and the subsequent Semiconductor-Nanotechnology Manufacturing Competency Model competencies. The online portal allows employers, educators/training providers, and job seekers to draw on the competencies identified in the model to build job, degree, and individual competency profiles within the Talent Hub.

The system can then use advanced data analytics to connect talent with career and educational opportunities and dynamically inform the underlying competency model, as well as the development of training programs and recruitment strategies.[4]

Features of the Talent Hub include the following:

- A job gap tool that allows talent to map job opportunities and determine gaps between their own profile and the job requirements and see how various training programs can help them close those gaps.
- Work role skill profiles that allow employers to define work requirements and rate the required proficiency and importance of required competencies.
- Training and education program profiles that list competency outcomes, proficiency levels, and assessment methods, facilitating dynamic alignment of training with industry requirements.
- The first dynamic system that provides real-time industry input to inform curriculum development, skills assessment, and career alignment
- Lifelong learning profiles to enable individuals to build their skills profiles as they acquire work and educational experience

[4] https://nationaltalenthub.com/#/

Scaling Up

To scale the use of this competency-based approach, NIIT launched pilot programs with the State University of New York (SUNY) Polytechnic Institute and engaged with several community colleges in New York (e.g., Hudson Valley Community College, Mohawk Valley Community College). These academic partners took advantage of the National Talent Hub to develop and launch pilot instructional programs and GAINS Registered Apprenticeship programs to support talent development for the semiconductor industry. Next, programs from two community colleges in North Carolina's Research Triangle region – Wake Technical Community College and Fayetteville Technical Community College – were added to the Talent Hub to support statewide talent pipeline development. The community colleges went through an alignment process to structure courses around the competencies identified by employers in the National Talent Hub. As of January 2022, Wake Tech incorporated information on 40 of its programs in the National Talent Hub system to sync program learning objectives with employer expectations[5], and in July colleges and universities throughout the nation within the NSF Advanced Technological Education (ATE) program were granted free access.

Registered Apprenticeship

In 2021, DOL ETA's Office of Apprenticeship awarded $9.5 million over four years to NIIT to strengthen and build the nanotechnology and semiconductor workforce through the Growing Apprenticeships in Nanotechnology and Semiconductors (GAINS) Registered Apprenticeship programs.[6] As a result of this award, NIIT serves as a national Industry Intermediary to expand the use of Registered Apprenticeship in supply chains in the nanotechnology and semiconductor industries.[7] Expertise from GAINS partners including the Manufacturers Association of Central New York (MACNY), the American Institutes for Research (AIR) and Credential Engine help further advance credential transparency and improve accessibility to the semiconductor and nanotechnology industry.[8]

Registered Apprenticeship is an industry-driven, high-quality career pathway where employers can develop and prepare their future workforce, and individuals can obtain paid work experience, receive progressive wage increases, classroom instruction, and

[5] https://www.youtube.com/watch?v=r2OoWFwj0Zg

[6] https://www.dol.gov/newsroom/releases/eta/eta20211217-0

[7] See Registered Apprenticeship Industry Intermediaries Factsheet: https://www.apprenticeship.gov/sites/default/files/dol-industryfactsheet-raindustryintermediaries-v04-web.pdf

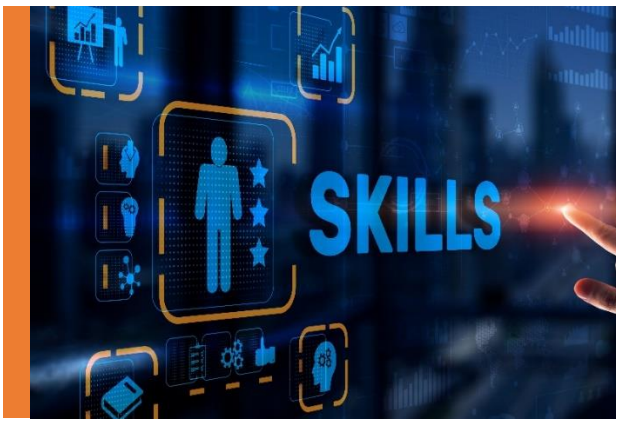
[8] https://bit.ly/3NZ18ks

a portable, nationally recognized credential. Registered Apprenticeships are a proven model to recruit, train, and retain talent. For example, 93% of apprentices retain employment after completing an apprenticeship program. A recent evaluation on the American Apprenticeship Initiative showed that employers reap a positive return for every dollar spent on Registered Apprenticeships with a median return on investment of $144 for every $100 invested.[9]

The North Carolina statewide initiative will include the deployment of the GAINS program in the state, which leverages the same infrastructure as the National Talent Hub. NIIT already has developed and launched several state and national registered apprenticeships through this program including roles for Maintenance Technicians, Operator Technicians, Engineering Equipment Technicians, and Equipment Manufacturers.[5] Under its National Talent Pipeline Development Initiative, the NIIT is establishing regional talent development hubs in these regions in which the entire education pipeline is aligned within the Talent Hub to ensure connectivity with industry and career opportunities.

The competency-based approach employed in the GAINS program enables NIIT to crosswalk Registered Apprenticeship program standards within the Talent Hub, and it allows training providers to efficiently align their related technical instruction programs and tailor them to the capabilities of individual learners. “By using the same architecture within the Talent Hub to assess programs, job requirements and individual skills and aligning them with Registered Apprenticeship standards, employers can easily report out they’ve met those standards, both with their on-the-job training and with the related technical instruction”, explained Robert Weinman NIIT Director of Workforce Innovation.[5] For example, NIIT can substitute higher levels of instruction in the program for individuals assessed as being at a higher proficiency level in the beginning. As a result, they can finish the program at a higher level than the baseline after completing the 16-to-24-month apprenticeship model. This structure supports Registered Apprenticeship programs that meet talent where they are, while supporting a diverse talent pool at various skill levels.[10]

Participating employers use the tools available in the National Talent Hub database and through the GAINS program to create competency-based job profiles and work with GAINS experts to translate them into competency-based apprenticeship work process schedules. GAINS staff also provide support for the process of registering apprenticeship programs with DOL, further lowering the burden on employers.[11] For example,



[9] https://wdr.doleta.gov/research/details.cfm?q=&id=2727

[10] https://www.youtube.com/watch?v=r2OoWFwj0Zg

[11] https://www.apprenticeship.gov/sites/default/files/logos/discover-apprenticeship-logo.svg?v=20201105

if an employer is interested in creating an apprenticeship program or expanding an existing apprenticeship program, the employer can build a competency-based job profile in the Talent Hub. GAINS subject matter experts then submit data into DOL administrative systems and provide details to DOL required to register an apprenticeship, freeing employers from administrative burdens. "Being able to leverage the National Talent Hub to support the GAINS program is game changing, and the NIIT's partnership with USDOL-ETA on the Advanced Manufacturing Competency Model and the first Semiconductor Competency Model is now being put to use as we deploy the Hub in support of the expansion of Registered Apprenticeships throughout the strategic supply chains", said Martha Ponge, the Director of National Apprenticeships for the NIIT.

Next Steps

Moving forward, NIIT will continue to advance the connection of education and training providers, employers, and job seekers within the National Talent Hub, with a particular focus on gateway positions and apprenticeships. For example, a relationship with the Micro Nano Technology (MNT) Network was established, which includes 25 colleges around the country focused on nanotechnology.[6] These partnerships expand geographic access to the Talent Hub, making it possible for employers, job seekers, and educators to connect. Through the DOL' Veterans Employment and Training Service (VETS), NIIT will be offering the ability for Returning Service Members and their families to establish profiles in the Talent Hub free of charge and leverage the power of the system to leverage their military experience to advance their careers. Additionally, NIIT continues to partner with DOL ETA to share a competency model specific to the semiconductor-nanotechnology manufacturing sector. A preliminary version, which builds on the Advanced Manufacturing Competency Model, was published on the CMC in the summer of 2022 to inform and support the further development of industry-responsive academic programs. The full version of the semiconductor model resides within the National Talent Hub and is dynamic, reflecting ongoing input from the users of the hub—employers, educators, and individuals.

NIIT also foresees a need for cohesive employer-trainer partnerships to build out the talent pipeline infrastructure to support career advancement beyond entry-level apprenticeships. "There is an even greater need now to get access to skilling those individuals up with fundamentals and getting them more hands-on knowledge and experience with equipment," observed Robert Weinman.[6] For example, as of August 2022, close to $50 billion will be invested into the manufacturing of memory chips to increase the production of semiconductors in the U.S.[12] However, for multiple reasons, such as

Equipment Access

Even community colleges that can partner with tool and equipment providers often can't maintain the partnership, keep up with software requirements, or fix security challenges.

[12] https://www.whitehouse.gov/briefing-room/statements-releases/2022/08/09/fact-sheet-chips-and-science-act-will-lower-costs-create-jobs-strengthen-supply-chains-and-counter-china/

supply chain issues and staffing shortages, community colleges struggle with accessing equipment needed for training, Mike Russo further explained. Making equipment more visible and accessible would create a shared asset that could benefit the entire industry.

These efforts indicate that braiding federal resources from multiple sources can be leveraged to provide infrastructure for industry-led partnerships. The successful creation of robust talent pipelines thereby helps job seekers, employers, educators, and industry thrive in a global economy. In this case, the combination of DOL ETA competency models, NSF ATE, and DOL ETA's Office of Apprenticeship resources contributed to promising practices and tools that bring together job seekers, educators, and employers. Convening and aligning all players in the advanced manufacturing industry ecosystem allows for strong engagement toward the ambitious pursuit of helping job seekers find resources and gain the skills needed by employers to support a vibrant domestic industry, all within a unique, nationally integrated infrastructure.

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