Competency Models In Action:

State Agency Develops STEM Career Pathways to Inform Community College Programs of Study

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- Using real time labor market information to develop curricula
- Maintaining collaboration between state government agency and educational institutions
- Bridging the gap between credit and non-credit college programs

Introduction

It's no secret that Science, Technology, Engineering and Math (STEM) occupations offer many well-paying, in-demand job opportunities. What's less well known is how to progress from entry-level jobs to mid- and high-level positions.

The Missouri Economic Research and Information Center (MERIC), the research division for the Missouri Department of Economic Development, has responded to that career progression challenge. Working in collaboration with MoSTEMWINs, a Trade Adjustment Assistance Community College and Career Training (TAACCCT) grantee, MERIC has developed career pathways in three key STEM industry clusters: Information Technology, Health Care and Life Sciences, and Advanced Manufacturing and Logistics.

Workforce Need

From a national perspective, the outlook for STEM occupations is strong. For example, according to projections from the Bureau of Labor Statistics, employment in healthcare occupations is projected to grow 19% from 2014 to 2024, much faster than the 6.54%average for all occupations. Similarly, the employment of computer and information technology occupations is projected to grow 12% from 2014 to 2024. The employment of industrial machinery mechanics, machinery maintenance workers, and millwrights delineated as a mid-level occupation on MERIC's Advanced Manufacturing career pathway, is projected to increase by 16% during that same period.[1]

Approach

"We worked collaboratively with the 13 community college member MoSTEMWINs consortium, which focuses on training state residents in STEM occupations, to develop career pathways that inform their programs of study," says Alan Spell, Research Manager, MERIC. "We synthesized information from the U.S. Department of Labor's competency models, O'NET, and Burning Glass Technologies Labor/Insight in developing the career pathways. Our goal was to provide the consortium with current labor market information on projected high growth

[1] Bureau of Labor Statistics, Occupational Outlook Handbook, 2014-2015 Edition

occupations to share with students, educators and workforce system providers for the betterment of our state's economy."

"The labor market information that MERIC provides helps our consortium colleges with curriculum development for in-demand jobs," says Dawn Busick, Project Director, MoSTEMWINs. "It enables us to develop and connect the right programs of study to meet the right jobs and needs of Missouri employers. As a Round 1 TAACCCT grantee focused on Health Care in 2010, our consortium grant office MoWINs brought MERIC to the table as a partner and as Round 2 TAACCCT grantee, we continued to work with them with a focus on Advanced Manufacturing. Today, as a Round 4 grantee, we applied for additional funding to further develop statewide data integration systems, tool and policies in consultation with industries. MERIC principals sit on the MoWINs Executive Advisory Board and attend all of our consortium partners meetings."

Although it is too early in the current MoSTEMWINs grant to track participant outcomes, return on investment based on the use of job openings information for the TAACCCT Round 2 MoManufacturingWINS (MMW) grant is very positive. Of the total 4,529 MMW participants who were enrolled as of December 31, 2015, 73% had completed a program of study and 93% had completed at least one industry-recognized credential. Of the 3,318 MMW participants who had completed the program as of December 31, 2015, 77% were employed as of March 31, 2016.[2]

The occupations on the MERIC career pathways are divided into Now, Next and Later occupation categories based on the typical training and education required. Now occupations usually require 1 – 12 months of on-the-job training and may require specific work experience. Next occupations often call for an associate's degree or vocational certificate. Later occupations usually require a bachelor's degree or high and may need specific work experience.[3] The pathways describe the specialized skills and certifications and software that apply to each category.

For example, the Advanced Manufacturing and the Transportation and Logistics career pathways follow:

[2] March 31, 2016 Statewide MMW Public Policy Outcome Survey
[3] MERIC, https://www.missourieconomy.org

ADVANCED MANUFACTURING PATHWAYS

NOW OCCUPATIONS	NEXT OCCUPATIONS	LATER OCCUPATIONS
One-Twelve months of On-The-Job training	*Long-term OJT, Certificate, Assoc. Degree*	*Bachelor's degree or Adv. Degree*
Production Operators	First-Line Product. Supervisors	Indust. Production Managers
Laborers and Material Movers	Electrical Engineering Technician	Electrical Engineers
CNC Operator	Mech. Engineering Technician	Mechanical Engineers
General Maint. and Repair Workers	Indust. Engineering Technician	Industrial Engineers
	CNC Programmer	
	Indust. Machinery Mechanic	
	Welders	

Specialized Skills

Entry-level specialized skills include the general operation of production equipment, inspection of parts, basic repairs, understanding manufacturing processes such as lean manufacturing and continuous improvement, and forklift operation. More advanced skills such as welding, CNC programming, and technical work to include testing, calibration, quality control, scheduling, and documentation require specialized training or on-the-job experience. Later occupations generally require a bachelor degree for engineering but production management can be obtained through extensive experience.

Certifications and Software

Environmental Protection Agency Certification

Forklift Operator Certification

Hazardous Material Certification

AutoCAD or CAM Software

TRANSPORTATION AND LOGISTICS PATHWAYS

NOW OCCUPATIONS	NEXT OCCUPATIONS	LATER OCCUPATIONS
One-Twelve months of On-The-Job training	*Long-term OJT, Certificate, Assoc.Degree*	*Bachelor's degree or Adv. Degree*
Laborers and Material Movers	First-Line Transp. Supervisors	Transportation, Storage, and
Industrial Truck and Tractor Operators	First-Line Supervisors of Office and	Distribution Managers
Shipping and Receiving Clerks	Admin. Support Workers	Logisticians
Cargo and Freight Agents	Heavy and Tractor-Trailer Truck Drivers	Airline Pilots
Planning and Expediting Clerks		

Specialized Skills

Entry-level specialized skills include the general operation of material moving equipment, such as forklifts, dollies, and hand trucks, as well as knowledge of basic repairs, inspection, and packaging. More advanced skills such as office management, scheduling, and planning require specialized training or on-the-job experience. Later occupations generally require a bachelor degree for Logisticians and Airline Pilots but Transportation Management can often be obtained through extensive on-the-job experience.

Certifications and Software

Commercial Driver's License

Six Sigma Certification

Forklift Operator Certification

APICS (American Production and Inventory Control)

Next Steps

"We have developed a wage explorer tool that displays the aggregated entry level wages, industries and work regions of recent Missouri graduates based on programs of study," says Mr. Spell. "It matches this aggregated data for individuals who complete training programs with Quarterly Wage Reports, and allows users to explore the connections between training choices and work outcomes. We are currently working with the MoSTEMWINs colleges to add data for all non-credit programs to a similar, new tool that includes work outcome measures and reporting for all programs by school."

Related Links

MERIC
https://www.missourieconomy.org/

MERIC Wage Explorer
https://www.missourieconomy.org/occupations/wage_explorer.stm

Missouri Community College Association
http://mccatoday.org/mostemwins/