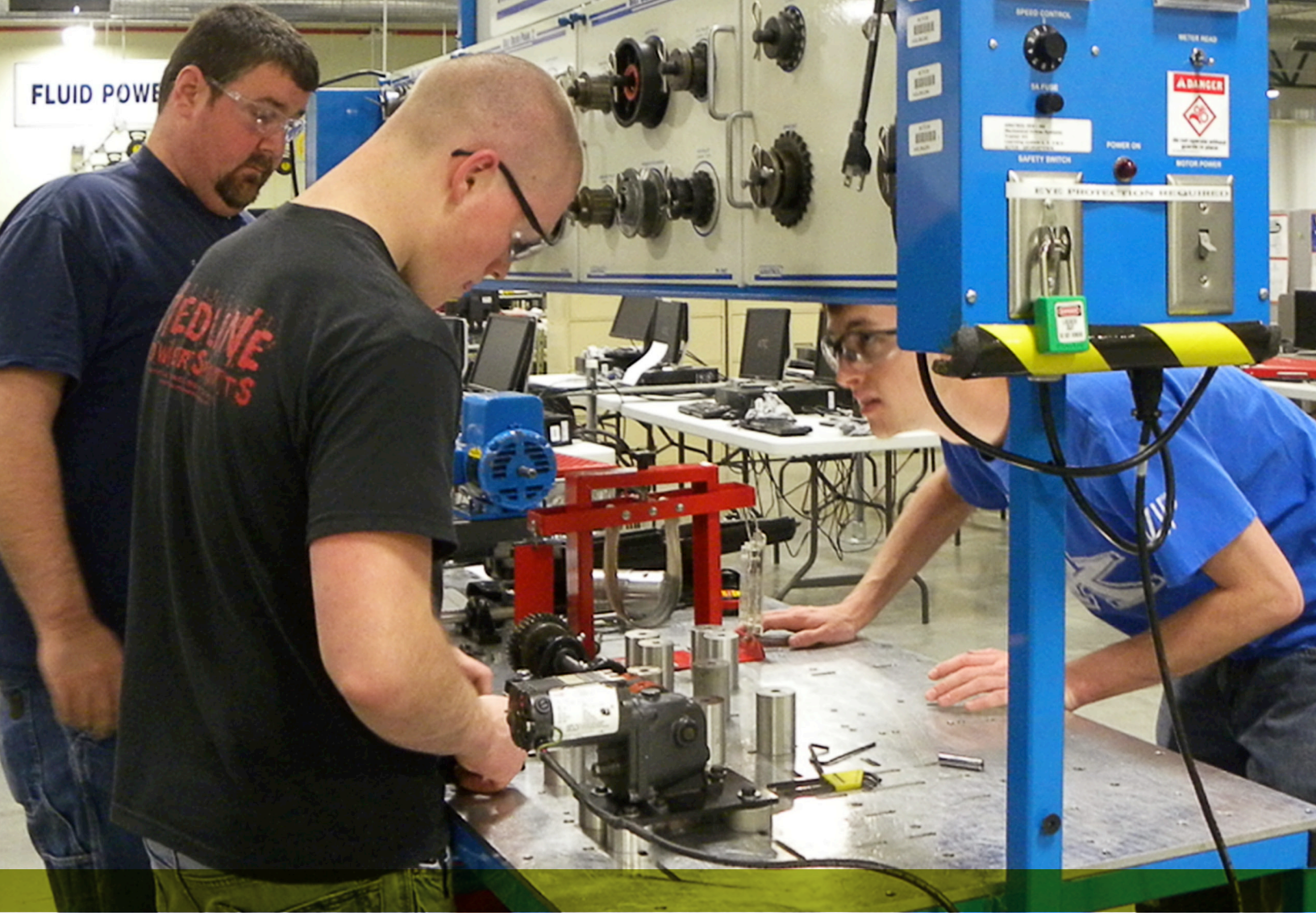


A Framework for Evaluating Implementation of Workforce Education Partnerships and Programs

Research Brief - August 2015

SRI Education™
A DIVISION OF SRI INTERNATIONAL

Spurred by a demand to prepare more American workers for middle-class jobs in high-technology industries, funders are investing aggressively in large-scale partnerships between community college workforce educators and employers. Despite such investments, however, few broadly usable insights have been gleaned about effective partnership and workforce program implementation. That gap limits the national capacity for identifying the best practices of these partnership efforts—identification that is needed for scaling the practices up for broader use to improve workforce education programming.

To address this problem, from 2009 to 2015, researchers from SRI International's Education Division studied community college workforce educational implementation in five industries and geographic regions.

That work has resulted in the Workforce Education Implementation Evaluation (WEIE), a framework for evaluating hard-to-measure aspects of the design, development, and delivery of workforce education partnerships and programs. Partnership strategies between employers and community colleges permit local regions to make adjustments in their workforce education system to ensure adequate supplies of skilled workers to meet employer demand.

For researchers, evaluators, and workforce education team leaders, the WEIE framework documents and tracks aspects of workforce programming that make for partnership sustainability and appropriate instructional programs. To illustrate WEIE's potential, the SRI Education Division study applied the framework to two contrasting cases. Each case represents a predominant approach to workforce program development in the United States: the large-scale partnership, an approach that involves close collaborations that can lead to structural changes in the college's instructional delivery system; and traditional employer outreach, an approach that involves the college in occasional consultations with employers to identify workforce skills gaps.

WEIE use clarified how regional labor market structure and dynamics guide decisions about how much effort to invest in a partnership. It highlighted the partnership implementation factors associated with building community college workforce program capacity to leverage social and organizational capital from employers and other institutions. And it revealed the instructional program implementation factors associated with preparing workers for the workplace and lifelong careers. This brief discusses those findings and implications for improving the delivery and evaluation of workforce education programming.

The WEIE framework relies on the following research approaches:

- Detailed analyses of occupational and industry employment databases, company data, an online job advertisement dataset, and a dataset consisting of resumes of program alumni
- Partnership analysis drawing from interviews with more than 80 college leaders, industry partners, and regional economic development representatives in the U.S. Northeast, South, Midwest, and Southwest, and in diverse high-technology industries offering middle-class wages—information technology (IT), advanced manufacturing, biotechnology, engineering technology, and wind energy technology
- Instructional data collection focusing on two high-technology workforce programs offered at about 10% of American community colleges: IT support and advanced manufacturing maintenance

- Instructional analysis based on:
  - Interviews and surveys of 8 instructors in the 2 target fields, focusing on their methods to make students job-ready; surveys of 38 students; and interviews with 25 students
  - Observations conducted in 8 classes to characterize instructional methods in workforce education
  - Collection of materials and student work from 24 lessons
  - Ratings of instructional materials and student work. Ratings were conducted by 12 industry professionals and workforce educators using a validated workforce rubric.

Rationale and Core Ideas for an Implementation-focused Approach

Evaluations of American postsecondary workforce partnerships currently emphasize outcomes and productivity. They focus on numbers of instructional materials produced and numbers of students recruited, enrolled, and job-certified. Measuring productivity is important, but evaluations focused only on such measures yield little insight about the implementation processes that lead to more effective workforce partnerships and instruction.

The WEIE framework offers evaluation concepts and measurement tools to provide more data about the quality of workforce program implementation. It focuses on three key elements:

- Labor market context – Data key to understanding employer partnering options
- Partnership quality – Concepts to assist in regional partnership development
- Instructional quality – Practices to deepen learning and build transferable skills

Figure 2. Framework for workforce education implementation evaluation

How the WEIE Works

The rest of this brief explains how the WEIE framework works by applying its tools and concepts to two contrasting cases, each of which reflects a common approach to workforce development: (1) large-scale partnership, and (2) employer outreach.

In *large-scale partnership* one large employer or an allied group of employers works closely with educators to develop training goals; share equipment and labs; provide curriculum resources; and participate in training by offering apprenticeships and internships, and by sponsoring other workplace activities.

In *employer outreach* the college periodically invites industry representatives to meet briefly as an advisory panel to review workforce program goals and curriculum. This is the predominant approach to workforce programming.

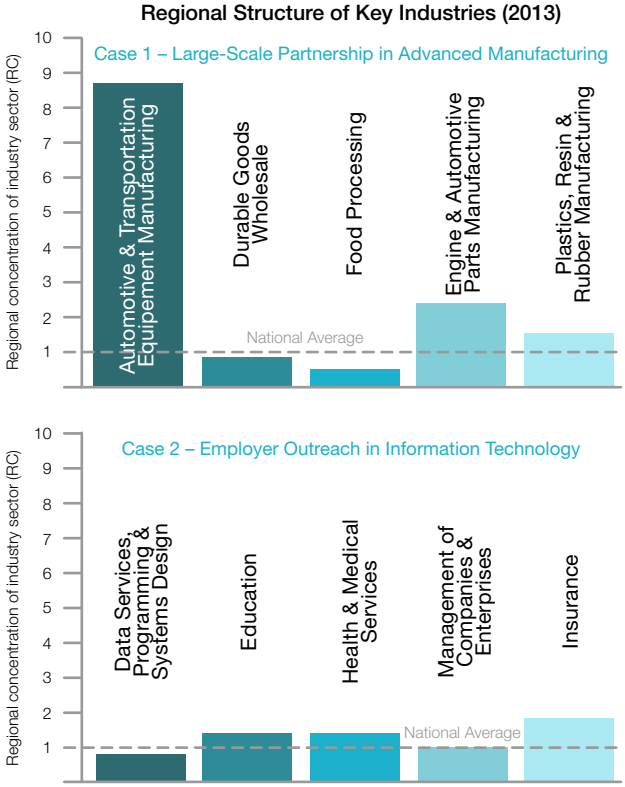
Labor Market Context

> **Helps answer the questions: How do local labor market structure and dynamics shape workforce education partnering needs and approaches? How can program outcomes be tracked?**

The structure and dynamics of the regional labor market underlie what kind of workforce training is needed in a region, what kind of partnership opportunities are likely to evolve, and what vulnerabilities those partnerships will have to economic trends and shocks. The WEIE framework used analysis of traditional labor market data, i.e. government data on employment structures, and online job postings data, to characterize the labor market context of the large-scale partnership and employer outreach cases. The large-scale partnership case focused on a college program developed to prepare advanced manufacturing workers, and its partner was a major automotive manufacturer. The employer outreach case focused on a college program developed to prepare information technology support workers.

The *structural analysis* of the large-scale partnership case determined that the concentration of regional employment in program target occupations was high relative to the national average, with a large concentration of jobs offered in the automotive manufacturing industry: an industry dominated by the community college's industry partner. For the employer outreach case, jobs in program-related occupations were less common in the region than the national average, and distributed across a more diverse group of industries. These results illustrate how structural data can inform local college decisions on the number and intensity of partnerships to develop.

Regional Structure of Key Industries (2013)



Regional concentration of industry sector (RC) is defined as RC = (industry share of regional employment / industry share of national employment). The key industry sectors are the five sectors that employ the most workers in the target occupations at the regional level, and are shaded from dark (highest number of workers in target occupations) to light.

Source: SRI analysis of the Bureau of Labor Statistics (BLS) (2014, 2015) Quarterly Census of Employment & Wages and Occupational Employment Statistics Data. Data are based on Private Sector employment only.

Analysis of labor market *dynamics* was needed to complement structural analysis. Are industries growing or contracting, how many workers are they hiring, in what occupations and with what skills and credentials? To assess dynamics, the WEIE framework recommends review of trends in traditional employment data and in online job advertisements, including the frequency of job postings and salary levels. This analysis draws on a job advertisement database developed by Rothwell (2014). For the large-scale partnership advanced manufacturing case, the total number of workers employed in program-related occupations had been growing, but most of the key industries that employed these workers had actually contracted in recent years. In addition, the key partner had reduced staff and did not seem to be placing online job want-ads. In the employer outreach IT case, the occupations students were being prepared for were experiencing high growth nationally, but regional employment had been more volatile and growth across key industries was mixed. However, we saw a high level of online job posting activity in the IT occupations, indicating that regional demand might have been stronger than the structural analysis suggested. Understanding labor market dynamics helps colleges customize their outreach and programming to help graduates build skills that are regionally in-demand by employers.

Outcomes for workforce program participants can be drawn from resume databases that characterize the career trajectories and skills of graduates. By pairing this information with job-posting data we can also characterize demand for graduate skills in the regional labor market. While rigorous implementation of such an approach would require tracking and collecting resume data from graduates, this is in fact significantly less burdensome than analyses that require the use of sensitive student data and access to protected Unemployment Insurance (UI) databases: factors which can be prohibitively time-consuming, complex and costly for routine evaluation. An exploratory application of the approach, based on convenience samples that should not be considered representative of all program graduates, indicated that for both cases about one third of sampled program alumni's current or most recent employment was in a target occupation. In addition, our analysis showed moderate regional demand for the skill-set of the alumni in the large-scale partnership sample, and strong regional demand for the skill-set of the alumni in the employer outreach partnership sample. Such outcome data can be used by the college to describe the marketability of program graduates.

Large-scale partnership can increase the number of organizations in program support roles and decrease the number of organizations in less supportive roles.

Different Roles of Regional Institutions*	Case 1: Large-scale Partnership with Key Partner **Advanced Manufacturing**	Case 2: Multiple Employer Outreach Approach **Information Technology**
Resource Providers	One industry partner is primary resource provider Shares a wide range of resources: space, equipment, curriculum, faculty, knowledge	Multiple employers Each shares some knowledge and curriculum resources
Competitors	No direct competition	2-year and 4-year colleges Short-term certification programs
Complementary organizations	State and regional industry sector associations; Pre-collegiate engineering program; K-12 schools; 4-year colleges; Regional economic development agencies	Regional IT training resource and technical assistance center
Beneficiaries	One industry partner mostly	Multiple employers and industry sectors
Opponents/problem makers	Academic and other workforce programs within the college	Academic and other workforce programs within the college Other colleges and trade schools
Affected bystanders	Advanced manufacturing employers in the region	Pre-collegiate STEM programs; K-12 schools; Regional economic development agencies; Business associations

**Framework adapted from Arney, Eddy, & Campbell (2010) and Bloom & Dees (2008)*

Partnership Quality

Helps answer the questions: What roles can different regional institutions play to enhance workforce educators' capacity to respond to labor market needs and economic cycles? What partnership strategies should be monitored?

Partnerships need to be responsive to political forces, administrative structures, and varying cultural values, both locally and regionally. The WEIE builds on ideas such as partnership capital (Amey, Eddy, & Campbell, 2010) and social ecosystems (Bloom & Dees, 2008). These concepts can help guide partnerships to bring about systemic change. To do so, the framework focuses on 1. identifying the roles different regional institutions should play in relation to each other and 2. developing practices of monitoring partnership strategies that lead to success.

Identifying Roles the Partners Play in a Regional Ecosystem

Building partnership both reduces competition and can help secure social and organizational resources for the workforce education program. The table on this page shows how partnership roles and interactions with other organizations affect the quality of partnership.

Monitoring the Four Key Partnership Strategies

A workforce partnership uses four strategies to set the goals of the partnership and improve its sustainability. Monitoring them can strengthen a partnership:

- *Coalitions* building expands two kinds of workforce program support: social (e.g., lobbying, engaging potential competitors) and organizational (e.g., equipment, space)
- *Communications* processes establish the vision, values, and priorities for the partnership's approach to systemic change in workforce preparation
- *Credibility* development involves having both short-term and long-term plans to demonstrate the workforce program's effectiveness to external audiences

- *Contingencies* preparations ensure the workforce program has both the social support and organizational resources to weather changes in labor markets and funding opportunities offered by government, industry, education, and other players

Partnership Strategies*	Case 1: Large-Scale Partnership with Key Partner	Case 2: Multiple Employer Outreach Approach
Coalitions	✓+	–
Communications	✓+	–
Credibility	✓+	✓–
Contingencies	✓–	✓–

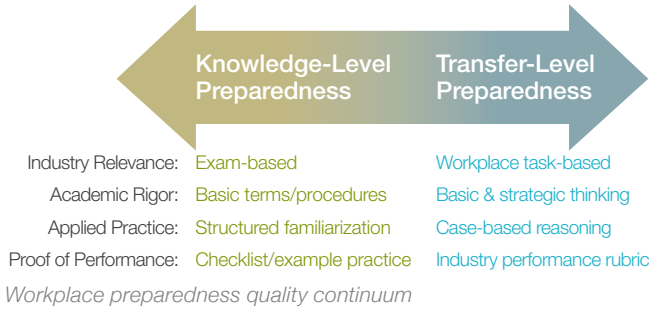
**Strategies adapted from Bloom & Dees, 2008*

The table above shows how these processes look from the perspectives of the large-scale partnership case and the employer outreach case. The large-scale partnership exceled at coalitions, communications, and credibility, but could be seen as more mixed on contingencies. Its close ties to one industry make it vulnerable to labor market change but its strong profile on the other three strategies enhances its readiness to take advantage of new funding opportunities. The employer outreach case, with its personal links to a few different industries and its stance of serving as many industry sectors as possible, was somewhat effective in building credibility but in a mixed position with respect to contingencies. For example, its broad preparation approach puts it in a good position to weather labor market change, but possibly not as strong a position to exploit new funding opportunities.

Instructional Quality

Helps answer the question: How can the instructional design and delivery choices of workforce educators improve preparation for transferable knowledge and skills?

Budgets and time for workforce instructional design and delivery are tight. Accordingly, implementation tools that lead to more consistent quality of instructional approach have high value. The WEIE focuses on four instructional implementation quality indicators drawn from the literature of technician education, adult learning, and training (Boucouvalas & Lawrence, 2010; Burke & Hutchins, 2007; Felder, Woods, Stice, & Rugarcia, 2000; Finch & Crunkilton, 1999; Herman, Bramucci, Fiala, & Litman, 2000; Keiser, Lawrenz, & Appleton, 2004; Kerka, 1997; Lualhati, 2007; Torraco, 2008). These four factors are i*ndustry relevance*, *academic rigor*, *applied practice*, and *proof of performance*. The WEIE provides tools for checking both the intended curriculum and the enacted curriculum (Porter, 2002, 2004). Using these tools helps workforce educators focus instructional programming appropriately along the continuum between "knowledge-level preparedness" and "transfer-level preparedness."



Workplace preparedness quality continuum

Research Methods

Interviews with workforce program leaders and instructors provided data on the *intended* curriculum. Expert panel ratings of a sample of instructional materials (24 lessons) and observer ratings of instructional methods (8 lessons) provided *enacted* curriculum data. The 12 experts were industry professionals and workforce educators who were trained in rating the instructional materials using a 0-4 scale of the Technicial Education Curriculum Assessment (TECA) (Keiser, Lawrenz, & Appleton, 2004). Analysis entailed creating subscales for different workforce quality attributes and then examining differences between beginning and advanced courses in the two programs. Observers characterized the quality of applied practice opportunities. They tallied the class times devoted to instructor-led activities

(e.g., lectures) and student-led activities (e.g., hands-on labs); and they rated the depth of learning (Webb, 2002) of these two types of activities, as well as the degree of problem solving complexity (Jonassen, 2000) these activities entailed. Analysis compared the differences on these features between beginning and advanced courses in the two programs.

Balance Between Knowledge- and Transfer-Preparedness in Instructional Materials

Intended curriculum data indicated: Representatives of the large-scale partnership emphasized transfer-preparedness, as reflected in the factory space the employer partner donated for training; their desire to integrate coursework with the student internships they offered; and their suggestions for class activities that employed workplace technologies and simulated work tasks and time pressure. Representatives of the employer outreach program emphasized knowledge-preparedness more, with focus on preparing students for industry certification exams; at the same time, they also suggested integrated class activities that relied on workplace technologies and on situations that simulated work tasks and time pressure.

As described below, ***enacted*** curriculum analysis produced a more nuanced portrait of the two cases.

Instructional Materials Quality

Expert ratings of the instructional materials and student work for both programs show how the four quality indicators–industry relevance, applied practice, academic rigor, and proof of performance–contributed to an overall understanding of the enacted curriculum in terms of the workplace preparedness quality continuum from knowledge-level focus to transfer-level focus.

Instructional Materials Ratings on Four Quality Indicators and Associated Placement on Workplace Preparedness Quality Continuum

Program	Knowledge-focused implementation placement	Mixed implementation placement	Transfer-focused implementation placement
Large-scale partnership	Proof of performance	Academic rigor	Industry relevance* Applied practice
Employer outreach	Proof of performance	Industry relevance Applied practice	Academic rigor*
Specific program notes on reasons for materials ratings			
Large-scale partnership	Lab assessments focused too much on task completion and didn't rate facets of technical acumen. More situational judgment tasks needed.	Adequate academic rigor achieved through focus on scientific principles (e.g., simple machines and electrical circuits), and mathematics (e.g., to calculate resistance and set ranges for robotic programming).	Internships, factory classroom, and updated equipment strongly supported industry relevance. Applied practice at all course levels offered a mix of guidance with varied opportunities to troubleshoot.
Employer outreach	Lab assessments focused too much on task completion and didn't rate facets of technical acumen. Few situational judgment tasks were included. Online quizzes and lengthy textbook readings were overemphasized.	Adequate industry relevance achieved through preparation for industry certification exam. Applied practice was sufficiently varied in the advanced course, but only adequate in beginning courses, which mostly used "cookbook labs."	Strong academic rigor achieved through focus on the scientific principles (e.g., electrical circuits) and mathematics (e.g., translating binary to hexadecimal notations; assigning IP addresses). Lab reports required explanations based in principles.

**Denotes significant difference between programs*

Instructional Methods Quality

Observers rated the quality of instructional methods that support applied practice, with focus on whether implementation practices led to students showing classroom behaviors associated with deep learning and complex problem solving. These measures help characterize the quality of hands-on labs.

Instructional Methods Ratings on Two Factors of Applied Practice Quality and Associated Placement on Workspace Preparedness Quality Continuum

Program	Knowledge-focused implementation placement	Mixed implementation placement	Transfer-focused implementation placement
Large-scale partnership	Basic problem complexity in beginning courses	Adequate deep learning opportunities in beginning courses	High problem complexity in advanced courses Many deep learning opportunities in advanced courses
Employer outreach	Basic problem complexity in beginning courses Few deep learning opportunities in beginning courses	Medium problem complexity in advanced courses Adequate deep learning opportunities in advanced courses	

Implications

The WEIE framework can deepen understanding of implementation practices, resulting in improved effectiveness for workforce-employer education partnerships:

- Labor market analysis of both structure and dynamics identifies gaps in a region between the skills employers require and the jobs that workers are prepared to do. It also indicates the market growth potential for workers trained in the skills of target fields. Community college leaders can use this information to plan employer outreach strategy and instructional programming.
- Labor market analysis also offers a low-burden way of characterizing partnership outcomes through the compilation and analysis of alumni resumes. Resumes can be collected directly from alumni or via searchable online resume databases to determine if alumni have obtained jobs in their field of study, and what their skill-sets are. When combined with job-advertisement data, this analysis is also useful for describing the transferable skills developed by the program that are in demand regionally and nationally.
- Whether workforce educators opt to embark on a large-scale partnership or not, the WEIE's partnership implementation approach provides for identifying how various other players in the region relate to a college workforce program and how to develop an outreach strategy that enhances both social and organizational support for the program. It also indicates the primary partnership strategies to monitor over time to improve the partnership network, strengthen its message, build credibility by showing short-term and long-term results, and stay ready for economic and political contingencies.
- Instructional implementation analysis singles out four criteria to monitor in order to improve the transfer-level focus of a workforce education program: industry relevance, academic rigor, applied practice, and proof of performance. It also provides tools for rating instructional materials in regard to these four criteria and for rating instructional methods focused on applied practice (e.g., hands-on labs) in terms of the two factors of problem complexity and depth of learning. These concepts and tools may be used to refine instructional programs as part of an industry advisory panel meeting, a working collaboration with employers around lesson design, faculty meetings to select industry-created materials, or periodic college program reviews for accreditation purposes.

Tools and other information available at: http://www.sri.com/work/projects/community-college-partnerships-instructional-impacts

Suggested citation: Yarnall, L., Tennant, E., & Stites, R. (2015). *A framework for evaluating implementation of workforce education partnerships and programs*. Research Brief. Menlo Park, CA: SRI International.

This material is based upon work supported by the National Science Foundation under Grant No. DUE 0903331. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

References

Amey, M. J., Eddy, P. L., & Campbell, T. G. (2010). Crossing boundaries creating community college partnerships to promote educational transitions. *Community College Review, 37(4),* 333-347.

Bloom, P. N., & Dees, G. (2008). Cultivate your ecosystem. *Stanford Social Innovation Review, 6(1),* 47-53.

Boucouvalas, M., & Lipson-Lawrence, R. (2010). Adult learning. In C. Kasworm, A. Rose, & J. Ross-Gordon (Eds.), *Handbook of adult education* (pp. 35-48). Thousand Oaks, CA: Sage Press.

Bureau of Labor Statistics (BLS). United States Department of Labor. (2014). *Occupational employment statistics (OES).* Retrieved 12/11/14 from http://www.bls.gov/oes/home.htm

Bureau of Labor Statistics (BLS). United States Department of Labor. (2015). *Quarterly census of employment and wages (OCEW).* Retrieved 1/26/15 from http://www.bls.gov/cew/home.htm

Felder, R. M., Woods, D. R., Stice, J. E., & Rugarcia, A. (2000). The future of engineering education II. Teaching methods that work. *Chemical Engineering Education, 34(1),* 26-39.

Finch, C. R., & Crunkilton, J. R. (1999). *Curriculum development in vocational and technical education. planning, content, and implementation.* Needham Heights, MA: Allyn and Bacon.

Herman, A. M., Bramucci, R. L., Fiala, G. F., & Litman, R. J. (2000). *Built to work: A common framework for skill standards.* Washington, D.C.: U.S. Department of Labor.

Keiser, J., Lawrenz, F., & Appleton, J. (2004). Technical education curriculum assessment. *Journal of Vocational Education Research, 29(3),* 181-194.

Kerka, S. (1997). *Constructivism, workplace learning, and vocational education.* ERIC Digest No. 181.

Lualhati, J. (2007) *Approaches to industry alignment.* Alexandria, VA: The Global Skills Exchange.

Porter, A. C. (2002). Measuring the content of instruction: Uses in research and practice. *Educational Researcher, 31(7),* 3-14.

Porter, A. C. (2006). Curriculum assessment. In J. L. Green, G. Camilli, & P. B. Elmore (Eds.), *Handbook of complementary methods in education research,* (pp. 141-159). Washington, DC: American Educational Research Association.

Rothwell, J. (2014). *Still searching: Job vacancies and STEM skills.* Washington, D.C.: Metropolitan Policy Program at Brookings Institution.

Torraco, R. J. (2008). Preparation for midskilled work and continuous learning in nine community college occupational programs. *Community College Review, 35(3),* 208-236.

SRI Education™

SRI Education, a division of SRI International, is tackling the most complex issues in education to identify trends, understand outcomes, and guide policy and practice. We work with federal and state agencies, school districts, foundations, nonprofit organizations, and businesses to provide research-based solutions to challenges posed by rapid social, technological and economic change. SRI International is a nonprofit research institute whose innovations have created new industries, extraordinary marketplace value, and lasting benefits to society.

Silicon Valley
(SRI International headquarters)
333 Ravenswood Avenue
Menlo Park, CA 94025
+1.650.859.2000
education@sri.com

Washington, D.C.
1100 Wilson Boulevard, Suite 2800
Arlington, VA 22209
+1.703.524.2053

www.sri.com/education

STAY CONNECTED