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Sustainability and Workforce Development in Maine

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Maine is facing challenges in terms of its workforce: education levels lag behind those in the other New England states; population growth is slow; and the economy is undergoing a change that has shifted from manufacturing to more knowledge-based jobs. Catherine Renault, Linda Silka and Jake Ward discuss these challenges, looking at what employers want in their employees and at the kinds of jobs the state is likely to see in the future. They point out that the Sustainability Solutions Initiative, with its emphasis on a boundary-crossing approach to education, is an example of a way to train today's students to fill and create the jobs of the future.

MAINE'S WORKFORCE CHALLENGE

The economic challenges of the past few years have accelerated public perception of a change that has been going on for a decade or two—the skills required for jobs are changing. The days are gone when a high school diploma was sufficient to get a job at a local manufacturing establishment that would pay enough for a middle-class lifestyle. Not only have many of these companies disappeared, but the jobs that are left are quite different.

The Maine Development Foundation (MDF) and the Maine Chamber of Commerce teamed up in 2010 to produce a report called *Making Maine Work: The Role of Maine's Public University System.* The message was clear: jobs of the future require education and training beyond high school. Many of the highest growth and highest wage jobs require a bachelor's degree or more. *Making Maine Work* went on to note that Maine's educational attainment trails regional rates: while 35.7 percent of Mainers aged 25 or older have a higher education degree, 43.2 percent of New Englanders have reached this milestone.

As a result of this, MDF and the Chamber made two recommendations: (1) enroll, educate, and graduate more people; (2) graduate people with skills and knowledge that meet the current and future needs of Maine businesses. These seemingly simple prescriptions are actually quite complicated to implement. The biggest reason is that the composition of the workforce is changing at the same time the demands of Maine businesses are changing.

MAINE'S DEMOGRAPHIC CHALLENGE

With baby boomers approaching retirement age across the U.S., all states will soon be dealing with an aging population. Maine, as the oldest state in the country, is on the leading edge of this challenge. The 2010 Census found that Maine's median age has increased from 38.6 years in 2000 to 42.7 years in 2010. Both the under 20 and 20 to 39 age cohorts have declined, while the 40 to 64 age cohort and the population over 65 have increased. Two counties, Lincoln and Piscataquis, had median ages of 48.1 years.

Maine's population growth comes from within the state. Inmigration from other states is extremely low. Maine's immigration rates are also low: only 3.3 percent of Mainers were born outside the U.S., and only one-third of those immigrated since 2000. As a result, Maine is one of the least diverse states in the country, with 96.9 percent of the population white and the largest minority population, Native American, at 1.9 percent.

These facts combine to define Maine's workforce challenge. To meet the needs of Maine's employers, we will need to work with the young people and incumbent workers already in the workforce and find ways to engage older workers who are past the traditional retirement age. As a result, *Making Maine Work* observed, "Adults need to continue their education and training to keep their skills and knowledge current with employer needs." (Maine State Chamber of Commerce 2010: 6)

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CHANGING COMPOSITION OF MAINE'S LABOR MARKET

The Maine Department of Labor (MDOL) has been studying changes in Maine's labor market. They observe that "in the past sixty years, blue-collar jobs declined from more than half to less than one-quarter of jobs, administrative support jobs stagnated, and managerial, professional and technical jobs increased from one-fifth to nearly one-third of jobs" (MDOL 2010: 3). Further, MDOL has observed that demand for health care and computer-literate workers has driven much of job growth in recent years.

Congressman Michael Michaud's office recently completed a survey of Maine manufacturers, which found that manufacturing employment has declined

by 40 percent since 1994 and that more than 13 percent of Maine's factories have closed since 2001. In the past three years, 141 factories have shut their doors and 8,600 workers have lost their jobs in the manufacturing sector. The congressman's staff found that the remaining manufacturers are maintaining their employment base or seeking to increase it, but have challenges finding the skilled workers they need. More than one-half of the businesses surveyed said they found it either difficult or very difficult to find the workers they considered skilled or qualified for the jobs available.

These findings are at least a partial explanation for the continuing relatively high rates of unemployment in Maine—there is a demonstrated mismatch between the skills demanded by employers and the skills offered by those looking for work. The number of job postings continues to rise, but the skills of those looking for work have failed to keep pace with the changing workplace.

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The simple fact is that knowledge-based industry is growing in Maine (as it is elsewhere). MDOL has documented that "industries recording employment gains between 1990 and 2009 employ a larger share of workers with bachelor's degree or higher than industries with substantial employment losses" (MDOL 2011: 2).

These findings suggest that workers who have been laid off have lower educational attainment, and without additional training, they will have difficulty finding employment with companies that are in fact hiring. Skills that were previously valued such as manual dexterity and ability to accomplish routine processes have been replaced with the need for workers to understand and monitor complex systems, collaborate and communicate with other workers, demonstrate computer skills, and accept a growing range of responsibility. Jobs in paper mills increasingly require the ability to monitor complex machines through computer interfaces. Many manufacturers expect line workers to complete sophisticated quality control through data collection, analysis, and recording of results.

Georgetown University's recent survey of help-wanted advertisements (Carnevale, Smith and Strohl 2010) found that workers who use computers earn more than those who do not; that workers with college degrees have the lowest unemployment rates during the recession; and that those without college degrees are dropping out of the middle class. Their conclusion is that the shift to jobs requiring increased education and training is being accelerated by the recession.

WHAT DO EMPLOYERS WANT?

When addressing the seeming mismatch between the unemployment rate and the number of job openings, many ask, "What do employers want?" There are calls for increased "relevance" in college and community college curricula and, as the Maine Development Foundation and the Maine Chamber put it, "graduate people with the skills and knowledge that meet the current and future needs of Maine businesses (Maine State Chamber of Commerce 2010: 1)

This rhetoric is often paired with calls for more educational programs with specific content such as nursing or teaching degrees, or certification programs for medical technicians or network administrators. Most surveys of employers, however, suggest that the more important skills are the so-called soft skills such as communications, teamwork, and computer literacy.

For instance, the National Association of Colleges and Employers' (www.naceweb.org) annual survey *Job Outlook 2012* includes a list of the top ten skills that employers are looking for:

- Verbal and written communication skills
- Honesty and integrity
- Interpersonal skills
- Teamwork skills
- Strong work ethic

- Motivation and initiative
- Flexibility and adaptability
- Computer skills
- Analytical skills
- Organizational skills

The results from MetLife's annual survey of teachers, students and Fortune 1000 executives are consistent with these findings (Markow and Pieters 2011). The survey found agreement among these stakeholders that the critical components of being college- and career-ready are higher-order thinking and performance skills rather than knowledge of particular content. Ninety percent of those surveyed said that problem-solving skills, critical thinking, the ability to write clearly and persuasively, and the ability to work are either absolutely essential or very important for a student to be ready for college and a career.

Interestingly, executives placed far greater emphasis on the capacity for collaboration than do other stakeholders. While there was a general consensus among the groups that both the ability to work independently and the ability to work in teams are important, a clear majority of business executives (59 percent) rate team work as essential, while only 40 percent give the same emphasis to working independently.

The Association of Colleges and Universities surveyed employers in 2010 and learned that colleges can best prepare their graduates by helping them develop both a broad range of skills along with knowledge and in-depth skills and knowledge in a specific field or major (Hart Research Associates 2010). Employers liked students who had:

- Depth of knowledge in their major and broad skills
- Applied their college learning in real-world settings
- Conducted research and developed evidence-based analysis
- Knowledge of human cultures and the physical and natural world

The top skills identified by these employers were:

- The ability to communicate effectively, orally and in writing (89 percent)
- Critical thinking and analytical reasoning skills (81 percent)
- The ability to apply knowledge and skills to real-world settings through internships or other hands-on experiences (79 percent)
- The ability to analyze and solve complex problems (75 percent)
- The ability to connect choices and actions to ethical decisions (75 percent)
- Teamwork skills and the ability to collaborate with others in diverse group settings (71 percent)

GREEN IS IMPORTANT TOO

The conversation about "green jobs" and sustainability is running in parallel with the skills discussion, even as employment fails to recover from the recession. Green jobs mean not only those in renewable energy, bio-based materials, conservation, pollution mitigation, and energy efficiency, but also those in companies where sustainability is a core manufacturing principle and/or a marketing strategy.

According to the Brookings Institute (Muro, Rothwell and Saha 2011), Maine had 12,212 jobs in the sector that produces goods and services with an environmental benefit, and this number was growing in Maine at four percent, faster than the national rate. This is probably an understatement because many other Maine businesses are interested in using renewable energy, being energy efficient, using recycled inputs in production processes and in products themselves, reducing pollution, being seen as conserving resources and protecting the environment.

Many Maine businesses are using "green" as a way to set themselves apart from their competition. For instance, Maine Businesses for Sustainability is a local organization that supports a wide range of companies that have sustainability as a core principle. Their

members range from technology and biotechnology companies such IDEXX Laboratories and PowerPay to hospitality firms, utilities, and recyclers. Many Maine farmers are taking advantage of the trend toward locally grown food to increase their production; this is a direct result of consciousness about the environmental costs of shipping products long distances. Similarly, sustainable forestry and sustainable fishing practices are widely adopted by Maine's natural resource industries. Even consumer products made in Maine are emphasizing their use of recycled or "natural" ingredients such as Sea Bags (recycled sails), Toms of Maine (natural bath and personal-care products) and Coast of Maine (composted residue from salmon aquaculture, blueberry harvesting, and wood processing).

HOW CAN THE UNIVERSITY OF MAINE SYSTEM CONTRIBUTE?

The University of Maine is at a tipping point in an ongoing national conversation about the balance between a liberal arts education, the importance of linkages to local businesses, and the value of science, technology, engineering, and math (STEM) skills in all fields of endeavor. The concern expressed by some educators that more closely aligning our college and community college courses with the needs of employers would be the death knell to a liberal arts education would appear to be misplaced. Most of the skills requested by businesses such as excellent oral and written communication, critical thinking and analytical reasoning, ethical decision making, and organizational capacity seem to be the same ones that a person would acquire through a liberal arts education. And, flexible teaching pedagogies that include team projects, use of business computer applications, and application of learning to real world projects would provide the rest of the skill sets desired. Internships, apprenticeships, and co-op experiences would only strengthen a student's understanding of the importance of these skills in a work setting.

The other opportunity for the University of Maine is that education is not just for 18- to 24-year-olds anymore. The University should think about how to include and encourage the participation of workers who are already employed and those who are looking for jobs. Indeed, the new paradigm is life-long learning or perhaps "just-in-time" learning, given that knowledge in most fields is changing so fast that everyone needs to stay in learning mode just to keep up! This imperative is even more important in Maine, given our demographics—we need to increase the skill level of our adult population and keep them in the workforce longer if we are not attracting or keeping skilled younger workers.

To do this requires the university to manage through its discomfort with the perceived differences between education and training and the prejudice that is attached to any learning that is too "useful."

For instance, existing teachers could be targeted for ongoing knowledge infusions in fields as diverse as science and history, along with new teaching pedagogies and technologies. This could be delivered in short courses leading to certifications, continuing education units (CEUs), professional development, or advanced degrees, and supported by the Maine Department of Education and local school systems. This could address the real problem of the number of science teachers in the state who did not study science as undergraduates and greatly improve K-12 outcomes.

The Contribution of the Sustainability Solutions Initiative to Maine's Workforce Development

Given that sustainability is a core skill for many Maine employers, and that the University of Maine has significant credibility in this area, there is an enormous opportunity to work with students, educators, and businesses in the "green" field. The university already has strong programs in civil and environmental engineering and is providing a steady stream of high-quality graduates.

However, it is the cross-disciplinary Sustainability Solutions Initiative (SSI) that has provided a model for framing the issues on sustainability and workforce development. SSI has sought to move beyond the dichotomy of jobs versus the environment by seeking to craft Maine-based approaches to sustainability that create opportunities for workforce development that involve redesigning education so that future generations will be prepared to solve the complex problems of sustainability.

In SSI we have seen that the higher education implications of workforce development, while significant, come up against a long standing controversy at the heart of higher education. Just as there has been a pitting of jobs against the environment, there continues to be a view that training for job skills is at odds with preparing students with a broad set of thinking and problem-solving skills. Put bluntly, the question is, Should the purpose of college education be knowledge for its own sake or vocation? Workforce training has been seen the province of community colleges and technical schools and not the responsibility of universities. As Anthony Carnevale, director of Georgetown University Center on Education and Workforce, notes in a recent article, university faculty resist anything that smacks of job-skill training. He comments that their position has been, in effect, "we're not here to make foot soldiers for American capitalism" (Marcus 2012: 18).

Despite attempts to see higher education as inimical to job-skill training, the data reported earlier on what businesses are looking for in new graduates suggests that the mismatch is far less than is often assumed. Business leaders are looking for the same things faculty want, which are graduates with a broad range of nimble problem-solving skills. And higher education scholars such as Newfield (2008) point to recent research reinforcing this point, which indicates that classic liberal arts education is an important way in which students acquire these critical attributes. SSI is paying careful attention to these arguments; we are finding that part of the intellectual work now needed and in which we are participating is the reconsideration of what it means for universities to contribute to workforce development. The sustainability emphasis is providing new opportunities for envisioning how to integrate higher education with workforce development.

Toward that end, a first SSI goal has been to be focused on the future in conceptualizing workforce development. In SSI we have seen that this is far from simply about training people for the jobs that happen to exist right now. SSI is focused on training graduate students so that they will be poised to create Maine's future jobs. It is intent on anticipating not just immediate needs, but also on preparing for what will be needed five, 10, 15, or even 20 years into the future to prepare for and respond to sustainability issues in areas of landscape change, forestry, urbanization, and for Maine's marine environment. Current students and faculty are doing the research that will contribute to the creation of those jobs.

A second SSI goal is to test new ways to teach students that will prepare them for the workforce, but do so without compromising a rigorous research focus needed to devise sustainability solutions. What SSI is doing falls within the overarching theme of boundary spanning (Parker and Crona 2012). SSI students are being taught to span the boundaries of individual disciplines and to close the gaps between research and action. For example, graduate students from different disciplines take interdisciplinary classes together that focus on how to learn with and from fellow graduate

Top 10 Ways SSI Will Make a Difference for Workforce Development

- Building workforce skills and innovation in science, technology, engineering, and math
- Strengthening networks to help the flow of resources to match people with needs and solve problems
- Creating a new generation of scholars and students focused on integrating problems and solutions in sustainability science
- Developing municipal, nonprofit, and policy-related internships for students
- Gaining skills in cross-functional team work
- Facilitating connections between students and professionals so they can work across boundaries
- Cultivating a workforce with a problem-solving orientation, to integrate across the pure and applied sciences
- Promoting awareness of new industries supporting public demands for ecological services
- Encouraging innovative thinking to support Maine's innovation economy
- Fostering opportunities to keep students in Maine

"Top 10" lists provide a synthesis of common themes, methods, strategies and outcomes within SSI and reflect the collective input of more than 30 SSI faculty and students.

students from disparate biophysical and social science disciplines (communication, ecology, economics, education, engineering, and psychology). Many of these courses are solution and practitioner focused, and students also learn from and with practitioners. The intent is to reduce the gap between students and practitioners, with students shadowing practitioners to achieve a better sense of the interconnectedness of sustainability problems. Together these efforts are creating a different kind of graduate program experience designed to prepare students to enter the workforce and be ready immediately upon graduation to contribute to solutions-focused efforts.

A third goal advanced by SSI has been to explore new forms of "pipeline" approaches aimed at reframing concepts of workforce development. We have sought to reduce gaps between students (e.g., high school, college, graduate school, and post docs) who have advanced to different points in their education. Toward this end, SSI faculty have pursued an innovative mentoring plan designed to strengthen the science education pipeline and thereby further enhance workforce preparation. Across a range of sustainability research topics, SSI post docs mentor graduate students who in turn mentor undergraduates and high school students on real, hands-on research-action projects throughout Maine. And these efforts are not limited to a single campus: all of the state's campuses are being brought together under SSI to provide enhanced student cross-learning, again with the intent of closing the gaps in training, which will enhance workforce development.

Implications for Policymakers

In sum, there is much that policymakers can learn from the workforce-development experiments at the heart of the SSI work. One lesson is the focus on integration. SSI is preparing students by ensuring that they are skilled at working across disciplines, across levels, and across institutions. We are in the process of evaluating this experiment, but the evidence thus far indicates that this approach situates and accelerates student learning. Students finish their education with a deeper understanding of the problems that matter in Maine and of the opportunities that various jobs provide in addressing these integrated, highly complex problems.

Relatedly, policymakers in Maine and elsewhere can also learn from SSI's experience of bringing together the intellectual capital of all of Maine's campuses as we envision new forms of workforce development. This approach of bringing campuses together is still rare across states, and we are finding that innovation and problem solving flow from these cross-cutting activities. By having campuses work together, we prepare students to draw on all of the academic strengths throughout Maine. Finally, policymakers can learn from SSI lessons about tackling the skills versus education impasse. As we noted at the outset, there is much commentary about academia's shortcomings in preparing students for the real world of work. A lesson for policymakers is SSI's effort to avoid conceptualizing job training as separate from intellectual growth and to seek to design Maine-based approaches to integrating the two so that students across a range of academic levels acquire broad-based problem-solving skills that are marketable for today's jobs and have the potential for creating the jobs of the future we cannot yet even envision.

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