

# Maine Policy Review

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Volume 23

Issue 1 *Innovation*

---

2014

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### Recommended Citation

Dorrer, John. "Do We Have the Workforce Skills for Maine's Innovation Economy?." *Maine Policy Review* 23.1 (2014) : 65 -74, <https://digitalcommons.library.umaine.edu/mpr/vol23/iss1/11>.

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# Do We Have the Workforce Skills for Maine's Innovation Economy?

by John Dorrer

*Over the last five decades, with the shift from goods-producing to service industries, skill requirements have changed dramatically for most workers. John Dorrer describes how a workforce with superior skills is the key to economic growth and innovation and suggests that while much has been done in reforming K–12, postsecondary, and adult education systems to accommodate Maine's changing economy, it is not enough. To meet the challenges facing Maine, more innovation and adaptation will be required from policymakers, institutional leaders, employers and Maine people themselves.*

## OVERVIEW

A convergence of economic and demographic forces is shaping a set of formidable challenges for securing Maine's future. A workforce with superior skills is the key to economic growth and innovation. Maine's aging population, slow population growth, and the ensuing projections have extraordinary implications for the workforce and our economic prospects. The constancy of technology innovation, globalization, and industry restructuring will remain dominant factors shaping Maine's competitiveness. Together, these forces will assert big impacts on the availability of jobs, the nature of work, and the demand for new skills. Successful alignment of skill development with job creation and economic dynamism will unquestionably drive future productivity and growth. To get this done, unprecedented collaboration and bold solutions will be required from policymakers, business leaders, and educators to ensure our institutions produce highly capable workers with the right skills and qualifications. Students, workers, and parents, too, will need to be more vigilant in directing education and skills investment decisions to ensure access to good jobs with high wages.

For more than three centuries, Maine's economy has been largely defined by an endowment of natural resources and the industriousness of its people. Harvesting trees for ship building and using waterpower to drive lumber mills defined Maine's early industries. For most of the twentieth century, the output from

technologically advanced paper mills and an assortment of manufacturers provided a dominant share of gross state product. More recently, a steady shift to services has shaped where Maine people work and the skills they need. Manual skills and industrial discipline were once highly valued. More jobs today require advanced intellectual, communication, and analytical skills.

Wrenching change and great disruption has marked each successive chapter in Maine's economy. Over the course of the state's economic history, a chain of events has dislocated workers and required widespread adaptation from workers, businesses, and institutions. The skills and motivation of Maine workers were consistently recognized and highly valued in the context of this evolving economy. The future will demand no less.

In these unsettling times, a comprehensive vision for Maine's future remains absent. Promising developments and technological innovations in our midst, however, provide a potential path forward in shaping the next economy. Harvesting the wind and oceans for energy production, processing wood and bio-fibers for alternative fuels and composite materials, and restoring agricultural lands for food production are among fragile, evolving economic sectors with growth potential. In a more prevalent way, significant innovation across all industries and throughout our lives will persist. Ubiquitous applications of information technology will reshape our environments, jobs, and market possibilities. Maine citizens confront a more complex society and highly competitive global economy. To successfully

navigate the opportunities ahead, Maine's workforce must be better educated and more highly skilled.

### ECONOMIC DYNAMISM AND GROWTH

Innovation is fundamental to a growing economy. By innovation, we mean the introduction of a new or significantly improved product, process, or method in business practices, workplace organization, or external relations. In the 1940s, the economist Joseph Schumpeter first introduced important concepts identifying creativity as the driver of economic development. Schumpeter asserted that capitalism can only be understood as an evolutionary process of continuous innovation and creative destruction. In 1969, Peter Drucker published *The Age of Discontinuity* in which he advanced the notion for both countries and companies that the future belonged to knowledge work and knowledge workers. This type of work depended on high levels of knowledge and skill.

More recently, Robert Atkinson and Stephen J. Ezell argue that economic growth hinges on the ability to create new products, services, processes, or ways of doing business (Atkinson and Ezell 2012). The authors describe how technology and innovation ultimately drive long-run economic growth and show how countries now compete on the basis of their “national innovation ecosystems”—comprised of knowledge, risk capital, and regulatory, institutional, and technological factors. Atkinson and Ezell call on governments to rethink their economic growth strategies and policies by making support for technology and innovation a central tenet. For states to thrive, Atkinson and Ezell say they must compete more on the basis of innovation and entrepreneurship and less on cost.

Elements of a competitive approach demand

- a workforce and jobs based on higher skills
- strong global connections
- dynamic firms including strong, high-growth startups
- industries and individuals embracing digital technologies
- strong capabilities in technological innovation

With this multifaceted approach to competition, states will need to assess the efficacy of their economic

development strategies and educational systems in the broad global context.

### COMING UP SHORT: SKILLS AND WORKFORCE QUALIFICATIONS IN THE GLOBAL ECONOMY

In a world where complex technologies, knowledge development, advanced manufacturing, and sophisticated transactions drive economic output and competitiveness, a highly educated workforce becomes an essential ingredient for success. Investments in human capital have consistently yielded significant private and social returns. High wage premiums and reduced unemployment have been consistently reported for those with college degrees and advanced skills. A recent study surveying adult skills conducted by the Organization for Economic Cooperation and Development (OECD 2013a) presents compelling new data on adults' proficiency in literacy, numeracy and problem solving in technology-rich environments. Key findings include the following: (1) Proficiency in literacy, numeracy and problem solving in technology-rich environments is positively and independently associated with the probability of participating in the labor market and being employed, and with higher wages. (2) In all countries, individuals who score at lower levels of proficiency in literacy are more likely than those with higher proficiency to report poor health, believe that they have little impact on the political situation, and not participate in associative or volunteer activities. In most countries, individuals with lower proficiency are also more likely to have lower levels of trust in others.

High education levels and advanced skills are the hallmark of high-performing economies and nations well endowed with social capital. Yet in many developed economies, there remains a paradox. Millions of individuals remain unemployed or employed in jobs not commensurate with their level of education and training. On the demand side, some employers are unable to fill critical positions because of a lack of qualified applicants. A recent report from the McKinsey Global Institute stressed this paradox, “And, even as less-skilled workers struggle with unemployment and stagnating wages, employers face growing shortages of the types of high-skill workers who are needed to raise productivity and drive GDP growth” (Dobbs et al. 2012: 1).

The report in further analyzing forces of supply and demand in the global labor supply puts forth the following implications:

- A potential shortage of about 38 million to 40 million high-skill workers, or 13 percent of demand for such workers.
- A potential surplus of 90 million to 95 million low-skill workers around the world, or around 10 percent of the supply of such workers.
- A potential shortage of nearly 45 million medium-skill workers in developing economies, or about 15 percent of the demand for such workers.

The study argues that “absent a massive global effort to improve worker skills...—there will be far too few workers with the advanced skills needed to drive a high-productivity economy and far too few job opportunities for low-skill workers” (Dobbs et al. 2012: 1) The shape and scale of human capital investments across the globe will determine economic competitiveness and living standards.

Monitoring global workforce trends and developments becomes fundamental for U.S. and Maine policy-makers. The mobility of capital and advancing education and skills levels across the globe will continue to factor in to our own economic prospects.

The United States once led the world in the educational preparation of its workers. A recent OECD study, however, ranked the United States thirteenth among developed countries in postsecondary attainment with 43 percent of young Americans ages 25 to 34 having postsecondary credentials (OECD 2013b). The OECD study on adult skills in the world’s developed economies found that in numeracy, the United States performs around the average when comparing the proficiency of 55- to 65-year-olds, but is lowest in numeracy among all participating countries when comparing proficiency among 16- to 24-year-olds (OECD 2013a). U.S. adults also ranked below average in literacy as well in problem-solving skills in technology-rich environments in comparison to their peers in developed economies. Public spending on active labor market programs as percentage of GDP remains below most of our major economic competitors, according to the OECD analysis. How could this be at the same time that we have come to widely acknowledge the primacy of human capital as the key driver for economic competitiveness and prosperity?

In testimony before the U.S. Senate Budget Committee in a hearing on “The Impact of Federal

Investment on People, Communities and Long Term Economic Growth,” Anthony P. Carnevale, director of Georgetown University, Center on Education and Workforce, reported that the United States spends 1.4 trillion on human capital developments annually in the public and private sectors, an amount that is roughly 10 percent of GDP. Postsecondary and K–12 education make up 41 percent; formal and informal employer based training accounts for most of the other 59 percent. Yet, with 10 percent of GDP going to human capital investments, there are troubling signs that these investments are not producing the results our economy needs (Carnevale 2013)

## The shifting demands for skills derive from the changing nature of the U.S. labor market.

Survey results from a number of sources report employer dissatisfaction with the preparedness of graduates for entry-level positions. According to a survey of 217 employers, more than one-third of the respondents (34 percent) report that their newly hired high school graduates are deficiently prepared. About one in five employers (22 percent) report their two-year college graduates to be deficiently prepared, while less than one-fifth (17 percent) report four-year college graduates to be deficiently prepared (Casner-Lotto, Rosenblum, and Wright 2008). A 2012 survey from the *Chronicle of Higher Education* found that 31 percent of employers are dissatisfied with the average skills of their workers (Chronicle 2012). In another survey, more than half (53 percent) of business leaders say their companies face a “very major” or “fairly major challenge” in recruiting nonmanagerial employees with the skills, training, and education their company needs, while another 31 percent say it’s “somewhat of a challenge” (Bridgeland, Milano, and Rosenblum 2011: 7).

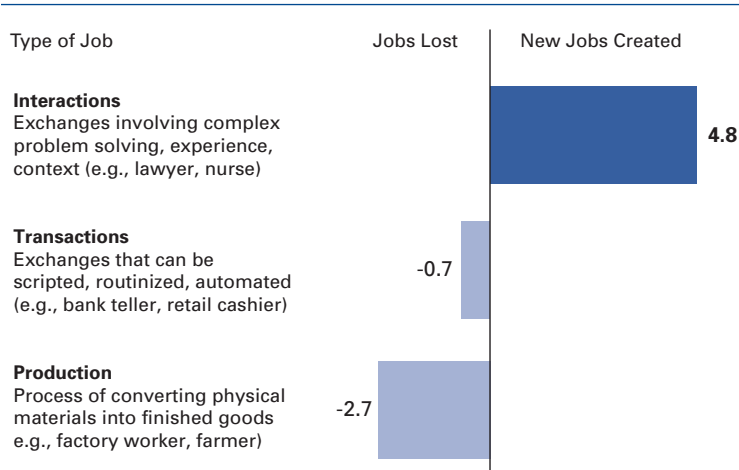
So what is it that employers want from graduates and how should our education and training institutions respond? A survey of employers conducted by Hart Associates for the American Association of Colleges and Universities in 2010 yielded the results reported in Table 1.

TABLE 1: **Learning Outcomes Where Employers Seek More Emphasis**

Learning Outcomes	Percentage of Employers
<b>The World Around Us</b>	
Science and Technology	70
Global Issues	67
The Role of the U.S. in the World	57
Cultural Diversity	57
Civic Knowledge, Participation and Engagement	52
<b>Intellectual and Practical Skills</b>	
Written and Oral Communication	89
Critical Thinking and Analytical Reasoning	81
Complex Problem Solving	75
Teamwork Skills in Diverse Groups	71
Creativity and Innovation	70
Information Literacy	68
Quantitative Reasoning	63
<b>Personal and Social Responsibility</b>	
Ethical Decision-Making	75
<b>Integrative and Applied Learning</b>	
Applied Knowledge in Real World Settings	79

Source: Hart Research Associates (2010)

FIGURE 1: **Skill-Based Job Creation in the United States, 2001–2009 (millions of employees)**



Source: Manyika et al. (2011)

The shifting demands for skills derive from the changing nature of the U.S. labor market. Recent research from the McKinsey Global Institute analyzed jobs in the U.S. economy based on job skills and functions rather than occupational title, the more conventional method (Manyika et al. 2011). Using data from the U.S. Department of Labor’s Bureau of Labor Statistics, the analysts examined job creation and job loss over the period 2001 to 2009. They classified jobs into three major categories including jobs requiring complex interactions or exchanges involving high-level problem solving, experience, or context; jobs associated with transactions that are scripted, routinized, or automated; and jobs involving production of goods or the process of converting physical materials into finished goods.

Using the skills-based approach, the study reported that 4.8 million jobs were created involving interactions, 700,000 jobs requiring routine transactions were lost, and another 2.7 million production jobs were lost (Manyika et al. 2011). The nature of such skill shifts over a relatively short time frame puts extraordinary stress on workers who are on the job-losing end and demands substantive innovations from workforce-development and job-training programs (Figure 1).

At a practical level, the results of the Manpower Group’s annual talent shortage survey conducted in 2013 reveal that employers in the United States and worldwide continue to identify “the lack of available skilled talent and the struggle to fill vacancies as having a negative impact on business performance” (Manpower Group 2013: 24). Describing a survey by the McKinsey Center for Government Peter Cookson reports: “Colleges and universities appear to overrate the degree to which they prepare students for the life of work. According to McKinsey, ‘72 percent of educational institutions felt their graduates were ready for the job market, but only 42 percent of employers agreed.’”<sup>1</sup>

INNOVATION AND SKILLS:  
BUILDING BLOCKS FOR MAINE’S ECONOMY

Technology innovations and the introduction of new work processes have been constant forces on Maine farms, in the woods, and in factories, offices, and laboratories. Over the course of Maine’s economic history, government, education, and business have collaborated to ensure that public policy, education, and training systems aligned with market

and technological forces to ensure workers had the requisite skills to fuel productivity growth for employers. In Maine's early economic history, agriculture was dominant, employing significant numbers of people. The one-room schoolhouse with one teacher teaching basic skills was well aligned with the needs of this sector, at least for a time. Next came the establishment of land grant universities. These new institutions added significant education, training, and research capacity to support this vital economic sector as new skills and knowledge were required to improve yields and increase productivity.

With time, the agrarian economy gave way to industrialization and a wave of mass manufacturing, leading to the creation of urban centers and the migration of workers from the farms to the factory. Textile mills, shoe shops, and towering paper mills defined Maine's economy and influenced the establishment of education standards and curriculum modification for workforce preparation. Compulsory education and vocational training were introduced as part of workforce development strategy for the times.

Over the last five decades, there have been dramatic shifts from goods-producing to service industries. Skill requirements have changed dramatically for most workers as have the expectations of our education and training institutions. We are also asking much more of our students. While much has been done in reforming K–12, postsecondary and adult education systems to accommodate the changing Maine economy, it is not enough and more innovation and adaptation will be required from policymakers, institutional leaders, employers, and Maine people themselves.

## INNOVATION AND MAINE'S CHANGING SKILL REQUIREMENTS

### *Past Trends*

The economic shifts and structural changes throughout the Maine economy have been unrelenting for some time now. An examination of broad shifts in occupational employment over the last 12 years indicates the nature of these shifts. Occupations in management, business, science, and the arts represent a growing share of employment as production, transportation, and material-moving share declines. These shifts have significant consequences for the types of skills Maine workers need to find a job and advance a career (Table 2).

**TABLE 2: Distribution of Occupational Employment, Maine, 2000 and 2012**

Occupational Category	2000 (%)	2012 (%)	2000–2012 (% Change)
Management, Business, Science and Arts Occupations	31.5	34.6	+3.1
Sales and Office Occupations	25.9	24.5	-1.4
Natural Resources, Construction and Maintenance Occupations	12.0	11.1	-0.9
Production, Transportation and Material Moving Occupations	15.3	11.7	-3.6

Source: American Community Survey, U.S. Census Bureau (<https://www.census.gov/acs/>)

### *The Case of Manufacturing*

The loss of jobs in manufacturing and supporting sectors has had devastating consequences for thousands of Maine workers and has redefined the fate on entire regions of the state. According to a report by the Maine Center for Workforce Research and Information, “employment in manufacturing accounted for 43 percent of nonfarm jobs 60 years ago; in 2011, it accounted for just 8.5 percent of jobs. During the same period, jobs in service-providing industries nearly quadrupled” (Maine CWRI 2012: 1) Technology innovation and globalization especially have altered Maine's manufacturing landscape. For Maine workers, moves from employment in manufacturing to jobs in the emerging service economy have been extraordinarily challenging. To maintain high wage levels, these workers are often required to obtain more education and acquire new skills. Along with skills mismatch, affected workers have been forced to relocate to find new employment, often accompanied by the loss of real and social assets.

The story about Maine's manufacturing sector however is not simply one of decline as one might conclude from news reports. Maine manufacturing output per worker rose 56 percent between 2000 and 2011 (Maine CWRI 2012). Technology application has unquestionably played a critical role in driving productivity increases. In turn, the application of new technologies has demanded new and higher-level skills from the manufacturing workforce. Between 2000 and 2012, Maine lost 32,000 manufacturing jobs. At the same time, educational preparation of the manufacturing workforce increased. In 2000, nearly 25 percent of workers reported some college or an associate's degree. By 2010, more than 31 percent Maine's manufacturing

**TABLE 3: Job Postings in Maine by Major Occupational Groups, 2013**

Occupation Family	Job Postings	Percentage of Postings
Sales and Related	15,315	12.6
Healthcare Practitioners and Technical	15,193	11.7
Office and Administrative Support	14,209	12.5
Management	10,750	8.8
Transportation and Material Moving	7,370	6.0
Business and Financial Operations	6,812	5.6
Computer and Mathematical	6,711	5.5
Installation, Maintenance, and Repair	6,376	4.4
Food Preparation and Serving Related	5,389	5.2
Personal Care and Service	4,525	3.7
Arts, Design, Entertainment, Sports, and Media	4,192	2.8
Healthcare Support	4,117	2.6
Production	4,108	3.4
Education, Training, and Library	3,456	3.4
Community and Social Services	3,169	3.4
Architecture and Engineering	2,387	1.8
Legal	2,187	0.8
Construction and Extraction	1,802	1.2
Building and Grounds Cleaning and Maintenance	1,479	2.0
Protective Service	1,202	1.5
Life, Physical, and Social Science	960	1.0
Military Specific	109	0.1
Farming, Fishing, and Forestry	65	0.1
Total Job Postings	122,550	100

Source: Burning Glass Technologies, Labor Insight

workforce had some college education or an associate's degree. In 2000, 14.5 percent of workers held bachelors degrees or above and 16.3 percent of the workforce reported holding such degrees in 2012.<sup>2</sup>

These trends point to the changing nature of skills and knowledge required of workers in Maine's evolving manufacturing sector.

#### *Current Labor Market Developments*

An examination of Maine's current labor market using data from Internet job postings reveals more

detailed information about types of jobs in demand and the skills sought by employers. There were 122,550 Internet job postings in Maine for 2013, a significant increase over the 59,941 jobs posted in 2012 (<http://burning-glass.com/>) (Table 3). This is consistent with an improving economy and increased hiring by Maine employers over the past year. Sales and office/administrative support jobs dominate current demand with a 25 percent share of all job postings. But, when we combine major occupational groups where high-skill, professional, and technical jobs are concentrated, including health care practitioners and technical, management, computer and mathematical, business and financial operations, education, training and library, architecture and engineering, life, physical and social sciences, and legal occupations have a nearly 40 percent share of all postings (Table 3).<sup>3</sup>

Further dissection of these job postings provides more refined information about skill needs and job performance requirements (Table 4). Topping the list of skills stressed by Maine employers are communication and coordination skills (45 percent), business environment skills (34 percent), and problem solving (22 percent). These skills sets are fundamental to the modern workplace, where interactions with fellow employees and customers most often define the nature of work and drive performance. Employers require adherence to a set of behaviors and values from their employees that reflect the organization and define its culture. There is also significant emphasis on information technology skills including software and programming skills (22 percent), database and data warehousing (3.6 percent), business intelligence (3 percent), and programming, development and engineering (3 percent). Other significant skills clusters are identified for the business sector (project and process flow, finance and accounting, marketing, and human resource development) and health sector (advanced patient care, basic patient care, mental and behavioral health, therapeutic methods).

As Maine employers search for the right candidates to fill jobs, technical and occupation-specific skills are an essential requirement that candidates must meet. These skills, however, are not enough, and employers place a high premium on communication, social, and organizational skills that are integral to most modern work environments and effective job performance. Increasingly, these high-performance skills are not only for the college-educated workforce. They are found across the spectrum of jobs in the

economy and are essential for those who seek upward mobility.

### OCCUPATIONAL PROJECTIONS 2010 TO 2020

Projecting occupational employment is an inexact science. Projections from the Maine Department of Labor call for the addition of 35,000 jobs between 2010 and 2020. Georgetown University's Center on Education and the Workforce (CEW 2013) projects a gain of 65,000 over the same period. The combined forces of globalization, technology innovation, market developments, and new management regimens profoundly influence job types, job numbers, and skill requirements. For this reason, determining occupational growth and decline remains challenging.

Of the jobs projected by 2020 by the Maine Department of Labor, 12,023 or 34.1 percent will require a degree (associate, bachelor, master, doctoral, professional) and another 3,053 or 8.7 percent will require non-degreed postsecondary education/training. (See Table 5.)

And, while most jobs will not require postsecondary education, there is no doubt that these jobs will demand higher levels of literacy, technology skills, self motivation, and organization in more complex and competitive work environments.

Georgetown University's Center on Education and Workforce (CEW 2013) projects jobs by major occupational categories and offers a more optimistic outlook over those prepared by Maine Department of Labor analysts. (See Table 6.) Georgetown researchers call for the addition of 10,970 managerial and professional jobs, 2,260 jobs in science, technology, engineering, and math (STEM), 360 new jobs in social sciences, 4,390 new jobs in education, and 5,020 additional jobs for health care practitioners and technical workers. These job categories involve higher skill levels and typically require postsecondary credentials. They represent 35 percent of all new jobs projected between 2010 and 2020. On a percentage basis, these results are comparable to what Maine Department of Labor analysts project as the percentage of jobs requiring postsecondary education.

Clearly, more than one-third of projected new jobs between 2010 and 2020 will require postsecondary credentials and advanced skills. In addition to filling demands generated from growth, Maine employers face the impending retirements over the same period of thousands of experienced, credentialed, and skilled workers.

**TABLE 4: Skills Maine Employers Want from Maine Job Postings, 2013**

Skill Cluster	Percentage of Job Openings
Common Skills: Communication and Coordination	45.2
Common Skills: Business Environment Skills	34.6
Common Skills: Problem Solving	22.9
Software and Programming Skills	22.7
Customer Service: Basic Assistance	13.8
Common Skills: Project and Process Flow Skills	12.2
Admin Support: General	9.7
Sales: General	9.2
Health: Advanced Patient Care	6.4
Health: Basic Patient Care	6.2
Finance: Accounting, Bookkeeping, and Tax Preparation	6.1
Repair: General	5.4
Health: Medical Specialties	5.2
Common Skills: Language	4.4
Customer Service: Sales	4.0
Business: Process and Planning	3.9
Health: Mental/Behavioral	3.8
IT: Databases and Data Warehousing	3.6
Marketing: General	3.5
IT: Business Intelligence	3.1
Health: Therapy	3.1
IT: Programming, Development, and Engineering	3.1
Legal: General	2.8
Finance: Basic Financial Transactions	2.7

Source: Burning Glass Technologies, Labor Insight

Maine will need thousands of scientists, engineers, computer specialists, management specialists, and marketing experts to move its economy forward.

Ensuring that Maine is able to meet these demands requires long-range planning and preparation. The skills and credentials needed for this work are built on a foundation gained from a superior K–12 education. Reforms to elevate standards in Maine K–12 education must continue to ensure that the achievements of the state's graduates are rising. Skill enhancement and professional

TABLE 5: **Maine Occupational Projections, 2010–2020, by Educational Requirements**

Educational Requirements	Average Employment		Percent of Total Employment		Change in Employment	
	2010	2020	2010	2020	Net	%
Total	641,551	676,770	100	100	35,228	5.5
Doctoral or Professional Degree	16,577	18,742	2.6	2.8	2,165	13.1
Master’s Degree	11,712	12,846	1.8	1.9	1,134	9.7
Bachelor’s Degree	81,771	86, 570	12.7	12.8	4,799	5.7
Associate’s Degree	43,583	47,498	6.8	7.0	3,925	9.0
Postsecondary Non-degree	35,724	38,777	5.6	5.7	3,053	8.5
Some College, No Degree	2,607	2,785	0.4	0.4	178	6.8
High School Diploma or Equivalent	282,635	291,936	44.1	43.1	9,301	3.3
Less Than High School	166,942	177,625	26.0	26.2	10,683	6.4

Source: Maine Department of Labor, Center for Workforce Research and Information, 2010-2020 Occupational Projections.  
(Available from: <http://www.maine.gov/labor/cwri/jobseekers2.html>)

preparation must be offered through rigorous postsecondary programs where curriculum content is updated regularly to reflect contemporary work environments and employer standards. To maintain effective alignment between the demands of employers and postsecondary education systems, Maine will need steady investments in the quality of our postsecondary institutions. Such investments however must be accompanied by constant interaction between employers and educa-

tors including a rigorous evaluation focused on the adequacy of skills and preparation that graduates bring to the workplace.

SUMMARY AND RECOMMENDATIONS

Management, business, science, and arts occupations, typically where jobs require high skill levels and postsecondary credentials, have shown significant growth since 2000 according to U.S. Census survey data. Occupational projections from multiple sources suggest that one-third of new jobs generated between 2010 and 2020 will require postsecondary degrees and advanced skills. The challenges are not merely to have enough well-trained engineers and scientists to support an expanding innovation economy that values technical skill sets. And, while there will be large numbers of jobs in Maine open to those with a high school education, many of these jobs will also require higher literacy, numeracy, communication, and technology skills from those seeking to advance careers and earnings. We must ensure a

TABLE 6: **Occupational Projections by Job Types, Maine 2010 to 2020**

Occupation	2010 Jobs	2020 Jobs	Job Gains	Growth Rate (%)
Managerial and Professional Office	82,920	93,890	10,970	13
Science, Technology, Engineering and Math (STEM)	21,370	23,630	2,260	11
Social Sciences	2,940	3,300	360	12
Community Services and Arts	31,050	34,970	3,920	13
Education	39,730	44,120	4,390	11
Healthcare Professional and Technical	33,080	38,100	5,020	15
Healthcare Support	20,940	24,340	3,400	16
Food and Personal Services	105,260	117,110	11,850	11
Sales and Office Support	165,260	178,860	13,600	8
Blue Collar	146,680	155,350	8,670	6
Total	649,240	713,670	64,430	10

Source: Center on Education and the Workforce, Georgetown University (CEW 2013)

solid foundation of academic, social, and technical skills for all who are expected to contribute to advancing our society and economy. More complex social, market, and political environments require higher levels of knowledge, skills and competencies from all of us who must navigate and make choices within them.

Escalating standards for effective job performance and career advancement are being advanced from a more demanding social and technology-intensive workplace. Employer surveys and a myriad of labor market studies all point to inadequacies with the current state of the workforce and call for strengthening workforce skill sets in critical thinking, problem-solving and communication. The signals and feedback from many different directions are quite clear. Since, 1984, with the release of *A Nation At Risk*, the United States has struggled to recalibrate education and training system to achieve higher standards for performance in an increasingly competitive world. Employers continue to provide consistent feedback about the inadequacies of our graduates entering the workforce. There are insufficient numbers of college graduates in STEM disciplines to fill available jobs. At the same time, employers, both nationally and here in Maine, call for higher levels of communication, critical thinking, and problem-solving skills from those they are seeking to hire.

Ensuring that Maine's innovation economy will flourish in the years ahead means that the K–12 education system must produce more graduates with higher levels of academic qualification pegged to international standards such as those being promoted by the Common Core. We can no longer push those with inadequate preparation on to the next level without compromising quality. Postsecondary institutions must also be clear about entry requirements and more effectively communicate academic standards to be met by those seeking to enroll in various disciplines. Employers must provide regular feedback about how well prepared graduates are to perform in rapidly evolving work environments. There should not be a false choice between promoting STEM education over the liberal arts. Instead, we need instructional rigor from both to ensure a workforce that is educated and trained for the diverse demands of society and work.

It is the job of education and training systems to prepare workers and citizens for a more complex and competitive world, but it is not their job alone. Students, parents, and workers, too, must assume more responsibility in understanding the changing nature of work,

pathways to qualification, and requirements for advancement. Too often, these fundamental processes remain hidden and unexamined by those whose futures will be shaped by them. 🐼

## ENDNOTES

1. Cookson, Peter. 2012. "Education and Jobs: The Great Mismatch." <http://www.quickanded.com/2012/12/education-and-jobs-the-great-mismatch.html>
2. These figures were calculated using data from the following website: [http://lehd.ces.census.gov/applications/qwi\\_online/](http://lehd.ces.census.gov/applications/qwi_online/)
3. Data in Tables 3 and 4 were obtained from Burning Glass Technologies, Boston, MA, using proprietary software, Labor Insight.

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