

Opportunity New England

A Plan to Build Regional Success on Innovative Individuals

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In a knowledge- and innovation-based economy, human capital—the education, skills, creativity and mobility of individuals—is the key to innovation, productivity and thus wealth creation. The basic unit of production is now the singular individual, not a factory or a machine. In New England, a growing proportion of those individuals will be Latinos. In a strange geocultural twist, the region’s competitiveness with the roaring economies of China and India will be determined in the Spanglish-speaking neighborhoods of Providence, New Haven, Brockton, Manchester and other New England cities.

Emphasis on the individual is reshaping the business models of today’s firms, large and small, as they gear up to compete not on products and services but through innovation and the insight of individual workers. (Perhaps the only thing more powerful than individual insight is a *network* that harnesses the insight of many individuals—the idea behind “open platform systems.”) Innovation-driven business models, in turn, require large numbers of technically proficient, scientifically literate, knowledge workers who can collaborate across disciplines.

In the coming decade, meeting the human capital development needs of these firms and individuals will challenge New England’s education and workforce development institutions. And indeed, education institutions need to likewise refocus on enabling the insight of individual learners.

A few transformative strategies will help our education and workforce institutions navigate the gravitational pull that is molding all resources to the needs of the individual.

Transforming our education/workforce system into one that successfully gets the right skills to the right person at the right time will require networked resources with a radical focus on the individual. Currently, our education and workforce development systems are designed around faculty, curricula and programming to deliver a standard product to passive students. A radical focus on the individual would aim to shatter the walls of these institutions and reorganize the resources across them all to deliver customized experiences so that learners get education that is content-rich and timely, and helps them become better learners as a result. We need a new model for “adult education” that is lifelong and that provides deeply integrated academic and experiential learning and sophisticated education/job search tools. This new model would empower individuals as the drivers of innovation.

The individual era

First, it is important to understand the following forces that are driving the focus on the individual.

Globalism. Twin revolutions in technology and information have made it possible to distribute production, work, capital and ideas worldwide. This globalization of all aspects of production has caused a transformation in the skills that both firms and individuals must have to be successful.

In coming years, New England firms will face increasingly intense global competition, which creates an imperative for innovation. Much of what is done today by existing firms in our labor market, even firms which primarily serve local needs, will be done as well or better within 10 to 15 years by China and India.

Our firms need to re-invent themselves over the next decade, or face decline. While they need specialized labor for the work they are currently doing, it is even more critical that they find the highly innovative and flexible talent that will help them invent and perform the next generation of work. Innovation is the new differentiator. We need to move from engineers and chemists who work on technologies and processes to individuals who design customer solutions using engineering and chemistry and who can adapt these skills to emerging customer challenges.

In an interesting paradox to the phenomenon of globalization, the individual worker, manager, entrepreneur, researcher and low-skilled or highly educated person has become the single most important resource for competitive advantage. Those individuals with discrete subsets of innovation skills, as measured by college degrees, are able to benefit from this paradox, seeing increased returns on their human capital investments while those yet to engage must be provided opportunities to do so. Moreover, those firms and regions that have many innovation-ready workers will have a competitive advantage; those that do not will face a tough challenge. And all individuals will need to focus their work and learning experiences on acquiring the necessary skills for the innovation economy.

Human capital and innovation. Researchers at the Society of Human Resource Management estimate that 65 percent of a firm’s value is generated by the knowledge, skills and networks in its individual employees. For example, Microsoft’s ratio of intangible to book (tangible) assets is 11 to one. This human capital realizes its value in knowledge work that yields innovation. For knowledge to yield innovation, an individual must possess baseline technical expertise,

engage in constant learning and collaboration across disciplines and teams, and generate projects that produce insights regarding customer needs, organizational assets and market tools, according to research on knowledge networks by Melissa Schilling of New York University. Proctor & Gamble’s “Connect and Develop” initiative opened up its R&D infrastructure to scientists, suppliers, customers and even competitors all over the world. It was a technology entrepreneur in Japan who came up with the idea for Mr. Clean Magic Eraser which came to market within a year.

All evidence indicates that the pace of this cross-discipline innovation is increasing in scale and scope. The years ahead will not be marked primarily by a slow, steady stream of sustaining innovation by large, established firms. We should instead expect constant and accelerating “disruptive innovation,” much of it driven by networks of collaborating firms that create whole new business models, rather than just new products or technologies, as the basis of competitive value. Individuals will need to be global and flexible in their skills set to effectively engage emerging networks.

Further, knowledge work for all individuals increasingly requires an integrated understanding of science, technology, engineering and math (STEM). This, of course, alludes to our need for people trained in the hard sciences and engineering but also speaks to a broad need for “scientific literacy” on the part of those in other disciplines. According to the OECD, in member countries, high- and medium-high-technology manufacturing and knowledge-intensive service industries now account for 38 percent of economic value added.

In the innovation economy, work and learning are simultaneous events. Individuals and firms are constructing the knowledge they need for tomorrow’s work today from colleagues, web-based resources, formal learning and available best practices. Competitive economies recognize that learning cannot be separated, spatially and temporally, into a place and time to acquire knowledge (a school) and a place to apply knowledge (the workplace).

Innovation skills

If the human capital embodied by individuals is the key to innovation, which skills are the most important? Our emerging understanding of global production and innovation, thanks in part to work by economists such as Frank Levy of MIT and Richard Murnane of Harvard, suggests that individuals need the following set of innovation skills:

- **Learn-on-demand**—the ability to construct new knowledge from work activities and apply it. Example: Cisco’s Ecosystem connects more than 40,000 partners with on-demand resources (people and technology) to learn how to deliver new solutions to customers.
- **Expert thinking**—the ability to generate solutions that are not rules-based from technical knowledge.

Example: diagnosing the illness of a patient whose symptoms are strange.

- **Complex communication**—the ability to adapt communication skills to multiple situations and cultures. Example: an engineer describing to a marketing team why a new design for a DVD player is an advance over previous designs.

- **Scientific literacy**—the ability to understand fundamentals of STEM. The U.S. Labor Department projects demand for occupations requiring science and engineering skills to increase three times faster than all other occupations.

- **Mobility**—the ability to transition across projects, firms, disciplines and work/learning experiences. Eli Lilly and Proctor & Gamble are among companies that deploy informal open innovation platforms that call for individuals to work outside firm boundaries.

These skill needs apply to *all* individuals—low-skilled or highly educated, rank-and-file worker, manager, entrepreneur or researcher. While each person may have different levels of need for each of these skills based on their current work and education, those individuals who wish to be successful increasingly will seek to develop all of them.

Innovation skills are developed through individual experiences that deeply integrate formal or academic training with applied knowledge, and are reinforced by movement between work and learning, and from one workplace to another. For firms, regions and nations to be successful in the global, innovation economy they must pursue public and private initiatives in education and workforce development that produce workers with these skills across many disciplines.

New England’s innovation gap

New England faces unique challenges in developing these innovation skills in its workforce. Currently, we cannot even fill demand for skilled STEM workers, never mind develop workers with the innovation skills necessary for future competitiveness. Based on current and future vacancies and projected job growth, Massachusetts needs to increase the number of STEM degrees completed by 300 percent, according to a comparison of college production versus industry need conducted by Metro South/West Regional Employment Board and based on an analysis by Northeastern University economists W. Neal Fogg and Paul E. Harrington. But simply increasing the number of STEM professionals is not enough.

New England needs STEM workers with strong innovation skills. These are engineers with MBAs, mathematicians with MFAs, scientists with MPAs ... people who can communicate across disciplines and innovate. Of particular concern are the work and learning preparation of soon-to-be high school graduates, low-skill immigrants and native-born New Englanders, and current college students. These individuals are actively

engaged in making decisions about work and learning. They are focused on human capital development in a way that bridges the worlds of work and learning. Where should they work? Where and what should they learn? How will they pay for learning?

One thing is certain: the jobs that once provided the stepping-stones for upward mobility are rapidly disappearing. There has been a fundamental shift in the composition of the New England economy toward higher-wage, knowledge- and innovation-focused jobs over the past 10 years. In every industry cluster that is heavily dependent on a highly educated workforce, New England has a larger share of jobs than the U.S. average. These include: financial services, innovation services, biotech, electronics, software and communications, health, and postsecondary education.

Structural shifts in job mix in New England have displaced workers with no education beyond high school from the full-time workforce, leaving them underemployed, unemployed and increasingly outside the labor force. The loss of one in three New England manufacturing jobs since 1990 is a highly visible signal of change.

A less visible sign of crisis is the steep decline in labor force participation and full-time employment rates among working-age adults with no more than a high school education. This shift is seen in native-born and foreign-born workers of all ages. As of 2000, only 38 percent of adults, ages 25 to 64, without a high school degree work full-time, compared with 60 percent or more of people with some college or more.

The growth in knowledge and innovation jobs is concurrent with two other key New England trends: 1) growth in immigrant populations, in particular, native Spanish speakers with low levels of literacy and 2) lackluster performance by high-schoolers in applying their academic knowledge to real-world situations (we suspect the same would be true of college students if it were measured).

Latinos represented 43 percent of New England's net population growth in the 1990s, and 100 percent of net population growth in 15 of the region's 20 cities with populations of 75,000 or more. The National Center for Public Policy and Higher Education projects that the Latino population of southern New England (Massachusetts, Connecticut and Rhode Island) will grow to between 11 percent and 14 percent of the working-age population by 2020, up from less than 3 percent in 1980. Latinos must become a part of New England's future skilled workforce if the region is to prosper.

Yet the educational attainment of New England's Latino population is significantly lower than that of its Non-Latino, white population. Among people age 25 and older in New England, 42 percent of Latinos had less than a high school education, compared with 13 percent of Non-Latino whites, according to the U.S. Census Bureau.

These numbers are even more striking when we examine New England's limited English-proficient population. Of 341,070 individuals ages 18 and older who spoke English "very little" or "not at all," 39 percent had less than a ninth-grade education, and 59 percent had less than a high school credential, according to the U.S. Labor Department.

The following figures illustrate the collision course between employment demands and demographic trends in selected New England states.

Figure 1: Change in Education Levels of Working-Age Population (ages 25 to 64) in Massachusetts

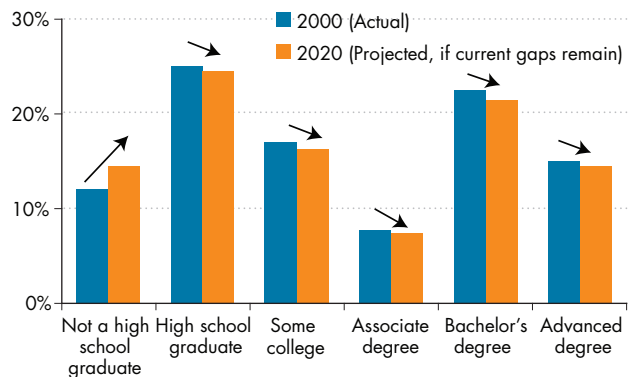


Figure 2: Change in Education Levels of Working-Age Population (ages 25 to 64) in Rhode Island

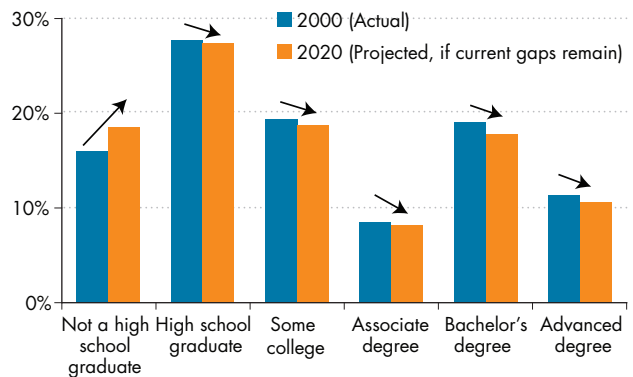
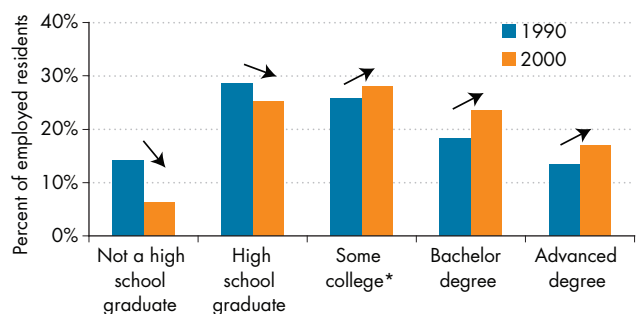


Figure 3: Change in Job Mix by Education Level of Workers in Southern New England (CT, MA & RI)



* Includes associate degrees and non-completers.
Source: U.S. Census Bureau.

Despite decades of state and national reform efforts, our K-12 system is still preparing students for an industrial economy of managers and semi-skilled workers that no longer exists. We are currently failing to prepare high school students and undereducated adults for further education and the workforce. For every 100 ninth graders in New England, 23 never finish high school and only 29 go on to complete a college degree, according to the National Center for Public Policy and Higher Education.

In addition, we know that many of our high school students lack the ability to apply their knowledge in critical ways. Recent achievement scores illustrate that even when high school students have basic math and reading skills, they lack the ability to apply these skills to problem-solving or analysis.

In fact, even New England's best suburban high schools and most selective colleges are not for the most part producing talent that is innovation-capable. Most high school and college grads cannot apply their knowledge. They are not good problem-solvers or decision-makers. They do not communicate well orally or in writing. They have limited experience in working and thinking across disciplines and are generally weak in STEM skills.

New model

We need to align our education and training continuum to include integrated high standards and experiential learning for all of our potential workers—low-income/low-skill workers, soon-to-be high school graduates and current college students.

We propose three catalytic strategies to create a new model of education: transformation of the senior year of high school (as a first step in comprehensive reform of the high school); better integration of adult basic education, skills training and community college; and new tools to customize and navigate the higher education experience as a lifelong learning resource integrated with the workplace.

Learning Through Internship. A radical focus on soon-to-be high school graduates would transform the senior year of high school. As demonstrated by low performance scores in applied knowledge, high school students require a framework for learning innovation skills in context. Some of the best work in high school reform is being done by the Big Picture Company, which operates 24 model high schools at sites around the country including six in Providence.

The focus of the model is something Big Picture calls *Learning Through Internship*. Each student, beginning in ninth grade, spends two days a week in an internship with an adult mentor who shares with the student a passion for a particular type of work, igniting a love of learning that will last a lifetime. All the academic work in the other three days of the school week is

structured on a project basis around the internship. Every 12 weeks, students defend their project work before a team consisting of their mentor, their advisor (Big Picture's name for a "teacher"), other Big Picture Company advisors and students, and a parent or guardian. The student is responsible for the development of the internship, with support from his advisor.

Placing the primary responsibility for the development of the internship on the student instills the principle that students are responsible for their own learning. Consistency in the application of this principle is one of the reasons Big Picture schools graduate students who are self-directed learning machines, the prime talent for an innovation economy. Big Picture students go onto college in higher percentages than their peers and demonstrate an ability to apply knowledge to new situations. While it will be difficult to quickly change the traditional high school, with its rigid schedules, to this model, elements of it could be incorporated into the senior year—currently a time of coasting for many students. A focus on *Learning Through Internship* in the senior year could transform this often wasted time into one which allows the student to deeply explore career and life interests. Clearly, the integration of academic and experiential learning needs to begin much earlier; the transformation of the senior year is simply a logical starting point.

To begin to address the growing need for both STEM knowledge workers and STEM-literate peers, a first phase of the project could focus on students with STEM interest and engage industries with STEM workforce needs.

The Learning Network. A radical focus on low-income/low-skill workers, would create new ways to access knowledge careers and wages. As noted, the labor market has a very large and growing pool of adults with low literacy and numeracy skills, and/or limited English proficiency, who cannot access public and private education and training resources, most of which presume at least high school literacy. While there are significant efforts underway in all New England states to expand the capacity and quality of their systems of adult basic education, the alignment and integration between adult basic education and job skill training and higher education remains problematic, and there are very few efforts to integrate innovation skills.

The conventional approach to the linkage of adult basic education and job skill training and higher education is to think of them as a sequence, with a smattering of supportive services intended to ensure a successful transition from one system to the next. This creates a bottleneck in our workforce system because most of our displaced workers do not have the credentials or basic skills to participate in most of our workforce system interventions. The problem is a focus on the system rather than the worker. A worker-focused

approach would integrate adult basic education with skill training, because it is a more effective way to learn and because it provides the worker with an immediate return on investment in their own learning as they acquire the skills to move up job ladders.

We propose a new program, *The Learning Network*, to integrate classroom training, workplace learning and career management skills through a partnership among workers, educators and managers. The heart of this program would be a mentored internship approach that uses the workplace as the hub of learning and is supported by integrated, research-based adult basic education, skills training classes and community college instruction. Managers and workers would act as facilitators of worker learning based on company needs and worker aspirations. Workers, managers and educators then would act as a team to contextualize skills achievement, learning and job ladders. This would create an integration of what workers can do, what companies need them to do and what community-based and higher education providers need to offer. Job ladders would develop organically and dynamically.

A logical place to pilot *The Learning Network* is in the health care industry because it has long job ladders that reach to the bottom of the workforce and it is facing acute labor shortages in the middle of the ladder—among nursing and other technical and semi-technical positions in allied health fields. The health care sector needs to transition low-skilled workers up job ladders to fill those positions in the middle. These mid-level jobs are also morphing into the hubs of patient care and will increasingly require the core innovation skills, expert thinking and complex communication, to transform the health care delivery system.

Opportunity New England.

A radical focus on college students and lifelong learners will customize learning experiences and simplify career transitions. This strategy puts all New England's higher education resources at the fingertips of the individual learner, creating one big college campus from our 270 institutions. Economic changes and the increasing importance of "innovation skills" require education (pre-K-12 and postsecondary) and workforce systems to dramatically decrease the time and transaction costs involved in

education-to-work and work-to-work transitions. Accordingly, we suggest the need for a groundbreaking, technology-enabled model called *Opportunity New England (ONE)*.

Conceptualized by journalists Neal Peirce and Curt Johnson of the Citistates Group in their work for the New England Futures Project, *ONE* would offer an integrated web portal, providing "one-stop" shopping both online and in person to prospective college students, adult learners and professionals—allowing them to prepare, plan, apply and learn online to acquire the vital competencies of innovation workers. The *ONE* model would include up to four potential elements.

A *Gateway* would provide a web-based directory of online courses and degree programs drawn from New England's 270 college and universities, with a strong emphasis on developing competencies associated with the innovation worker. The *Gateway* would also link students to online "mentor" systems that provide databases of colleges and universities, courses and degree programs and information on tuition and fees, as well as state-specific occupational data on emerging job needs.

Second, a *Negotiation Center* would review student needs/preferences and negotiate learning plans with one or more colleges. *ONE* would link potential students to college admissions officers and registration sites,

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as well as to online applications for state and federal financial assistance. *ONE* would also pioneer a *Passport* program, streamlining online application processes and allowing students to apply to multiple institutions via a single online application—saving time and money for students and institutions and speeding institutional responses. *Online Portfolios* would facilitate ongoing counseling and career placement.

Third, a *Coaching Center* would provide online and in person financial aid consultations and link students to counseling resources relating to enrollment, transfer options, innovation worker competencies, course selection and institutional choice. This “high-touch” component would be provided by counselors or advisors assisting students in achieving goals and would be accessible online and on partner campuses.

Finally, a *Career Center* would provide career exploration tools that are integrated with the competencies and academic preparation required of innovation workers, as well as links to businesses, employment needs and occupational outlook resources. *ONE* would be available to act as career counselor, placement agent and host for job fairs online. Using students’ online portfolios, the Career Center could be an ongoing job broker.

Moving forward

To create the innovation-capable workforce that will enable New England to succeed in this new century of global competition, we need to help Latino immigrants and their children to join the knowledge workforce,

because this is where most of our population growth will be concentrated. But our challenge is much more than simply upgrading the skills of immigrants and native New Englanders with low literacy levels. Very few of our high school and college graduates, even those from the best schools, have the ability to apply knowledge in a way that results in innovation.

The challenges we face require a radical reconfiguration of our education and workforce system to produce from an increasingly diverse population a workforce composed of individuals who are passionate, empowered lifelong learner/innovators. In making this transformation, we will be playing to our strength. America’s— and New England’s—current education system, flawed as it is, is better at producing innovators than any other system in the world, in part because it puts more emphasis on encouraging critical thinking and because it is less structured. We need to do what we do well much better, and do it for a much broader group of learners.

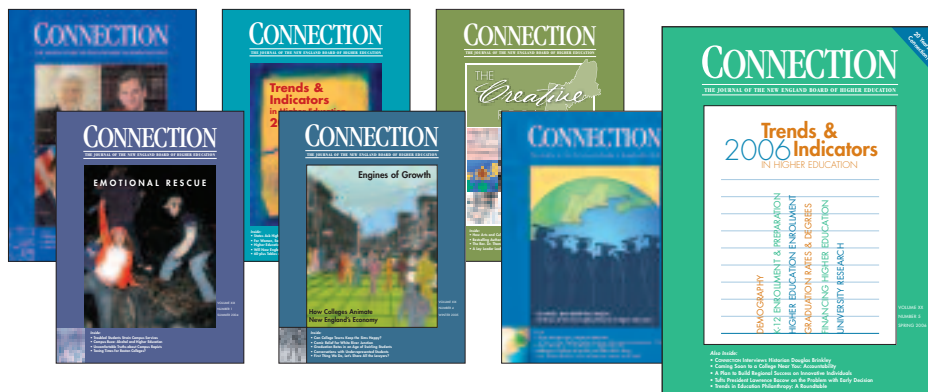
If we fail, we will not just miss an opportunity; we will face a decline in our standard of living and quality of life. In a world where human capital is the key to innovation, economic development is workforce development.

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