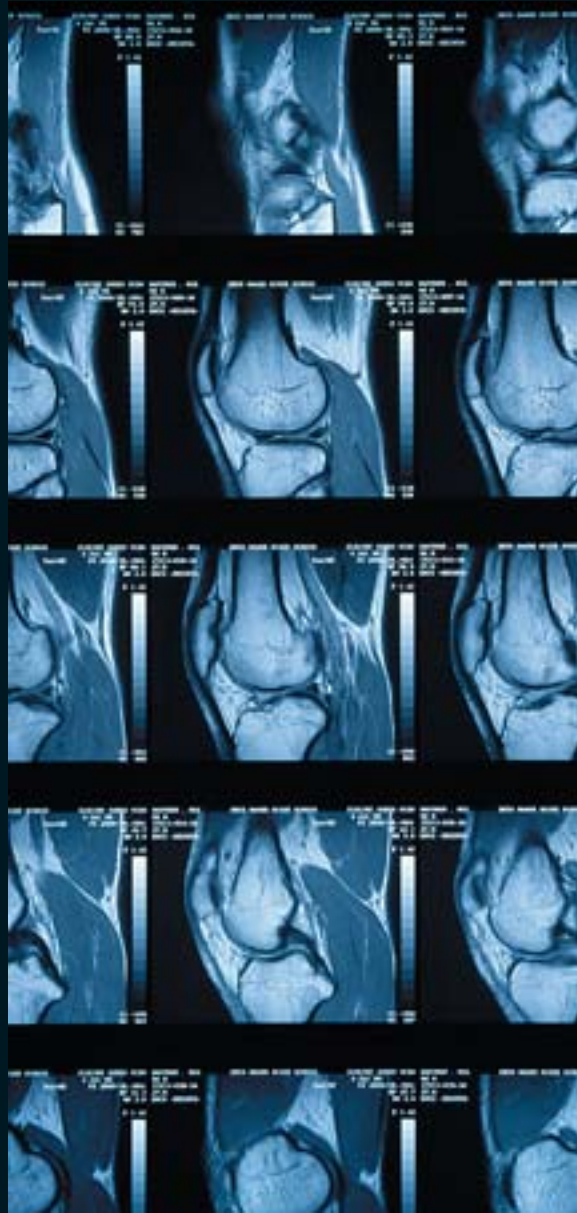


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- Economic Currents
- Massachusetts Current and Leading Indices
- Medical Devices:
A Stronghold of the
Commonwealth's Economy
- From the Field: Pioneer Valley
Training and Retaining IT Talent



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ILLUSTRATION: NAOMI SHEA

PIONEER VALLEY: Training and Retaining IT Talent

ELIZABETH WILLIAMS AND YOULANDA GIBBONS

Successful growth of the Pioneer Valley's information technology industry hinges, in part, on the availability of skilled workers. Regional planners, industry leaders, and higher education administrators have been looking at ways to tie together the skills and career interests of emerging college graduates with the needs of area business and industry. A coordinated effort could have favorable outcomes for institutions and industry alike.

The high cost of living in Massachusetts has discouraged in-migration. Because of this, it has been suggested that state policy should focus on ways to “grow” our resident population into a more skilled workforce.¹ The success of such a strategy is dependent on a system of education and training that is both effective and well attuned to the needs of business and industry across the Commonwealth.

One of the fastest-growing and most promising sectors of the state economy is the information technology (IT) sector. At the present time, only a fraction of the state’s IT jobs are located in the Pioneer Valley: 5.7 percent of computer support specialists, 2 percent of computer programmers, and .7 percent of software engineers are accounted for in the Springfield MSA.² A primary goal of the Pioneer Valley Planning Commission’s Plan for Progress³ is to boost the regional economy by encouraging graduates of area educational institutions to seek employment locally. Another key goal is to attract IT firms to the region by providing a skilled workforce.

Recognizing the important role of western Massachusetts colleges and the University of Massachusetts as suppliers of a well-trained IT workforce, the Plan for Progress Higher Education and Workforce Development Strategy Teams sought a better understanding of graduating college seniors’ employment interests and expectations. The University of Massachusetts responded to this need for information by conducting a survey of graduating IT students in the region’s colleges and universities.⁴ The teams anticipated that data describing the new IT talent pool would be useful to the region’s employers and help attract IT firms considering locating in the Pioneer Valley.⁵

Institutional Offerings in IT-Related Fields

Advocates of the baccalaureate contend that programs leading to IT-related degrees provide the best foundation skills necessary to succeed in the ever-changing world of work: problem-solving, communication skills, and, above all, the ability to acquire knowledge. However, the importance of having a bachelor’s degree in computer science, as opposed

to any other area, is a subject of debate. Though some companies prefer graduates with computer science degrees, there are successful IT professionals from all disciplines. Of the respondents to the 1998 *InfoWorld* Compensation Survey who indicated they had bachelor’s degrees, only 26 percent held degrees in computer science. Other respondents held degrees in business (19 percent) and the humanities (15 percent).⁶

According to the National Center for Education Statistics, the number of students earning bachelor’s degrees in computer science declined during the 1990s. In contrast, the number of graduate degrees in this field increased. The Massachusetts Board of Higher Education “Review of Computer and Information Science Technology Programs Report” indicates that over a ten-year period, Massachusetts also experienced a decline in the number of bachelor’s degrees in computer science and engineering. The number of graduate degrees in both of these areas continues to rise.

Two-year or associate’s degrees in computer information systems, data processing, and computer systems engineering are granted by community colleges whose primary

focus is to serve local communities. Four-year bachelor’s degrees are granted in computer studies, computer science, and electrical and computer engineering. Master’s and doctoral degrees are offered in computer science, management information systems, and electrical and computer engineering.

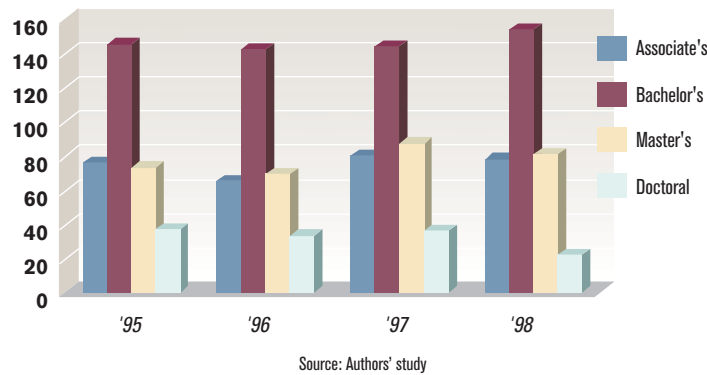
Business and industry leaders agree that community colleges can adapt more quickly than four-year colleges to meet the needs of business and industry. Though associate’s degree

programs do teach foundation skills, students with these degrees may sacrifice depth of knowledge for current technical skills, making it easier for them to obtain employment but harder to develop the knowledge and skills needed to reach their ultimate career goals.⁷

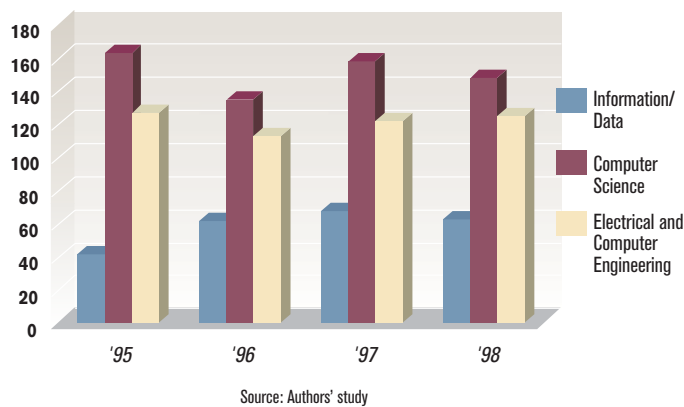
The Emerging IT Talent Pool

Demographics. The IT talent pool emerging from the region’s colleges and the University of Massachusetts can be

Number of IT Degrees Awarded at Pioneer Valley Institutions



Degrees Awarded at Pioneer Valley Institutions by IT Field



characterized demographically as disproportionately male and predominantly white. Nearly 40 percent of the IT students scheduled to graduate from western Massachusetts colleges in spring 2000 were natives of the area, whereas approximately one-quarter were natives of eastern Massachusetts and one-tenth were natives of central Massachusetts. The remaining 25 percent were from out of state. Given the locally oriented educational mission of community colleges, it is not surprising that western Massachusetts natives comprise a substantially larger proportion of the region's two-year degree recipients than its four-year degree recipients (57 percent vs. 31 percent).

Employment expectations and interests. Students majoring in IT fields are well attuned to the demand for their specialized skills. Their employment interests and expectations tend to be shaped by national and state trends. Anecdotal accounts suggest that prospective employees have specific expectations and interests regarding location of employment, salary, and other factors.

With regard to location, interest in working in western Massachusetts was highest among students who had grown up in the region and lowest among eastern Massachusetts natives. Among those attending community colleges, 88 percent expressed some level of interest in remaining in western Massachusetts for employment. Interest in working in eastern or central Massachusetts was highest among eastern Massachusetts natives and lowest among western Massachusetts natives.

Students enrolled in four-year colleges expect higher salaries in their first IT jobs than do students enrolled in two-year colleges. Among four-year degree recipients in the study, the mean expected annual salary was \$42,676; among two-year degree recipients, it was \$35,680. Less than 1 percent of students anticipated earning an initial salary of \$60,000 or more.

Students rated the importance of five different factors in making a decision to accept an employment offer. Opportunities for career development and quality of life were rated "very important" by substantially larger proportions of students than were salary level or cost of living. Nevertheless, all five factors were rated "very important" or "somewhat important" by more than 90 percent of the respondents.

An overwhelming majority of students anticipate that they will *need* (88 percent) and *receive* (93 percent) on-the-job training after entrance into the IT workforce.

This finding suggests that soon-to-be graduates recognize the ever-changing nature of IT work and expect to acquire new knowledge and skills subsequent to graduating from college.

Linking Prospective Employees and Employers

Employer needs. Analyses of data collected by the Bureau of Labor Statistics suggest there will be enormous growth in three IT occupations: systems analysts, computer scientists and engineers, and computer programmers. The BLS estimates that between 1996 and 2006, the United States will require more than 1.3 million new IT workers in these areas. Approximately 137,000 workers per year will be needed to fill *newly* created jobs. Specifically, it is estimated that 1,134,000 IT jobs will result from current workers leaving these occupations and 244,000 vacancies will occur due to retirements.⁸

Of the three occupations, systems analysts will be in greatest demand. The number of jobs is projected to double from 506,000 in 1996 to 1,025,000 in 2006. This compares to a projected increase of 14 percent for *all* IT occupations. The number of computer scientists and

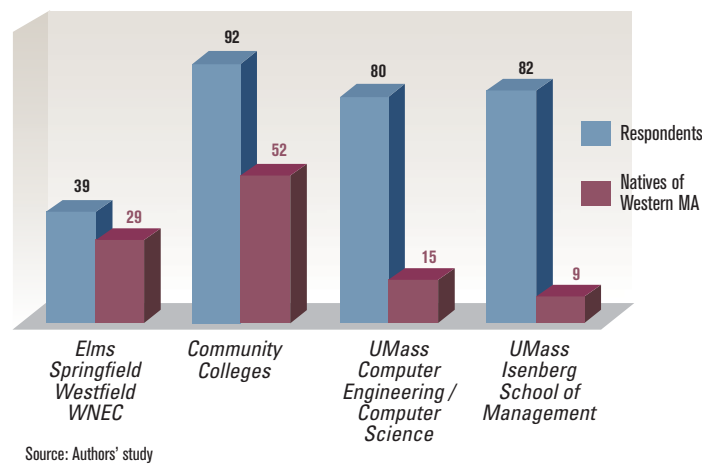
engineers is expected to grow by 114 percent, from 427,000 to 912,000 during the same period, whereas the number of computer programmer positions is expected to grow at a comparatively slower rate of 23 percent, expanding from 567,000 in 1996 to 697,000.

In contrast to the national picture, the 1999 Massachusetts Technology Collaborative Workforce Needs Survey reports that the greatest need for IT workers in the Commonwealth is in the area of skilled production. This points to the need for a different focus on training in the state, if a "native" workforce is a priority.

Information sources for students. For soon-to-be graduates interested in employment, gathering information about prospective employers is crucial. Which information sources are most widely used by students to find IT employment opportunities? Data suggest that "word-of-mouth" is the most popular, followed by company Web sites. Newspapers and employment agencies were the least utilized sources.

University students are more likely than students from other four-year colleges or from community colleges to report job fairs as good sources of information: Three-fourths of the university students surveyed reported learning of IT employment opportunities this way. These students were also more likely than students at other schools to indicate

Respondent Demographics by Institution Type



Can we keep IT graduates in the Pioneer Valley?

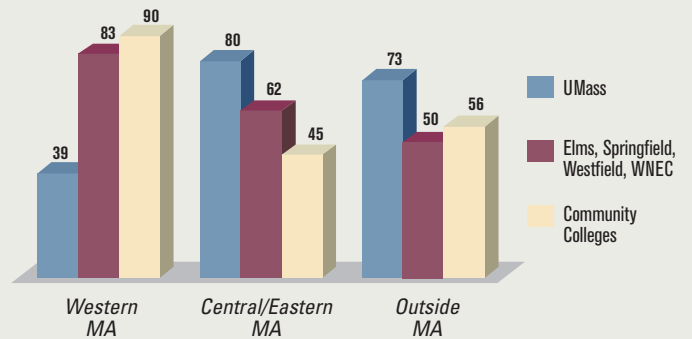
Who wants to work in western Massachusetts?

- Survey respondents from UMass were less than half as likely as other students to seek employment in western Massachusetts.
- University students were geared toward employment opportunities elsewhere in the state, as well as outside of Massachusetts.
- Overall, western Massachusetts ranked highest—but only marginally—as the preferred place to work.

Recommendations: Match training at local colleges and the University of Massachusetts with the needs of local employers. Include more local recruiters at job fairs, heavily utilized by university students.

Interest in Working in Each Geographic Area

Percentage of Respondents Choosing “Very Interested” or “Somewhat Interested”



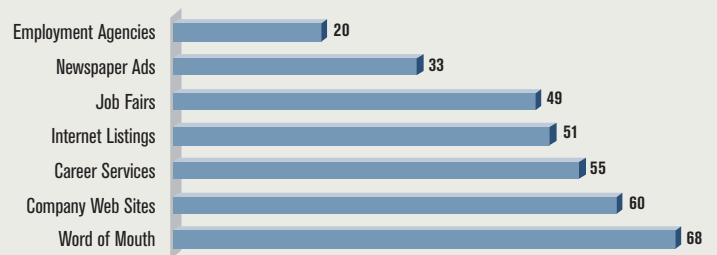
How do students learn about employment opportunities?

- For UMass students, job fairs were the most important source of information. Nearly 80 percent reported having received information this way.
- Less than 30 percent of the respondents from the other colleges surveyed looked to job fairs for employment information.
- Company Web sites and word of mouth were the most useful sources of information about employment.

Recommendations: Develop job fairs at colleges and community colleges. Include local recruiters. Match recruiting organizations to student skills.

Most Useful Sources of Information About Job Opportunities

Percent of Respondents Utilizing Each



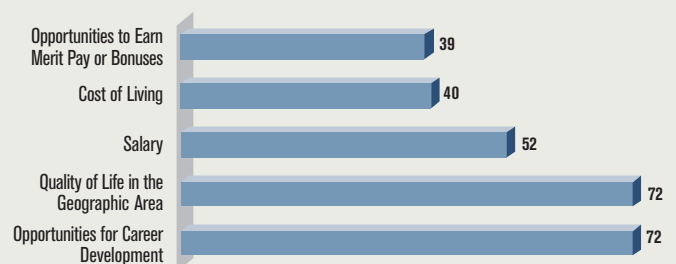
What factors make job offers attractive?

- Opportunities for career development and quality of life in a geographic area were the factors rated highest by all students, followed by salary level.
- Approximately two-thirds of community college students rated the cost of living in a geographic area as “very important,” compared to just one-quarter of university students.

Recommendations: Develop and emphasize career advancement opportunities. Include career development information on Web sites and in recruitment literature and interviews. Offer competitive salaries to qualified applicants. Emphasize benefits of life in the Pioneer Valley region: affordability, cultural richness, continuing education, access to New York and Boston, open space and natural beauty.

Influential Factors Associated with Accepting Employment

Percent of Respondents Choosing “Very Important”



Source: Authors' Study

Information Technology Job Opportunities in the Pioneer Valley

	MA	Pioneer Valley	Pioneer Valley Share (percent)
Population	6,349,097	695,368	11.0
Computer Science Jobs	61,290	808	1.3
Electrical and Computer Engineering Jobs	84,640	1,121	1.3
Information/Data Jobs	12,349	252	2.0
Total Information Technology Jobs	158,279	2,181	1.4

Sources: Authors' study; iMarket; U.S. Census Bureau, 2000 Census

that their institution's career services office was useful as a source of information.

Forty-eight percent of students reported having been pursued by prospective employers. Students enrolled in four-year colleges were twice as likely as students at two-year colleges to have had job prospects (57 percent vs. 27 percent). Also, students who had completed IT internships or co-ops were twice as likely to indicate that a company had expressed interest in them (62 percent vs. 32 percent).

Among community college students who had been pursued, an overwhelming majority (82 percent) reported that western Massachusetts companies had expressed interest in them. In contrast, only 42 percent of students enrolled in four-year colleges had been pursued by a western Massachusetts company. Only 20 percent of Greenfield Community College students reported having been pursued by an IT employer, a substantially lower proportion than at any other college.

Findings and Recommendations

A number of the IT students emerging from the region's educational institutions are interested in being employed in western Massachusetts. (Interest is high among community college students, who are often locals, but not among natives of eastern Massachusetts attending four-year institutions.) If western Massachusetts intends to capture more four-year degree recipients, efforts should be made to inform students about the comparative advantages of living in the region *and* to provide training to address local needs.

Educators must work more closely with business and industry leaders to ensure that curricula reflect the skill areas most in demand by employers. Internship and co-op arrangements between businesses and educational institutions have proven especially valuable. Local IT professionals lecturing on college campuses, and companies making resources and facilities, such as state-of-the-art computers and laboratories, accessible to students ultimately benefit all participants.

Across all groups, students reported that word-of-mouth, company Web sites, and career services departments

are principal sources of job information. For UMass students, however, job fairs are most important. Consequently, local employers seeking UMass graduates would benefit by participating in job fairs at the university. Overall, IT students lack knowledge about job opportunities in the Commonwealth. Addressing this issue would be a logical next step for educational institutions and the industry.

The majority of students across all groups expect on-the-job-training. IT employers are encouraged to invest in

training programs in order to attract and retain highly productive and skilled workers.

If western Massachusetts is to be successful in "growing its own" IT workforce, it is vital for regional IT companies to establish and maintain links with area colleges and the university. By creating collaborative and cooperative relationships with faculty and university leaders, the region's IT employers may more effectively meet their employment needs and remain competitive in the industry. ▮

1 Excerpts from the Board, *Massachusetts Benchmarks*, Winter 2000, p.5.

2 1999 Occupational Employment Statistics available from the Bureau of Labor Statistics (http://www.bls.gov/oes/1999/oes_ma.htm).

3 See Pioneer Valley Planning Commission's "Plan for Progress," 1994.

4 Two *Benchmarks* regions: Pioneer Valley and Berkshires, are represented in this study.

5 In order to gather the desired information, the University of Massachusetts Amherst Office of the Deputy Chancellor, under the direction of the Plan for Progress, collaborated with the Student Affairs Research, Information and Systems office (SARIS) in surveying 302 students with IT-related majors (e.g., computer science, electrical and computer engineering, computer information systems, management, etc.) graduating in May 2000 from UMass Amherst and the Pioneer Valley's other colleges and community colleges. We describe the personal characteristics, skills, and employment interests of the 221 students who expressed an intention to be employed in the IT field upon graduating in May 2000. Detailed methodological information can be found in "Western Massachusetts Institutions of Higher Education as Suppliers of the Information Technology Labor Force: A Survey of the Class of 2000," a report prepared for the Pioneer Valley Planning Commission's "Plan for Progress Higher Education and Workforce Development Strategy Teams," by Youlanda Gibbons and Elizabeth A. Williams.

6 *InfoWorld*, 1998.

7 *Ibid.*

8 Bureau of Labor Statistics, 1997.

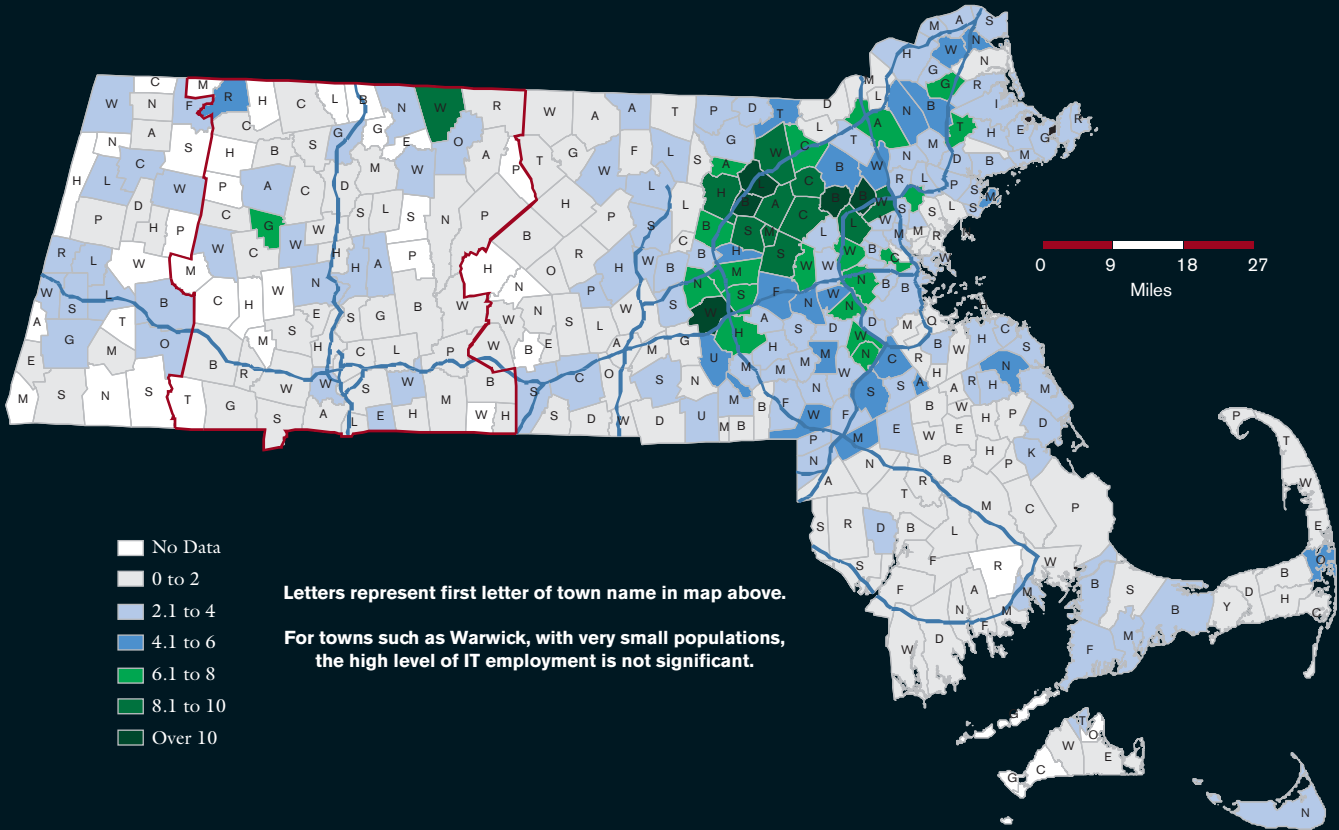
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YOULANDA GIBBONS is a Ph.D. candidate in the Department of Sociology at UMass Amherst.

The complete SARIS study can be accessed on the Web at: www-saris.admin.umass.edu/saris/pp_home.html

Information Technology Employees

per 1000 People of Working Age (18-65)



- No Data
- 0 to 2
- 2.1 to 4
- 4.1 to 6
- 6.1 to 8
- 8.1 to 10
- Over 10

Letters represent first letter of town name in map above.

For towns such as Warwick, with very small populations, the high level of IT employment is not significant.

