

## Community Colleges: Trainers or Retrainers of IT Workers

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# COMMUNITY

BY ROBERT I. LERMAN, STEPHANIE K. RIEGG AND HAROLD SALZMAN

# Colleges

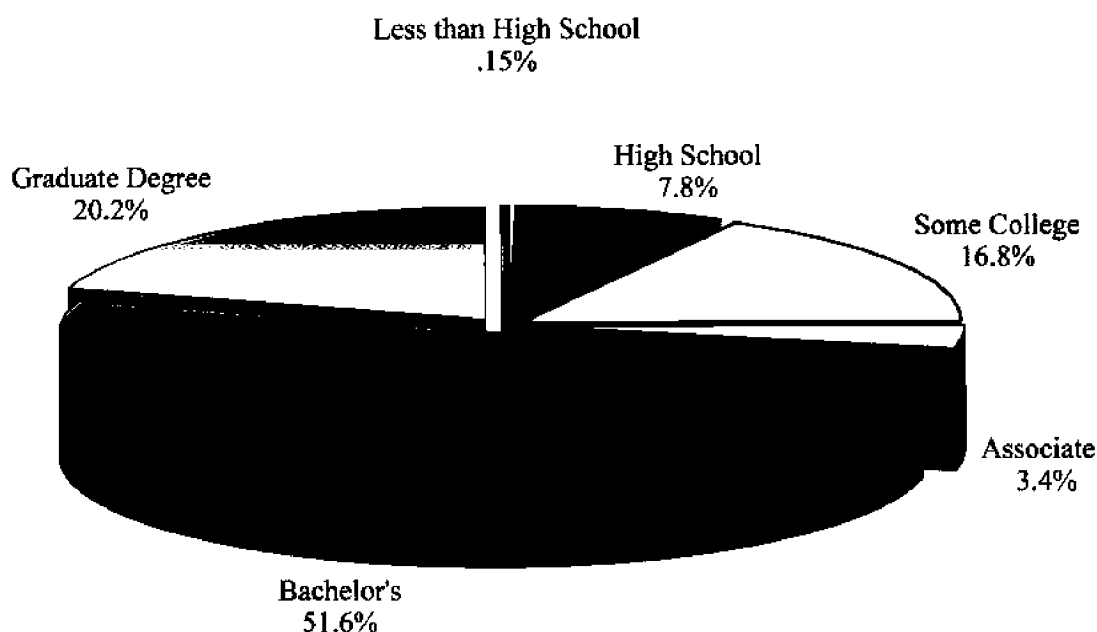
*(For the purposes of this article we use the National Academy of Sciences' definition of IT workers, unless otherwise noted. The definition follows: Information technology workers are those persons engaged in the conception, design, development, adaptation, implementation, training, support, and management of computer-based information systems at the professional, paraprofessional and technician level.)*

The demand for information technology (IT) workers has increased rapidly over the last decade and is projected to rise much faster than employment as a whole. Even with the decline of the dot-com industry, the expansion of jobs for computer scientists, database administrators, network

TRAINERS  
or RETRAINERS  
of Information  
Technology  
Workers

Figure 1:

## Education of Workers Filling IT Positions Created Between 1994 and 1999



Source: Urban Institute tabulations on data from the 1994 and 1999 Current Population Surveys.

administrators, Web specialists, and systems analysts will likely exceed the growth in the supply of U.S. citizens who are trained IT workers. Industry representatives contend that the U.S. faces a shortage of hundreds of thousands of IT workers, a shortage that justifies enlarging, for a second time, the H1-B program that grants 115,000 temporary visas per year.

Meanwhile, students in all types of post-secondary education have responded to this increased demand, filling IT classes to capacity. But while employers have clearly demonstrated their willingness to hire bachelor's degree (BA) graduates in computer-related fields for IT occupations, the future of community college associate degree (AA) graduates in IT is less clear. Community colleges would seem to be a natural supplier of low- and intermediate-skilled workers. However, some employers are concerned that two-year colleges cannot provide the in-depth training necessary for high-tech jobs. Reports suggest that public and private employers are not interested in hiring trained community college graduates for available IT openings (Behr, 1999; Virginia Governor's Commission on Information Technology, 1999).

At the same time, thousands of students are taking computer-related courses at community colleges.

What, then, is the role of community colleges in expanding the supply of information technology workers? Are community colleges responding effectively to the dramatic jump in demand for IT workers by offering solid education and training to a large number of students?

Hoping to answer these questions the U.S. Department of Labor commissioned the Urban Institute to conduct a short study on the topic. Our findings are intriguing.

### National Data

The evidence yields contrasting stories concerning the importance of community colleges. Quantitative analyses of AA graduates and interviews with large IT employers indicate that community colleges do not make a significant contribution to the supply of IT workers. Between 1994 and 1999, data from the Current Population Survey (CPS) indicate that of the 700,000 new IT workers in this period, 72 percent held a BA or higher, and only 3 percent held an AA as their highest degree (Figure 1). Thus, it appears that despite the shortage of IT workers, employers were able to fill openings with highly-educated workers. In addition, the absolute number of IT workers with an AA degree increased over this five-year period (Table 1) but more interestingly, the proportion of IT workers with an

AA decreased over the last five years—from 10.91 to 8.74 percent. While the data on AA degree holders looks bleak, it may not tell the whole story of the contributions of community college students to the field of information technology.

### Community College IT Students

Data on enrollments and case studies of several community colleges offer a different perspective than the national data—suggesting that community colleges undertake a substantial amount of IT training. We conducted interviews with administrators, IT program chairs, professors, career counselors, and students at four focal community colleges—two colleges with strong IT programs, and two randomly selected colleges in various parts of the country. While graduation rates are low—perhaps accounting for the low numbers of AA's working in IT—enrollments in community college IT programs are high. The proportion of students enrolled in computer-related programs ranged from 7 to 28 percent of the student body at our focal colleges, while the proportion obtaining any type of certification, much less an AA degree, was surprisingly low. At one college with a well-developed IT program, only 13 percent of IT students obtained an AA degree over a period of three years.

Why aren't these students pursuing degrees or certification? Most likely because many of them are re-career students switching careers in midlife, "upskillers" who are already in IT occupations but need to upgrade their skills, or liberal arts bachelor's degree holders who are going back for interest or to add a technological component to their current job (Northwest Center for Emerging Technologies [NWCET], 1999). At one college, 24 percent of IT students already held a BA degree—making an AA degree obsolete and unnecessary.

### Community College Students in the IT Labor Market

Even if we acknowledge the fact that many students are obtaining their IT training at community colleges, are they actually finding work at IT firms? Faculty and career counselors at the colleges indicate that their students have no problems finding high-tech jobs. Most find work in small-sized IT firms, or firms in other relatively high-tech industries, such as banking. Career counselors at several colleges told us that the larger IT firms are not very interested in hiring community college students. Interviews with hiring managers at large IT firms in the vicinity of each college confirmed these contentions. Managers admitted that their firms do not recruit community college graduates but their reasons varied. Some claimed that students who were serious enough about a career in IT would go on to a four-year college, especially given the numerous financial aid options available today. Other hiring managers argued that the theoretical foundations and critical thinking skills required to obtain a bachelor's degree in computer science are necessary to succeed in the field. Still, they agreed that the technical skills taught at community colleges seem to be in line with the skills needed for employment. Further, they admitted that once these students are hired they suffer no disadvantages when competing for promotions with other more educated workers.

### Strengths and Weaknesses of Community College IT Programs

Overall our study found that community college IT programs are on the right track to becoming if not leading trainers in IT, then leading *retrainers* of IT workers of all levels of experience and education. Several factors indicate the strength and potential of community college IT programs. First, the sheer number of students taking advantage of community college IT programs signals the continued growth of this field.

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**Table 1: Education Levels of IT Workers: 1994 & 1999**

| Education             | 1994            |                 |                         | 1999            |                 |                         |
|-----------------------|-----------------|-----------------|-------------------------|-----------------|-----------------|-------------------------|
|                       | # of IT Workers | % of IT Workers | % of Ed. Category in IT | # of IT Workers | % of IT Workers | % of Ed. Category in IT |
| Less than High School | 11,000          | 0.66            | 0.07                    | 12,000          | 0.51            | 0.08                    |
| High School           | 141,000         | 8.45            | 0.35                    | 195,000         | 8.27            | 0.46                    |
| Some College          | 267,000         | 16.01           | 1.07                    | 381,000         | 16.25           | 1.42                    |
| AA                    | 182,000         | 10.91           | 1.89                    | 205,000         | 8.74            | 1.91                    |
| BA                    | 793,000         | 47.54           | 3.85                    | 1,143,000       | 48.74           | 4.67                    |
| Graduate Degree       | 274,000         | 16.42           | 2.71                    | 411,000         | 17.53           | 3.49                    |
| Total                 | 1,668,000       | 100.00          | 1.38                    | 2,345,000       | 100.00          | 1.77                    |

Source: Urban Institute tabulations on data from the January–June Current Population Surveys 1994 and 1999.

Enrollments are high for community college IT programs, even if the proportion of students completing degrees and certificates is relatively low. Second, the content of community college IT programs appears to be in line with industry needs. Comparing the technical skills that employers require to the offerings of each of the community colleges indicates that the colleges are well tuned-in to the needs of the industry. Third, the ability to adapt curricula to industry demands in a minimal amount of time makes community colleges particularly well-suited to train students in the rapidly changing field of IT. And fourth, access to equipment and facilities is adequate. All four of the colleges we visited benefited from corporate equipment donations and had ample space for computer labs. None of the instructors felt limited by the equipment or facilities of the college and most were quite proud to show off their extensive high-tech resources. These colleges are well-equipped to take on more students in years to come.

Still, there are some areas where community colleges could use improvement. Undoubtedly the biggest problem for IT program directors is finding enough qualified faculty to teach IT classes. One possible solution to this problem would be to facilitate relationships between community colleges and private businesses that would

allow IT professionals to remain on the payroll of their current employer as full-time employees but only work half-time and teach half-time. The community college could then contribute the half-time teaching salary directly to the employer. The employer would then absorb the difference in pay, not the employee. Second, the career resources at many community colleges are weak. Career centers are a crucial link between employers and students, and need to be strengthened if community college graduates are to get a foot in the door—especially at larger companies. The most successful IT programs were those with formal links to employers. Our case studies showed that those colleges not only receive more financial support but also have more success placing graduates in jobs. Third, few industry-wide standards exist. The Northwest Center for Emerging Technologies has developed a set of skills standards for the IT industry that could be enormously helpful for both community colleges and industry. But until these standards are widely disseminated, accepted, and used in community college IT training and industry recruitment, it will be hard for employers to give up their biases against AA graduates.

From this limited study, we find several reasons to believe that community colleges can make a significant contribution to the

future supply of information technology workers. Despite national data showing a limited role for associate degree graduates in IT occupations, data on enrollments and information from our focal colleges offer encouragement. The high levels of enrollment, low graduation rates, and large numbers of older students suggest that community colleges are functioning as retraining institutions rather than primary training institutions. For students who are already in IT occupations, switching careers, or adding technological skills to their current non-IT careers, community colleges are a convenient, economical, and popular option. With some improvements, community colleges have the potential to become, if not the leading training suppliers, then perhaps the leading *retraining* suppliers, of tomorrow's IT workforce.

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