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## Employment Outcomes of Community College Information Technology Students

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Understanding the role of subbaccalaureate programs in preparing students for the workforce has become increasingly important, particularly in quickly changing fields that require well-trained technical workers, such as information technology (IT). Indeed, initiatives established both in government (such as the Advanced Technological Education [ATE] program of the National Science Foundation) and major foundations are now focused on increasing the number of Americans who earn credentials that are highly valued in the labor market, including two-year degrees and shorter term occupational certificates (Bill & Melinda Gates Foundation, 2009; Lumina Foundation, 2009). Knowledge of how particular credentials are understood and rewarded in local labor markets is beneficial for students seeking better employment through subbaccalaureate education and for the institutions committed to serving them.

To better understand the role of community colleges in educating IT workers, the Community College Research Center (CCRC) conducted a study in Washington State that addressed two key questions: (1) Which types of community college preparation in IT are associated with better employment outcomes?, and (2) Which kinds of employers in Seattle and in the state at large are more likely to employ students who complete particular types of community college IT preparation? This Brief summarizes the study's findings.

### Data and Methods

Our analysis used the transcript records of all students enrolled in a program supported by state funds at a Washington State community and technical college (WA CTC) during the 2000-01 academic year. Data comprised information on student characteristics, course-taking patterns, and educational outcomes in terms of credentials earned and courses completed by the spring term of the 2004-05 academic year. We focused specifically on students who either completed an IT credential by spring 2005 or who left a CTC by spring 2005 after having completing four or more

courses or 12 or more quarter credits identified as IT by their Classification of Instructional Programs (CIP) code (WA CTCs operate on a quarter system: 12 quarter credits are equivalent to 8 traditional semester credits). Students in the latter group, who did not complete a credential, are referred to below as "IT concentrators." In order to examine the labor market experiences of students who completed their IT education, at least temporarily, we excluded students who transferred to another college or who continued their studies at a CTC after spring 2005, since our data limitations would not have allowed us enough follow-up time with them in the labor market.

This student information was supplemented with data from the National Student Clearinghouse and with Washington State Unemployment Insurance (UI) wage records. We used these data to examine the earnings, hours worked, and employer characteristics of the IT students in our sample. Using multivariate techniques, we controlled for differences among students with different types of community college preparation to better compare their employment outcomes.

### Findings

#### Characteristics of Information Technology Students

To place Washington State IT students in context, we first compared their characteristics with those of career and technical education (CTE) students generally, that is, with all students who indicated a non-transfer, workforce, or vocational intent; enrolled in a WA CTC during the 2000-01 academic year; and left a WA CTC without transferring to another institution by spring 2005. We then compared IT students who had four distinct educational outcomes: (1) IT associate degree completers, (2) IT certificate completers, (3) IT associate degree and IT certificate completers, and (4) IT concentrators.

Compared with the overall group of CTE students, IT students were a more select group because they had reached certain educational milestones. CTE students included those who reached these educational milestones as well as those who completed very few courses. On average, compared with CTE students, IT students were more likely to be male (72.3% versus 47.4%), more likely to be in the top two socioeconomic status (SES) quintiles (47.2% versus 35.8%), and slightly more likely to be White (75.1% versus 72.8%). In addition, they were more likely than CTE students to have had some postsecondary education experience before enrolling in a WA CTC (59.6% versus 46.9%). IT students had higher rates of pre-enrollment work experience (64.5% versus 57.1% worked full time at

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some point in the five years before attending a CTC), had worked more hours (17.8 versus 14.2 average weekly hours in the second year before enrolling at a CTC), and had higher previous earnings (\$4,319 versus \$3,089 in average quarterly earnings in the second year before enrolling at a CTC).

IT students who completed different types of preparation had differences in their personal characteristics and pre-CTC experiences as well. On average, those who obtained an IT certificate, either alone or along with an IT associate degree, had higher previous quarterly earnings (\$4,874 and \$4,963) than those who completed only an IT associate degree or those who concentrated in IT coursework (\$3,988 and \$4,260). They were also more likely to attend a technical college (30.9% and 29.8%, versus 16.0% and 16.5%, among these four outcome types). IT students who completed only certificates were slightly more advantaged than IT students overall. They were more likely to hold a bachelor's degree (23.9% versus 16.1%) and to have a higher SES (52.0% versus 47.2% in the top two SES quintiles). They were also more likely to be older (71.2% versus 62.8% were over 27 years of age upon initial enrollment at a CTC) and to have had higher previous quarterly earnings (\$4,874 versus \$4,319).

These findings may suggest that IT certificate completers were seeking targeted skills offered by a certificate program rather than the more general skills offered by an associate degree. IT students who obtained only an IT associate degree may have included more relatively new entrants into the labor market, as they had the lowest rates of prior employment compared with IT students in general (58.9% versus 64.5%). IT concentrators were more likely to be employed while enrolled at a CTC than IT students in general (they worked an average of 49.1% of quarters while enrolled, versus 44.9% for IT students in general) and to have had higher average quarterly earnings while at a CTC (\$2,714 versus \$2,320), supporting the notion that they were pursuing specific skills related to advancement at work.

### **Employment Outcomes by Type of Preparation**

We first descriptively examined the subsequent employment experiences of IT students, based on completion of the four different types of preparation. The proportion of IT students who were employed one year after completing their studies ranged from 59.5% (for IT associate degree completers and for IT concentrators) to 68.3% (for holders of both an IT associate degree and an IT certificate). Mean hours worked per week ranged from 19.4 and 19.8 (for IT concentrators and IT associate degree holders, respectively) to 24.2 (for holders of both an IT associate degree and an IT certificate). Mean quarterly earnings ranged from \$3,786 (for IT associate degree holders) to \$4,419 (for holders of both an IT associate degree and an IT certificate). Students who held only an IT associate degree had low average quarterly earnings, perhaps because they were younger on average and less likely to have had prior postsecondary education or work experience.

Other student factors were also related to differences in employment outcomes. Students without prior full-time work experience had worse employment

outcomes than those with it: they were less likely to be employed full time and earned less per quarter one year after leaving a CTC. Given these differences, it is important to note that students entering community college may have vastly different purposes for attending, depending on their age, prior work experience, and prior education.

To fully account for differences among students who completed each type of preparation, we then controlled for factors potentially related to the number of hours worked and the average earnings observed among the different groups using multiple regression analysis. We found that IT students who left a CTC with more credentials had better employment outcomes. On average, after controlling for student characteristics, employment experience, community college experience (credits earned and quarters enrolled), and labor market conditions upon entrance into the labor market, those who earned an IT associate degree and a certificate had higher quarterly earnings (\$4,698) and more hours worked weekly (23.7) than IT concentrators (\$3,955 and 19.2 hours). Students who earned only an IT associate degree (\$4,371 and 20.9 hours) or an IT certificate (\$4,385 and 20.8 hours) also worked more hours and earned more than IT concentrators. Notably, once controlling for these differences, associate degree holders had outcomes that were more similar to IT certificate holders than IT concentrators.

IT credentials had positive value in the labor market, even when we controlled for the intensity and duration of the educational experience by including credits earned and quarters enrolled. This finding implies that these credentials may have independent value in the labor market aside from students' educational experience. This value may reflect social traits that employers associate with completing a credential, such as motivation or discipline, which are not necessarily associated with qualities that students would gain only through earning credits at a college. Alternatively, this value of a credential may reflect the completion of a particular program of study designed to impart a particular set of skills to completers; students who completed such a program may have acquired unique skills and abilities that would not be gained by taking an alternative set of courses (Grubb, 1999).

Work experience before and during CTC attendance was an important factor related to IT students' subsequent employment outcomes, including employment status, hours worked, and earnings. IT students who worked full time in any quarter during the five years before enrolling in a CTC were more likely to be employed, work more hours, and have higher earnings one year after completing their CTC studies. Likewise, students who worked more hours and who had higher earnings in these prior quarters were more likely to work more hours and have higher earnings one year after completing their CTC studies. IT students' employment experiences while they were enrolled also constituted an important factor related to their employment outcomes. Working while attending a CTC was associated with a greater likelihood of employment, more hours worked, and higher earnings among IT students one year after leaving a CTC.

Earlier education was also an important correlate of

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subsequent employment and earnings. IT students who already had a bachelor's degree, associate degree, or some postsecondary education were more likely to be employed full time one year after completing their CTC studies. Likewise, the same categories of prior education were important predictors of earnings one year after completing CTC studies.

Students' age was negatively related to their employment outcomes. Perhaps older workers had a more difficult time entering the IT field relative to younger workers because younger workers either had or were perceived to have had more experience with recent technology.

Our findings support the notion that IT credentials attained at a community college are associated with valuable employment outcomes for students entering the labor market. Given the non-experimental nature of this analysis, however, we cannot assume causality between completion of particular kinds of preparation in IT and subsequent employment outcomes. While we controlled for as many factors related to employment as we were able to in the regression analyses, it is still possible that other unmeasured factors may have affected the employment outcomes.

### **Employment Outcomes by Local Labor Market and Employer Type**

IT students' employment outcomes one year after they left a CTC provide an indication of how they fared in the labor market. To put these outcomes in context, we examined IT students' employment outcomes across local labor markets and employer types and compared them with overall Washington State patterns of employment. Ultimately, we sought to identify particular labor market conditions where promising employment opportunities for community college IT students might be more likely to exist.

Given the unique focus on the IT industry in the Seattle area compared with the state of Washington outside the city, we first examined the role of the local labor market in IT students' employment outcomes. We defined the students' local labor market according to the CTC they last attended, since it provides an indication of their commuting patterns as well as the set of networks that they were likely to access in finding employment. The employment outcomes of IT students one year after leaving a CTC in the Seattle area were somewhat different from those of students outside it. They were slightly less likely to be employed (59.8% in Seattle versus 62.4% outside the city) and to be employed full time (41.6% versus 43.2%). They worked fewer hours per week (18.3 hours versus 21.9 hours) but had higher quarterly earnings (\$4,243 versus \$3,814). These differences illustrate the potential importance of the relationship between local labor markets and the value of education (Kolesnikova, 2009)

The size of IT students' employers, in terms of number of employees, provides insight into employment opportunities that students encountered in the labor market upon completing their CTC studies. Taken as a whole, IT students in our sample worked for employers that differed in size: about 40.9% worked in small firms (fewer than 100 employees), 23.9% in medium-sized

firms (100 to 500 employees), and a little over 35.2% in large firms (more than 500 employees). IT students in Seattle and outside Seattle were more likely than all workers (in both areas, respectively) to work for medium-sized employers and less likely to work for large employers. This difference may suggest some differences in how medium-sized firms utilize IT workers relative to large-sized firms, or it may suggest a preference for IT workers with other types of credentials, such as a bachelor's degree and/or an industry certification.

In addition to size, the type of industry of IT students' employers provides insight into the students' labor market experiences. IT students both in Seattle and outside Seattle were employed in a wide range of industries after leaving a CTC, the majority of which were industries whose main focus was not IT. In fact, only 16.8% of IT students in Seattle and 9.8% of IT students outside Seattle were employed in IT-related industries. It is important to note that our employment data were industry-based rather than occupation-based; IT students might have been performing IT-related roles for non-IT-related industries.

Compared with workers overall, IT students were more likely to be employed in IT-related industries, as would be expected. They were also more likely to be employed in temporary services and educational services industries. The relatively high employment in temporary services may reflect students' intentions to use these firms to gain entry into more permanent IT employment. The relatively high employment in educational services may reflect IT students' employment at their own educational institutions. They were less likely to be employed in the health care and construction industries than workers overall, perhaps reflecting the higher proportion of workers trained specifically in these industries. IT students were just as likely as workers overall to work in retail trade.

Beyond the differences between IT students and the overall workforce, IT students who completed different types of preparation at a CTC varied with respect to the kinds of employers that hired them. In terms of employer size, fairly similar percentages of IT students completing the four types of preparation were employed across small, medium, and large employers. Thus, employers of different sizes did not engage in notably different hiring behaviors that favored workers with certain educational outcomes over others; however, because our data included only subbaccalaureate credentials, we could not assess these credentials relative to other credentials that employers might prefer, such as a bachelor's degree or an industry certification.

In terms of type of industry, the four groups of IT students were employed in a similar range of industries. One notable exception is that IT associate degree and certificate holders and IT certificate holders worked for temporary services firms at higher rates than IT associate degree holders and IT concentrators. These same groups of IT students were also more likely to attend a technical college, so it is possible these colleges had stronger relationships with temporary placement firms, leading to their students' greater likelihood of working in this industry. Alternatively, temporary placement agencies may have preferred



students with a certificate because they viewed it as a proxy for the acquisition of more specific skills. The implications of a higher rate of employment in the temporary placement firms are unclear. The finding may indicate a somewhat unstable employment experience as workers move from placement to placement, or it may suggest a way for workers to connect to permanent employment opportunities at the sites of their temporary placement, as these employers “tried them out” on a temporary basis (Andersson, Holzer, & Lane, 2007).

## Conclusion

This study has shown that when controlling for a range of factors related to employment, students who earned credentials were more likely to be employed and to earn higher wages than those who did not get as far in their IT training. This finding reinforces the notion that community college credentials in IT are associated with positive employment outcomes for students, and it underscores the importance of promoting credential completion for community college students, at least those in IT programs.

The observed employment patterns also suggest that employers prefer students with more credentials. Students with both an IT associate degree and an IT certificate realized greater returns compared with students who completed only one credential or who concentrated in IT coursework. Having two credentials may indicate that a student has both broad skills (via the associate degree) and more specific skills (via the certificate). Further research should examine employers’ preferences for higher levels of educational credentials, such as the bachelor’s degree, and the reasons for these preferences.

With respect to how IT students from the CTCs fit into the Washington State labor market as a whole, they worked for employers varying widely in number of employees, but were employed by medium-sized employers more frequently than the overall workforce. While they worked in a range of industries, IT students were more likely than other workers to be employed in IT-related industries, as well as in temporary placement services and educational services. These findings raise questions about the implications of working in industries that employ high numbers of IT students, particularly the longer term career implications of working in the temporary services industry. Further research should examine the career progression of community college students who begin their post-college employment with specific types of employers, such as temporary agencies.

Because the findings of this analysis underscore the fact that certain employers are more likely than others to hire community college IT students, community college IT program staff may want to use data on student employment to help target their placement efforts with the types of employers that have hired their students in

the recent past. They may also want to conduct outreach with employers that have not previously hired many of their students in order to better understand employers’ needs and to demonstrate to them the value of their college’s programs.

This analysis demonstrates the need for a nuanced examination of community college students’ employment outcomes and the types of employers that hire students holding different but related subbaccalaureate credentials. While our study focused on information technology, it provides important evidence on employment returns that may be applied to other technical areas. Programs supporting technician education, such as the ATE program, may be able to harness similar state longitudinal data on students’ educational and employment experiences to gain knowledge about students’ pathways after leaving their own programs. This information could inform program improvement and the strengthening of connections with the labor market, thereby enhancing students’ career outcomes.

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