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Northeast Ohio Information Technology Workforce Report

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**EXECUTIVE SUMMARY OF KEY FINDINGS**

The Information Technology (IT) Workforce is Sizable

- There are an estimated 96,000 IT professionals employed in Northeast Ohio.
- Most IT departments are small. Only 21% of companies had IT departments with 10 or more employees.
- The most common IT professionals are: Business Application Specialists (31% of IT workforce), Programmers (13% of IT workforce), Network Specialists (7% of workforce), and Information Systems Analysts (5% of workforce).
- Churn among IT professionals has been relatively high in recent years.
- Approximately 31% of firms surveyed hired at least one IT professional in 2006.
- 44% of companies lost at least some of their IT workforce in 2006 while 25% of companies lost more than 10% during that period.
- At any given time, half of all employers with more than 25 employees are seeking to fill at least one IT position.

Employers Needs are Clear

- The greatest demand for IT workers in 2006 and 2007 were for Business Application Specialists, Programmers, Software Engineers/Architects, and Web Developers.
- Employers are also having a difficult time filling Programmer, Software Engineer/Architect, and Web Developer positions and, more importantly, the void of these professionals has a negative effect on company performance.
- Quality Assurance professionals are also considered difficult to fill and among the most important functions for company success.

Demand Out Paces Supply

- The system of higher education is not producing enough graduates to keep pace with employer demand for professional workers.
- 2007 job openings compared with the number of graduates produced from Northeast Ohio's system of higher education in academic year 2006-07 reveal the greatest gap is in the Enterprise Systems Analysis and Programming/Software Development career clusters which include Programmers and Software Engineers/Architects.
- Gaps between supply and demand are also sizable for Database Administrators, Web Development professionals, Technical Support specialists, and Network Systems personnel.
- Enrollment in IT programs is down from 21,174 in 2000/01 to 8,769 in 2005/06 and 9,243 in 2006/07. This means there are fewer students currently in the IT pipeline.
- While enrollment is down, graduation rates have been stable since 2000/01. There were 1,378 IT graduates in 2000/01, 1,363 IT graduates in 2005/06 and 1,311 graduates in 2006/07.
- The four public universities (Cleveland State University, Kent State University, University of Akron, and Youngstown University) are graduating the greatest number of IT professionals (711 in 2006/07).
- Public two-year colleges also have a significant role in the supply of IT professionals. In 2006/07 the four community colleges (Cuyahoga Community College, Lakeland Community College, Lorain County Community College, and Stark State College of Technology) produced nearly 400 IT professionals.
Work Experience is Paramount

- According to IT graduates, experience equals employment. Recent graduates were frustrated with the amount of work experience required by employers for specific jobs.
- “Real world” or hands on applications, projects, and opportunities were considered one of the most valuable components of the educational experience from the perspective of recent IT graduates who are now working in IT fields.
- Work based learning is a tool that allows employers to find future job candidates/workers and it also provides students with the opportunity to establish relationships with employers (i.e., further enhances the ability to find a job).
- According to the in depth interviews with employers, businesses want IT workers who can apply technical IT applications to the business setting. More important, many employers want applied experience within a specific industry sector since IT applications tend to vary by industry.
- The proportion of employers throughout Northeast Ohio who offer any kind of student work experience is low. Only about 20% of employers offered at least one form of work based learning experience in 2006.

(Continued on Pg. 3)
EXECUTIVE SUMMARY OF KEY FINDINGS (Continued)

Soft Skills Dominate

- Communication skills, project management skills, inability to apply IT applications to the business setting, and willingness to adapt/keep pace with change were among the primary skill deficiencies described by employers during in-depth interviews.
- HTML, Java, SQL, Visual Basic, XML, and C++ were among the programming applications that full-time IT employees depend on most within the workplace and should be integrated into teaching and learning.
- With respect to database skills, distributed database skills and other IT skills, no one application dominated the list as something that IT workers are “dependent upon”. However, several of the distributed database skills were noted to be used at least “occasionally” by the majority of IT workers including data warehouse applications, data mining applications, web-based programming, and client server programming.
- Soft skill development is paramount for IT workers as 100% of IT professionals use written communications, verbal communications, team work, business etiquette and time management skills within their existing jobs.
- Based on their experience within the workplace, recent IT graduates agreed that team building skills are essential. They also identified presentation skills as a critical need.
- Most IT jobs require a bachelor degree (65% of all job openings in July 2007).

Use of Non-Permanent Workers is Common

- Nationally, the use of non-permanent workers (like temporary workers or consultants) has increased steadily since 2001. The same is true of Northeast Ohio.
- In 2006, 22% of all companies surveyed used temporary workers in at least one of their IT occupations and 42% used consultants to fulfill IT work requirements.
- Temporary workers were used most often for Network Specialists and Programmer positions. IT consultants were used most often for networking and programming functions as well as web development and administration.
- Almost all companies who used IT consultants in 2006 also anticipate using them again in 2008.

IT Graduates Not Connected to Jobs

- Most often, employers recruit workers from other companies in Northeast Ohio and do not recruit individuals directly from school. This finding is also substantiated by the amount of churn or turnover that exists in Northeast Ohio for IT positions.
- Many institutions of higher education report dedicating more and more resources to career service offices, career/job fairs, and other mediums to help connect their graduates with the job market.
- IT graduates have tried to use on-line web sites like Monster.com or Careerbuilder.com with very little success. Only personal networks/referrals and internships are yielding job interviews and employment. In fact, most IT graduates did not believe there were gaps between supply and demand within this region because their job search processes were so difficult.
- Employers report little loss of IT workers to other areas of the state or nation. While the region is not currently losing IT workers, it is possible that this could occur in the future. Most IT graduates reported that they are not above relocating outside the region for better jobs and more competitive salaries.

Connections Between Employers & Educators Needed

- Overall investment in training and development of IT workers is low in Northeast Ohio. One-third of all companies dedicate no portion of their IT budget for worker training while one-half allocate anywhere from 1-2% for staff training. World class levels of investment are assumed at 3% or more.
- Few employers partner with education and training providers. Employers are very unlikely (92%) to have an arrangement with a community or technical college to provide specific training for employees.
- Considering that most IT staffs are relatively small within the region (i.e., 79% had 10 or fewer IT workers), we might expect a keen interest in partnering with other firms to design and implement specific IT training programs for workers. However, only 27% of all employers felt their participation was probable.
- Interest in a program to build a strong pool of entry level employees was less popular (16%).
- About one in four employers are interested in joining forces with other employers to provide feedback to area colleges on important skill sets for IT graduates.
- Interest in collaboration with other firms to recruit workers in limited supply from outside of Northeast Ohio was minimal at 11%.
The Northeast Ohio Information Technology Workforce Initiative recently conducted comprehensive research on the demand and supply of IT professionals in Northeast Ohio. While previous research indicated a reduction in demand for IT workers, recent feedback from employers suggests a renewed and growing demand for IT professionals and skilled workers across the region. This assessment was intended to test new assumptions about the IT job market and to improve our understanding about the talent related factors that contribute to our region’s ability to build a strong and vibrant Information Technology industry cluster.

In addition to supporting an analysis of supply and demand, the IT Workforce Initiative is interested in working with other stakeholder organizations to develop a roadmap or comprehensive action plan to ensure a strong, stable, and globally competitive IT workforce for Northeast Ohio. NorTech’s recently published report *Navigating the New Realities of the North Shore A Vision for the Technology Economy of Northeast Ohio in 2020*, identified existing strengths that must be leveraged and gaps in investment, talent, and innovation that must be filled to make the region one of the top ten places in the world to live, learn, work, and invest by the year 2020. The roadmap developed by the IT Workforce Initiative will build upon existing regional strengths and outline the steps necessary to fill some of the identified gaps. Key findings from this research have been used to establish a set of strategic priorities for Northeast Ohio. These priorities should feed the development of strategies and action steps the region can take to create a world class IT workforce for the region. Strategic priorities have been placed at the end of this report.

### Research Objectives

**Phase I: Literature Review & In-Depth Interviews with Employers**

- Identify emerging trends and issues in IT through a national and local literature review
- Create an occupational framework of IT specialty positions to be used when surveying employers about IT demand (i.e., Phase III below)
- Sharpen research questions through employer input
- Recruit employers to participate in the initiative so research findings can be more effectively translated into an action agenda for Northeast Ohio

**Phase II: Focus Groups with Education Providers & IT Graduates**

- Sharpen research questions with input from education/training providers
- Assess work experience of NEO’s IT graduates to better understand gaps in education/training and workplace applications
- Recruit educators to participate in the initiative so research findings can be more effectively translated into an action agenda for Northeast Ohio

**Phase III: Surveys of Employers & Higher Education Programs**

- Determine the number of recent job openings for IT specialists and the level of difficulty finding qualified applicants/new hires among NEO employers
- Assess IT educational requirements, screening/hiring criteria, and skill requirements for IT workers
- Determine the nature and level of investments in IT worker training by employers
- Understand ways in which employers are most likely to work with education/training providers to ensure programs meet business needs
- Inventory IT programs available throughout Northeast Ohio through institutions of higher education
- Document the supply of IT graduates from higher education programs and match figures with employer demand for new hires

**Phase IV: Create an IT Road Map for Northeast Ohio**

- Identify priority action areas that are informed and aligned with research findings
- Create strategies to address regional priorities
- Develop regional initiatives and action steps to create a world-class IT workforce for the region
- Identify champions (either existing initiatives/organizations or new champions) to take action
ABOUT THE STUDY (Continued)

Research Methods

PHASE I: Literature Review & In-depth Interviews with Employers
Two primary research methods were used to gather information during phase I. A comprehensive literature search was performed at national and local levels to identify trends and issues in IT talent development and to create an IT framework of occupations for use during phase III of the research. In addition to the literature review, a series of key informant interviews with employers were conducted to gather input about research objectives, industry targets, and occupational classifications for IT. Baseline information generated from the in-depth interviews was used to inform design of the employer survey. The interviews were also used as a tool to recruit employers who would be willing to review research findings, formulate recommendations, help craft an IT roadmap or workforce strategy for NEO, and take action to ensure the development of a quality IT workforce. The key informant or in-depth interview approach is qualitative in nature. The interviews were not meant to be statistically representative or projective to the broader population of business and industries in Northeast Ohio. Rather, the interviews were intended to be more open-ended and provide employers with the opportunity to help shape the research before quantitative methods were employed. Phase I of the research was performed by the Joint Center for Policy Research of the Public Services Institute at Lorain County Community College.

PHASE II: Focus Groups with IT Graduates/Workers & Educators
Five focus group discussions were conducted to assess educational and work related experiences of IT graduates. Focus group participants achieved certification in the IT field or held an associate, bachelor, or master degree in IT. A total of 26 graduates participated in the focus group discussions. Those indicating an interest to participate in the research but unable to attend a focus group were interviewed by telephone or in person. Telephone respondents were asked the same questions as those attending the focus groups. A total of six telephone interviews were conducted. Collectively, 32 graduates in IT-related fields participated in this phase of the research. In addition to the graduate focus groups, one group discussion was conducted with post-secondary education institution deans, professors, and department heads of IT-related colleges and departments. All focus group discussions were conducted by the Center for Public Management of the Maxine Goodman Levin College of Urban Affairs at Cleveland State University.

PHASE III: Employer & Higher Education Surveys
Employer Survey: Two types of businesses were targeted for the employer survey:
- ‘Core’ IT businesses of all sizes (i.e., those companies whose main product or service is information technology related like hardware, software, ISP service providers, etc.);
- ‘Non-Core’ businesses with more than 25 employees (i.e., those which use information technology somewhere in their product or service delivery process). Non-core industry targets included manufacturing, health care, professional services, communications, education, personal services, distributors, government, hospitality/entertainment, biosciences, instruments/controls/electronics (ICE), banking, and insurance.

Core and non-core businesses were selected for the survey since they draw on the IT talent pool within Northeast Ohio and both are affected by developments in technology itself.

A mail survey was deemed the most plausible and cost effective way to collect needed information. Employers were asked to review rather long lists of IT professions and skill sets and to tally numerous categories of workforce issues which would have made an on-line survey approach difficult. During the week of May 2nd, 2007 a total of 7,050 business executives were mailed a questionnaire via U.S. post. To ensure a representative sample, a second mailing of 1,000 questionnaires was sent on May 16th to those in industry sectors where we had a lower-than-average response rate. The last day of questionnaire receipt was June 5, 2007. Of the original 7,050 universe, 973 questionnaires were returned due to incorrect addresses or because they were non existent businesses. A total of 480 employers responded to the survey for an overall response rate of 7.9% (11% for Core IT establishments and 7.5% for Non-Core IT establishments). The overall margin of error was plus or minus 4.3%. The employer survey was conducted by Cypress Research Group.
**National Trends**

One of the most comprehensive sources of information about the demand for IT workers comes from the *Information Technology Association of America’s* (ITAA) survey of hiring managers in IT and non-IT firms. As is widely documented, IT jobs in the U.S. peaked in 2000 with significant employment losses in 2001. Since this time many have surmised how long it would take for IT jobs to rebound and how the nature of IT jobs might change over time.

According to ITAA, “the IT workforce appears to have bottomed out at the start of 2002” and by 2003 only very small gains in overall IT employment had been made (ITAA, 2003, p 3). In fact, the net gain (i.e., the difference between hires and IT workers dismissed) in the first quarter of 2003 was actually smaller than the net gain the last quarter of 2002. Additionally, ITAA reported that increases after 2001 could be attributed more to “a slow down in the rate at which workers were let go” than growth in new jobs (ITAA, 2003, p 4). Equally important, IT managers were much more pessimistic about hiring for 2004 than had been anticipated by most experts.

While a recovery in the demand for IT jobs by early 2004 was not evident, trends in the nature of IT jobs did surface. Additionally, some key differences between IT and non-IT companies were observed. In 2003, programmers/software engineers, technical support personnel, and systems specialists comprised the three largest categories of IT jobs in the U.S. However, technical support personnel had the largest net gains while network administrators experienced the greatest job loss (ITAA, 2003 p 5).

One of the additional benefits of the ITAA survey is its concentration on demand for IT specialists among both IT and non-IT companies. The 2003 survey revealed some very important similarities and differences between these two groups of employers. Most notable, nine out of ten IT workers were found in non-IT businesses, and non-IT companies were more likely to hire according to plan, less likely to move jobs overseas, and more likely to increase compensation for IT workers.

Despite decreases in overall IT employment well into the new decade, employment forecasts by the *Bureau of Labor Statistics* for 2004-2014 are optimistic. As projection data suggests, growth in IT jobs is anticipated to intensify throughout the U.S. Some experts refer to this as an “escalating” demand for technology-based workers and estimate as many as 20 million new high skill/high wage jobs across the U.S. economy by the year 2020 (Gordon, 2006, p 2). Given this demand, many economists expect severe labor shortages for highly skilled technology workers. They also feel labor shortages are eminent given a significant imbalance between too many lower skilled people and availability of many high-skill jobs. In fact, a 2002 U.S. study found that 60% of all jobs now being created require skills that only 20% of workers possess (Gordon, 2006, p 3).

**Regional Trends**

A report prepared for the *Ohio IT Alliance* by the *Ohio Economic Development Information Network* found that the Northeast Ohio region accounted for more than one third of the states IT employment in 2001 but, IT employment in the region was very low compared to the rest of the nation. In addition, a series of employer surveys were conducted for the region in 2000, 2001, and 2002. These surveys were conducted with IT firms and firms from other sectors known to have significant internal IT functions. Similar to the national survey of hiring managers, the 2002 employer surveys for Northeast Ohio did not reveal significant growth in IT related jobs for the region since the bottoming out of the IT industry in 2001.
Regional Trends

However, even at a time when demand for IT workers was not strong, there was some evidence of IT shortages within Northeast Ohio. A study completed in December 2001 entitled Supply of Information Technology Specialists Among Northeast Ohio’s System of Higher Education found gaps between supply and demand for specific IT clusters including Digital Media Technology (222 graduates compared with 148 job vacancies); Systems Development & Integration: Programming/Systems Analysis Emphasis (2,452 job vacancies and only 651 graduates); Networking Technology (744 job vacancies and 34 graduates); Information Systems Management (584 openings and 67 graduates); Software Development/Engineering (435 openings and 5 graduates); and Computer Systems Support/Maintenance/Repair (1,801 openings compared with 46 graduates).

Since 2001-02, no other comprehensive assessment on demand or supply of IT workers has been undertaken in Northeast Ohio. Given the pace at which technological advancements are made and changes in the market typically occur, this study is intended to provide a more current and accurate pulse on supply and demand for IT workers.

THE REGION’S IT WORKFORCE–What is the size and nature of Northeast Ohio’s IT Workforce?

While the IT industry was slow to recover from the 2001 recession nation-wide, today’s IT workforce appears to be robust in Northeast Ohio. There are an estimated 96,000 Information Technology professionals throughout the 16 county region. The most common occupations are Business Application Specialists, Programmers, and Network Specialists which together comprise 51% of all IT professions. It is estimated that 29,000 Business Application Specialists, 12,000 Programmers, and almost 7,000 Network Specialists are currently employed in Northeast Ohio.

Additionally, the region employs almost 5,000 Information Systems Operators/Analysts, almost 4,500 Project Managers, 4,500 Web Developers, and approximately 4,200 Technical Support (Help Desk) Representatives.

Job outlook for IT professionals is also solid. More than 10,600 IT workers were hired in 2007 compared to about 8,600 IT workers in 2006. Additionally, Northeast Ohio employers anticipate more than 11,700 job openings in the near future.

The original sampling frame for the employer survey was designed to maximize the likelihood of participating firms employing at least one IT professional. Most employers responding to the survey (79%) employed at least one IT professional. A majority of those employing at least one IT professional, however, had 5 or fewer IT professionals on staff (69%). Larger employers (i.e., with more than 100 employees) employed an average of 22 IT professionals while smaller firms (i.e., fewer than 100 employees) employed an average of 4 IT professionals.

When firms which employed at least one IT professional were examined by each of the 18 IT occupations, they were most likely to have at least one Network Specialists (40%), Business Application Specialist (35%), or Technical Support (Help Desk) (31%) on staff. Far fewer companies employed Technical Writers (9%), Technical Sales Professionals (10%) or Technical Support Representatives (Outside) (11%). These IT professions are employed primarily in Information Technology firms (as opposed to manufacturers, health service providers, education providers, biosciences, banking, insurance, etc.). Overall, this analysis reveals that large IT staffs are relatively uncommon in Northeast Ohio.

Note: The Bureau of Labor Statistics estimates that Northeast Ohio has about 31,000 IT jobs (from Table B5). This estimate is significantly lower than the estimated 96,000 IT jobs described in this report. The difference is in the occupations studied. The BLS data does not include Business Application Specialists, Project Managers, Product Managers, Technical Program Managers, Quality Assurance, Technical Sales, or Technical Writers – all of which were defined by employers throughout Northeast Ohio as critical IT functions.
2006 Hiring

Almost one-third of companies surveyed (31%) hired at least one IT professional in 2006. Furthermore, one in four companies lost more than 10% of their IT workforce during that year. This means it is possible that half of all employers with more than 25 employees are seeking to fill at least one IT position at any given time in our region.

Additionally, 55% of IT hires in 2006 were for new positions (not replacements for existing positions). Over half of all IT hires in 2006 were Business Application Specialists (20%), Network Specialists (11%), Programmers (13%), and Technical Support Representatives (Help Desk) (11%). Software Engineers comprised 8% of all 2006 hires while Web Developers/Administrators comprised 6% and Database Administrators 5%.

July 2007 Hiring

Similar to 2006 hiring, almost 60% of all job openings in 2007 were in the following five professions: Business Application Specialists (19%), Software Engineer-Architects (15%), Database Administrators (9%), Web Developers/Administrators (8%), and Programmers (7%).

Because it is more difficult to fill a position if the number of job openings is similar to the number of employed professionals, job openings were analyzed as a percentage of all IT positions in 2007. The analysis revealed that the positions most difficult to fill in 2007 were Quality Assurance & Testing, Software Engineer-Architects, Database Administrators, Technical IT Sales staff, and Technical Writers.

(Continued on Pg. 9)
Future Hiring

Almost half of all job openings (48%) anticipated in the near future are in four professions: Business Application Specialists (21%), Programmers (11%), Software Engineers-Architects (8%), and Web Developers/Administrators (8%). Like 2007 job openings, this data was analyzed to determine the IT positions that would be most difficult to fill. The analysis revealed that demand for workers would likely outweigh supply in three areas: Product Managers, Technical Sales, and Technical Writers – positions that are found most often in IT companies. Quality Assurance positions were also identified as one of the IT occupations that would be somewhat difficult to fill into the near future.

The survey also delineated those occupations which employers anticipated would be both difficult to fill and are most critical to company goals. Positions which were most difficult to find and considered extremely important to company success included: Software Engineers/Architects, Programmers, Quality Assurance/Testing, Systems Engineers, and Web Developers/Administrators. There were other occupations for which employers said it was difficult to find qualified workers including Digital Media Specialists and Technical Writers. However, the void of these employees for a certain period of time was not considered detrimental to company performance or success.

Comparison of Current & Future Demand

Overall, when the proportion of all job openings in 2007 are compared with future job openings, there is no shift in demand from one or more types of IT workers anticipated into the near future. The fourth column of the table below indicates no significant changes in the proportion of IT professionals needed, suggesting a stable near-future demand for IT workers.

Current and Future Demand Comparison

<table>
<thead>
<tr>
<th>IT Occupation</th>
<th>% of all July 2007 Openings</th>
<th>% of all Future Openings</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business Application Specialist</td>
<td>19%</td>
<td>21%</td>
<td>2%</td>
</tr>
<tr>
<td>Database Administrators</td>
<td>9%</td>
<td>6%</td>
<td>-3%</td>
</tr>
<tr>
<td>Digital Media Specialists</td>
<td>1%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>Information Systems Operators/Analysts</td>
<td>1%</td>
<td>5%</td>
<td>4%</td>
</tr>
<tr>
<td>IT Generalists</td>
<td>4%</td>
<td>6%</td>
<td>2%</td>
</tr>
<tr>
<td>Network Specialists</td>
<td>3%</td>
<td>6%</td>
<td>3%</td>
</tr>
<tr>
<td>Programmers</td>
<td>7%</td>
<td>11%</td>
<td>4%</td>
</tr>
<tr>
<td>Project Managers</td>
<td>3%</td>
<td>5%</td>
<td>2%</td>
</tr>
<tr>
<td>Quality Assurance &amp; Testing</td>
<td>6%</td>
<td>6%</td>
<td>0%</td>
</tr>
<tr>
<td>Software Engineer-Architects</td>
<td>15%</td>
<td>8%</td>
<td>-7%</td>
</tr>
<tr>
<td>Systems Engineers</td>
<td>4%</td>
<td>5%</td>
<td>1%</td>
</tr>
<tr>
<td>Technical Program Managers</td>
<td>5%</td>
<td>1%</td>
<td>-4%</td>
</tr>
<tr>
<td>Technical Support Reps (Outside)</td>
<td>1%</td>
<td>1%</td>
<td>0%</td>
</tr>
<tr>
<td>Technical Support Reps (Help Desk)</td>
<td>6%</td>
<td>3%</td>
<td>-3%</td>
</tr>
<tr>
<td>Technical Sales</td>
<td>3%</td>
<td>4%</td>
<td>1%</td>
</tr>
<tr>
<td>Technical Writers</td>
<td>3%</td>
<td>1%</td>
<td>-2%</td>
</tr>
<tr>
<td>Web Developers/Administrators</td>
<td>8%</td>
<td>8%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Employer Use of Non-Permanent Workers

Nationally, the use of non-permanent workers has increased steadily since 2001. The same is true of Northeast Ohio. In 2006, 22% of all companies surveyed used temporary workers in at least one of the IT occupations and 42% used consultants to fulfill IT work requirements. Temporary workers were used most often for Network Specialist and Programmer positions. IT consultants were used most often for networking and programming functions as well as web development and administration. Almost all of those companies who used IT consultants in 2006 also anticipate using them again in 2008.
IT Pipeline

Compared to the 2000/01 study on IT supply in Northeast Ohio, enrollment in IT programs is down (from 21,174 in 2000/01 to 8,769 in 2005/06 and 9,243 in 2006/07). This means there are fewer students in the IT pipeline. Associate degree enrollment has decreased while bachelor and graduate degree enrollment grew over the past 6 years.

Production of IT Professionals

While enrollment is down, production of IT workers is stable compared to 2000/01 (i.e., 1,378 graduates in 2000/01 compared to 1,363 IT graduates in 2005/06 and 1,311 graduates in 2006/07). This means fewer students may be in the pipeline but more of them are graduating from IT programs. Patterns by level of award are opposite enrollment trends. There has been an increase in associate degree graduates while fewer graduates are being produced at the advanced degree levels (even though enrollment is higher in these areas).

Supply and Demand Comparison

Technical Support Career Cluster

Technical support programs focus on maintenance of hardware and software components of an individual terminal or an entire network. They include both replacing hardware and helping to ensure software applications function properly. All programs in Northeast Ohio are offered at the certificate and associate degree level.

- Enrollment is lower than it was 5-6 years ago (i.e., 674 students enrolled in 2000/01 compared to only 230 students in 2006/07) but production of graduates is similar to what it was in 2000/01 (i.e., 46 graduates in 2000/01, 46 in 2005/06, and 44 in 2006/07). Fewer students are enrolling in technical support programs but community colleges are doing a better job of graduating those who are enrolled.
- Employer demand for technical support professionals is far greater than what Northeast Ohio’s system of higher education is producing. At the time the employer survey was conducted there were 74 job openings for technical support representatives (outside) and 668 openings for help desk personnel.

Technical Support Supply and Demand Comparison

(Continued on Pg. 11)
Supply and Demand Comparison

Network Systems Career Cluster
These programs prepare IT professionals who contribute to the initial installation of and continuing administration, analysis, and maintenance of a network system. Most programs are offered at the associate degree level.

- Network security is a new programmatic emphasis of many degree programs. These particular programs did not exist in 2000/01. This is an indication that colleges/universities are attempting to keep pace with changes in market demand.
- Both enrollment and graduate production have increased significantly in recent years which means the system of higher education is more responsive to demand for network specialists than it was just a half decade ago.
- However, employer demand still outpaces supply by a wide margin. In July 2007 there were a reported 371 job openings for network specialists among the 480 employers surveyed. These numbers do not include current job openings for systems engineers. In 2006/07, the Northeast Ohio system of higher education produced 100 graduates.

### Network Systems Supply and Demand Comparison

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<tbody>
<tr>
<td><strong>Career clusters defined by the National Association of State Directors of Career &amp; Technical Education Consortium</strong></td>
<td>IT Occupations related to IT Cluster</td>
<td># Hired in 2006</td>
<td># Full Time Openings July 2007</td>
<td>Anticipated # of Full Time Openings</td>
<td>#</td>
</tr>
<tr>
<td><strong>Network Systems: Design &amp; Administration</strong></td>
<td>Network Specialists Systems Engineers</td>
<td>961</td>
<td>371</td>
<td>662</td>
<td>812</td>
</tr>
</tbody>
</table>

Database Design & Administration Career Cluster
These programs equip students with expertise in organization, storage, and access of information. In 2000/01, database applications were embedded in other IT degree programs but stand-alone database administration programs were nonexistent. Today a few programs in this area of specialty are offered at the certificate and associate degree levels. At the time the employer survey was conducted there were a total of 965 job openings for database administrators yet in 2006/07 there were a total of only 26 graduates from these programs. This does not include, however, graduates of other IT degree programs where database applications are integrated into teaching and learning.

### Database Design and Administration Supply and Demand Comparison

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<thead>
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<tr>
<td><strong>Database Development &amp; Administration</strong></td>
<td>Database Administrators</td>
<td>446</td>
<td>965</td>
<td>669</td>
<td>66</td>
</tr>
</tbody>
</table>
Supply and Demand Comparison

Enterprise Systems Integration/Programming & Software Development Career Clusters
Enterprise systems integration/programming programs prepare IT professionals to oversee all aspects of an information system specifically as it pertains to optimization of the operations of a specific firm. Programming and software development programs prepare IT workers who are responsible solely for the development and analysis of software applications.

- The many computer science and information systems management degree programs that exist in Northeast Ohio are classified under this career cluster.
- Like other career clusters, student enrollment is down from what it was in 2000/01. Graduate numbers, however, are fairly stable.
- Northeast Ohio’s system of higher education is not producing enough graduates to keep pace with employer demand for these professional workers. In July 2007 there were 3,703 job openings for enterprise systems personnel (including business application specialists with 2,005 openings; product managers with 371 openings; project managers with 72 openings; technical program managers with 519 openings; information systems operators/analysts with 142 openings, and quality assurance/testing positions with 594 openings). Additionally, there were 742 job openings for programmers and 543 openings for software engineers. In 2006/07 approximately 833 students graduated from related programs which is significantly short of the graduates needed to fulfill employer needs.

Interactive Media Technology Career Cluster
These programs prepare IT workers to use various forms of communication. Some programs may specialize solely in artistic visual or video components or visual organization of information. Also included in this career track are web development and administration programs. These workers most commonly provide two or three dimensional animation or audio components for entertainment, media, advertisements, and other applications.

- Unlike most other career clusters, enrollment in interactive media technology programs has increased since 2000/01. The number of graduates produced in this career cluster has also improved in recent years.
- Supply of media technology professionals is more in line with employer needs. In 2006/07, there were a total of 245 graduates and there was a total of 141 job openings for related IT professionals at the time the employer survey was conducted.

(Continued on Pg. 13)
As might be expected, the four public universities (Cleveland State University, Kent State University, The University of Akron, and Youngstown State University) are producing the greatest number of IT professionals. Combined, they produced 711 IT professionals in 2006/07. Public two year colleges also have a significant role in the supply of IT workers. In 2006/07 four community colleges (Cuyahoga Community College, Lakeland Community College, Lorain County Community College, and Stark State College of Technology) produced nearly 400 IT professionals. Combined, the ten private universities responding to our request for information produced a total of 232 IT professionals in 2006/07. About half of these graduates came from Case Western Reserve University.
# Northeast Ohio Higher Education Enrollment and Graduation Rates

<table>
<thead>
<tr>
<th>Private Four-Year</th>
<th>Enrollment 05/06</th>
<th>Graduates 05/06</th>
<th>Enrollment 06/07</th>
<th>Graduates 06/07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ashland University</td>
<td>100</td>
<td>21</td>
<td>93</td>
<td>20</td>
</tr>
<tr>
<td>Baldwin Wallace College</td>
<td>109</td>
<td>19</td>
<td>88</td>
<td>25</td>
</tr>
<tr>
<td>Case Western Reserve University</td>
<td>382</td>
<td>125</td>
<td>392</td>
<td>132</td>
</tr>
<tr>
<td>Cleveland Institute of Music</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>College of Wooster</td>
<td>44</td>
<td>9</td>
<td>57</td>
<td>8</td>
</tr>
<tr>
<td>Hiram College</td>
<td>15</td>
<td>11</td>
<td>17</td>
<td>9</td>
</tr>
<tr>
<td>John Carroll University</td>
<td>38</td>
<td>14</td>
<td>26</td>
<td>13</td>
</tr>
<tr>
<td>Notre Dame College</td>
<td>27</td>
<td>12</td>
<td>22</td>
<td>10</td>
</tr>
<tr>
<td>Oberlin College</td>
<td>32</td>
<td>11</td>
<td>26</td>
<td>10</td>
</tr>
<tr>
<td>Ursuline College</td>
<td>65</td>
<td>11</td>
<td>52</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>(232)</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Public Four-Year</th>
<th>Enrollment 05/06</th>
<th>Graduates 05/06</th>
<th>Enrollment 06/07</th>
<th>Graduates 06/07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleveland State University</td>
<td>551</td>
<td>191</td>
<td>731</td>
<td>195</td>
</tr>
<tr>
<td>Kent State University</td>
<td>2038</td>
<td>234</td>
<td>2157</td>
<td>239</td>
</tr>
<tr>
<td>The University of Akron</td>
<td>1515</td>
<td>229</td>
<td>1504</td>
<td>181</td>
</tr>
<tr>
<td>Youngstown State University</td>
<td>841</td>
<td>119</td>
<td>792</td>
<td>96</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>(711)</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Public Two-Year</th>
<th>Enrollment 05/06</th>
<th>Graduates 05/06</th>
<th>Enrollment 06/07</th>
<th>Graduates 06/07</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cuyahoga Community College</td>
<td>1097</td>
<td>89</td>
<td>1069</td>
<td>95</td>
</tr>
<tr>
<td>Lakeland Community College</td>
<td>842</td>
<td>55</td>
<td>898</td>
<td>65</td>
</tr>
<tr>
<td>Lorain County Community College</td>
<td>229</td>
<td>78</td>
<td>453</td>
<td>86</td>
</tr>
<tr>
<td>Stark State College of Technology</td>
<td>841</td>
<td>135</td>
<td>864</td>
<td>122</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>(368)</strong></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grand Total</th>
<th>Enrollment 05/06</th>
<th>Graduates 05/06</th>
<th>Enrollment 06/07</th>
<th>Graduates 06/07</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>8769</td>
<td>1363</td>
<td>9243</td>
<td>1311</td>
</tr>
</tbody>
</table>

2000/01 data not available by institution.
I always find it surprising to hear a lot of companies are looking for IT people. It didn’t feel that way at all when I was looking for a job. And my peers felt the same way, too. If they’re out there, they’re not doing a good job of letting us know."

"But if you don’t have experience, how do you get your first job?...you have companies at these college career fairs and they want people with three to five years experience. Why do they [companies] even go there?"

“It would be nice if people who get higher-level degrees would get some kind of tangible reward for doing so, but the local market just won’t pay out for that. For someone who can already do programming, there’s no incentive to advance their education.”

JOBS MARKET ACCORDING TO IT GRADUATES—Is the gap between demand and supply corroborated by recent IT graduates?

While there appears to be a shortage of IT professionals in Northeast Ohio (at least for specific occupations), focus group discussions revealed that most graduates of IT programs perceive the job market to be rather poor within our region. Some described it as one where there are plenty of low-level “help desk” types of jobs or senior-level jobs, but not much in between. A clear consensus among these graduates is that the local IT job market is limited at best, and that it stacks up poorly against other cities and regions of the country. Graduates feel there are few large IT companies or companies with large IT departments in Northeast Ohio where greater numbers and varieties of jobs are available, salaries are competitive, and opportunities for advancement exist.

Views regarding the degree of difficulty in securing an IT job upon graduation were mixed. Nearly half of the graduates found it difficult to find employment, while the remainder had no difficulty in securing a job in the IT field. However, despite some graduates’ perception of having difficulty in finding a job, the majority spent less than six months finding an IT-related position. A number of graduates believe the job market as “saturated” with new graduates seeking IT jobs, thus making it difficult to find employment in the field. One graduate said he was “laid off several times” from various IT jobs before securing a more stable position with his current employer. Further, many of the graduates indicated that they did not get a sense that a large number of IT jobs were available. The graduates did not feel that available IT jobs are well advertised by companies, and if jobs are available, that this information is not reaching them. A small number of graduates noted that opportunities may exist but they are uncertain as to how to obtain information on these opportunities. In contrast, several of the graduates stated that they had no difficulty in finding a job upon graduation because they were either employed while attending school or participating in an internship that evolved to full-time employment. The graduates also stated that there are an abundance of “help desk” types of jobs available, but little demand for few other types of IT jobs.

The overwhelming consensus among graduates was that Northeast Ohio IT employers seek workers with a level of experience not typically found among new graduates. The graduates found that IT jobs were available requiring anywhere from three to seven years experience, yet new graduates have minimum experience in the field (even with internship experience). Further, two of the graduates said that it was much easier to find employment after they received their master’s degree, than upon graduation with a bachelor’s degree. One graduate observed that entry-level candidates appeal to some employers because they are thought to have an “untainted mindset,” but did agree that Northeast Ohio companies preferred experienced candidates.

IT graduates were also asked to characterize their current employment situation, and provide insight as to whether they aspire to obtain a different type of job in the IT field or another job in a different field altogether. With few exceptions, the graduates indicated that they are happy in their IT field of work and intend to continue in some type of IT-related job. Graduates said that they are interested in other IT areas such as project planning, network administration and design, forensics, and hardware and software engineering and research. Two of the graduates stated that their current job is not the type of job they originally envisioned, but the type of job that is a “good fit” for them and their skill set. Only one graduate intended to seek employment outside the IT field.

Participants described their current job as an initial step to advancement – either toward increased or diversified opportunities within the company or with another employer. Many of the graduates indicated that there were opportunities available for advancement that they would pursue with their current employers. A couple of graduates are attending graduate school to enhance their knowledge base and skill level to better prepare themselves for advancement opportunities.
**Employer Recruitment of IT Professionals**

Sources of IT recruitment were measured in two ways. Employers identified the source of their 2006 hires and they also described the geographic scope of their recruitment efforts in general. Most 2006 hires were drawn from other Northeast Ohio firms while about one-third of 2006 hires were recruited “directly out of school.” Relatively few 2006 hires were drawn from outside of the region. There were very few differences by educational attainment of IT workers and sources of hiring.

In general, the vast majority of companies recruit at least some of their IT workers from Northeast Ohio (95%). About one-third of all employers (32%) also recruit workers from outside the region while one-quarter recruit IT workers from out of state. Pittsburgh is a more common location than are the east coast or west coast.

**Job Search Methods Among IT Graduates**

Of the methods utilized by the graduates to seek employment in the IT field, only personal networks and internships were considered effective for yielding interviews and securing jobs. A large number of graduates found employment when personally referred for an available position by a friend already working within the company, or by a friend knowing someone within the company. Those graduates who worked as interns while working toward their degrees said that these internships generally led to an offer for full-time employment. However, some of the graduates did note that these internships were difficult to obtain. One respondent said he was unable to secure an internship in Cleveland over a four-year period. Others indicated that they had friends who found it difficult to get internships in the IT field as well.

While the majority of the graduates utilized online methods to seek employment, there was consensus among graduates that this method was the least effective. Graduates accessed web sites such as Monster.com and CareerBuilder.com to post resumes and access available positions with few results. Only one graduate noted success through an online mechanism. Additionally, the graduates said they searched for IT positions by scanning newspaper and business classified advertisements, accessing online company and university postings, attending school and community career fairs, contacting headhunters, and working with school career services offices, advisors, and professors. However, only one graduate cited a career fair as beneficial in locating an IT job.

**Role of Educators in Connecting Graduates with IT Jobs**

Roundtable discussion with post-secondary education institutions revealed that many stiff offer the traditional job placement mechanisms (career fairs, job boards, placement offices), but have added newer placement mechanisms in an effort to better connect IT graduates with job opportunities. With regard to *formal mechanisms*, the institutions cited on-campus resources such as job placement departments and Career Service Centers, job and career fairs (both campus-wide and specifically for IT graduates), and employer presentations and visits. Job and career fairs are also held off campus at various locations. One institution representative stated that graduates have indicated an interest in virtual job fairs as an alternative for those unable to attend site functions. Additionally, most of the institutions participating in this focus group are partners in the College 360 Program, an online portal to education, employment, and social opportunities available to students in Northeast Ohio.

(Continued on Pg. 17)
Role of Educators in Connecting Graduates with IT Jobs

Internships, co-op programs, and partnerships with local companies were also mentioned as other mechanisms used to help students find jobs, primarily through gaining valuable work experience and establishing contacts with local companies. Online mechanisms where resumes and job postings are available through Internet access were also mentioned as resources used to help students find work. Blackboard sites are also utilized, as well as the creation of a database of student skills, which is used to match job candidates with prospective employers.

Some of the focus group institutions mentioned companies hosting mixers and social events as opportunities for IT students to meet and network with prospective employers. Specifically noted were the digital mixers once sponsored by NEOSA, which were viewed as successful in connecting IT students with employers. One respondent also stated that IT students are invited to attend mixers where they can meet and network with company representatives that comprise the university’s Center for E-Business Board of Directors.

Informal approaches included announcing job opportunities in classes, referrals of opportunities from alumni, employers contacting professors and IT departments and asking them for job candidate referrals, emailing job notices to students, and networking online with other educational institutions. One participating institution interacts with employers monthly to assess their needs and discuss the institution’s curriculum. Another institution also utilizes the assistance of the student chapter of a computer technology organization to help IT graduates find employment.

Also with regard to job placement and recruitment, focus group participants were asked how their institutions have altered their job placement and recruitment methods over time, and to identify significant changes from methods utilized in the past. The majority of the institutions indicated improved and streamlined procedures with campus Career Services and Job Placement Offices. Improved communications and sharing of employment information between IT departments and Career Services offices have helped to keep graduates better informed. The institutions also indicated increased participation from companies in sponsoring internships and co-op programs that offer opportunities for employment, as well as campus presentations and visits to help spark interest among students. One institution calls for an internship as part of its Capstone Course, where external contacts, projects, and community service is required. The participants also indicated an increased use of technology (e.g. blackboards and online postings) to reach out to students. Another institution said that one significant change observed over time is that companies are reaching out directly to students more so than in the past, and that students are receiving multiple job offers from companies before they graduate.

IT Staff Turnover

Employee turnover among IT workers in Northeast Ohio is high. While more than half of all companies surveyed (56%) retained all of their IT workforce in 2006, one in four companies had more than 10% of their IT workforce turn over that same year. The greatest amount of employee churn was for Quality Assurance/Testers, Software Engineers-Architects, and Technical Support Representatives (Help Desk).

It is commonly feared that workers who are trained in Northeast Ohio are often lost to other regions of the U.S. Numerous studies have suggested that this is less common than initially thought and this data corroborates that notion. Almost two-thirds of IT workers who left did so to work at another company within Northeast Ohio. Only 11% of IT workers who left their position did so for a company outside of the region. In fact, retirement and “other” reasons were more common than leaving a Northeast Ohio company for an employer outside of the region.
Retention of IT Graduates

While employer data supports the notion that few IT workers in Northeast Ohio are lost to other regions of the U.S., focus group discussions with IT graduates revealed that recent graduates don’t rule out relocation for better opportunities elsewhere. While a number of participants indicated that they wanted to remain in Northeast Ohio, most also agreed that they would leave the region if the right opportunity became available elsewhere. The graduates cited Northeast Ohio’s “lukewarm” IT job market as a reason for seeking better opportunities. A number of graduates indicated that they did not feel the market would support profitable opportunities for IT workers. For these graduates, better opportunities translated to a greater number of jobs being available in a variety of IT areas with room for advancement and additional responsibility, as well as competitive salaries and benefits. Additional reasons cited by graduates for relocating were warmer climate, being transferred to another company location, or furthering their education elsewhere. If they were to relocate, the graduates stated that they would most likely seek employment in the Carolinas and along the East Coast.

Many of the graduates, while choosing to remain in Northeast Ohio, did apply outside of the region for IT employment. In most cases, several chose to remain in Northeast Ohio primarily because of family ties or because their spouse had a career here. Other considerations cited by graduates for remaining in Northeast Ohio included a lower cost of living here than elsewhere, good learning experiences here based upon their current employment, and the inability to relocate due to financial constraints. Further, several of the graduates, although employed, have responded to job opportunities outside of Northeast Ohio. These graduates said that they chose not to relocate primarily due to the fact that they are happy with their current employers and are challenged in their work. A small number of graduates left Northeast Ohio upon graduation, but returned to the area because they experienced a similarly difficult IT job market elsewhere, or because of family reasons. Two non-native Ohioans relocated to the region from warmer climates – Alabama and California. The former Alabama resident located to the region after being hired by a Northeast Ohio software development firm. The former California resident came to Northeast Ohio to attend college but remained due to the region’s lower cost of living.

EMPLOYER SKILL REQUIREMENTS—What kind of skills are employers looking for & how does this compare with post-secondary preparation of IT graduates?

Educational Requirements (Employers)

A bachelor degree was the most common educational requirement for open positions in July 2007 (65% of all job openings). More than one-quarter of all openings required a certificate (10%) or associate degree (17%). Few positions in 2007 required a graduate degree (4%).

IT Skill Deficiencies (Employers)

Prior to design and implementation of the employer survey, a series of in-depth interviews were conducted with more than 30 employers from different industry sectors of Northeast Ohio to secure their input into overall research design. As a part of these interviews, employers were asked about skill deficiencies in IT job applicants, new hires, and incumbent workers. The findings were not meant to be representative of employers across Northeast Ohio but rather to inform the design of the employer survey.

Throughout these conversations, employers described communication skills as a primary deficiency in job applicants and new hires. Project management, work experience, and the ability to apply IT to business applications were also commonly mentioned.

Similarly, inability and unwillingness to keep pace with change (i.e., give up old software for new, greater flexibility, and willingness to adapt), lack of communication skills, and lack of understanding for overall business applications were described as skill deficiencies among incumbent IT workers.

Employers expressed a strong desire to assess IT business applications at the industry level so that IT professionals could be better prepared to apply IT skills within the company. This theme was also heard when employers were asked to comment on the occupational classification and they identified “business technologists/analysts/application specialists” as an additional broad IT function to probe.

(Continued on Pg. 19)
EMPLOYER SKILL REQUIREMENTS (Continued)

Critical Skills Employers

Building on in-depth interview findings, the employer survey measured critical technical and soft skill requirements for IT workers of Northeast Ohio. When probed about technical programming languages, no particular program dominated the list. The most common languages are HTML, Java, SQL, Visual Basic, and XML. C++ is also common when all types of C++ programs are considered.

With respect to database skills, distributed database skills, and other IT skills, no one skill dominated the list as something which IT workers “depend on”. However, several of the distributed database skills were noted to be used at least “occasionally” by the majority of IT workers including data warehouse applications, data mining applications, web based programming, and client server programming. This suggests that academic programs should integrate a strong base of these skills into teaching and learning.

Critical Programming Skills

<table>
<thead>
<tr>
<th>Programming Applications</th>
<th>Full-Time IT Employees who depend on</th>
<th>Full-Time IT Employees who use occasionally</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active X</td>
<td>8.7%</td>
<td>19.6%</td>
</tr>
<tr>
<td>ADA</td>
<td>0</td>
<td>1.0%</td>
</tr>
<tr>
<td>Assembler</td>
<td>1.9%</td>
<td>1.3%</td>
</tr>
<tr>
<td>Basic</td>
<td>2.2%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Borland C++</td>
<td>0.3%</td>
<td>3.5%</td>
</tr>
<tr>
<td>C</td>
<td>8.0%</td>
<td>5.8%</td>
</tr>
<tr>
<td>C++</td>
<td>14.4%</td>
<td>8.0%</td>
</tr>
<tr>
<td>COBOL</td>
<td>7.7%</td>
<td>6.7%</td>
</tr>
<tr>
<td>FORTRAN</td>
<td>1.3%</td>
<td>2.9%</td>
</tr>
<tr>
<td>HTML</td>
<td>33.1%</td>
<td>35.0%</td>
</tr>
<tr>
<td>Java</td>
<td>24.7%</td>
<td>17.3%</td>
</tr>
<tr>
<td>MSJ++</td>
<td>0.3%</td>
<td>1.6%</td>
</tr>
<tr>
<td>MS VC++</td>
<td>4.5%</td>
<td>3.9%</td>
</tr>
<tr>
<td>Oracle Dev 2000</td>
<td>11.9%</td>
<td>6.7%</td>
</tr>
<tr>
<td>PERL</td>
<td>3.2%</td>
<td>7.4%</td>
</tr>
<tr>
<td>PHP</td>
<td>2.6%</td>
<td>8.3%</td>
</tr>
<tr>
<td>RPG</td>
<td>1.9%</td>
<td>2.6%</td>
</tr>
<tr>
<td>SQL</td>
<td>43.3%</td>
<td>36.3%</td>
</tr>
<tr>
<td>Symantec C++</td>
<td>0.3%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Visual Basic</td>
<td>24.4%</td>
<td>22.5%</td>
</tr>
<tr>
<td>Visual C++</td>
<td>10.6%</td>
<td>7.1%</td>
</tr>
<tr>
<td>Visual J++</td>
<td>3.9%</td>
<td>4.5%</td>
</tr>
<tr>
<td>XML</td>
<td>21.2%</td>
<td>15.4%</td>
</tr>
<tr>
<td>Other</td>
<td>15.1%</td>
<td>0.9%</td>
</tr>
</tbody>
</table>

Similar to the in-depth interviews with employers, the quantitative survey revealed that soft skills are paramount for IT workers as 100% of IT professionals use written communications, verbal communications, grammar, team work, business etiquette, and time management skills in their existing jobs.

Critical Database Skills

<table>
<thead>
<tr>
<th>Database &amp; Distributed Database Applications</th>
<th>Full-Time IT Employees who depend on</th>
<th>Full-Time IT Employees who use occasionally</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oracle DB</td>
<td>13.2%</td>
<td>17.0%</td>
</tr>
<tr>
<td>Sybase</td>
<td>2.6%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Other IDE</td>
<td>10.6%</td>
<td>1.6%</td>
</tr>
<tr>
<td>Data Warehousing</td>
<td>10.3%</td>
<td>74.2%</td>
</tr>
<tr>
<td>Data Mining</td>
<td>4.2%</td>
<td>69.0%</td>
</tr>
<tr>
<td>Web Based Programming</td>
<td>32.7%</td>
<td>83.5%</td>
</tr>
<tr>
<td>GUI</td>
<td>7.4%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Graphic Visualizations</td>
<td>5.8%</td>
<td>4.2%</td>
</tr>
<tr>
<td>Client Server Prog.</td>
<td>26.6%</td>
<td>76.7%</td>
</tr>
<tr>
<td>Concurrent/Distributed Prog.</td>
<td>0.3%</td>
<td>1.3%</td>
</tr>
<tr>
<td>Mainframe Prog.</td>
<td>12.2%</td>
<td>2.6%</td>
</tr>
<tr>
<td>Scientific Engineering Prog.</td>
<td>6.1%</td>
<td>6.4%</td>
</tr>
<tr>
<td>Embedded/Real-Time Programming</td>
<td>2.6%</td>
<td>2.2%</td>
</tr>
</tbody>
</table>

Other Critical Skills

<table>
<thead>
<tr>
<th>Other Skills</th>
<th>Full-Time IT Employees who depend on</th>
<th>Full-Time IT Employees who use occasionally</th>
</tr>
</thead>
<tbody>
<tr>
<td>Windows NT</td>
<td>51.0%</td>
<td>90.2%</td>
</tr>
<tr>
<td>UNIX</td>
<td>23.1%</td>
<td>76.4%</td>
</tr>
<tr>
<td>Structured Analysis</td>
<td>3.9%</td>
<td>5.5%</td>
</tr>
<tr>
<td>Object Oriented Methods</td>
<td>4.8%</td>
<td>8.7%</td>
</tr>
<tr>
<td>UML</td>
<td>7.7%</td>
<td>7.1%</td>
</tr>
<tr>
<td>Written Communications</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Verbal Communications</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Grammar</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Team Work</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
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<td>35.0%</td>
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<tr>
<td>Business Etiquette</td>
<td>100.0%</td>
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Importance of IT Work Experience (Employers)

Throughout the in-depth interviews, employers expressed frustration over the ability to find candidates with a sufficient amount of work experience which is probably why many of them recruit IT professionals from other companies across the region instead of from the region’s schools, colleges, and universities. A key question is then whether or not employers are actively involved providing work based learning experience for students.

Based on employer survey data, it is estimated that there were approximately 6,400 work experiences in the form of internships and co-ops for students (both paid and unpaid) in 2006. However, the proportion of employers who offer any kind of student work experience is low. Only one in five employers offered at least one type of work based learning experience in 2006.

The importance of work based learning experiences for students cannot be emphasized enough. Recognizing that offering students these experiences requires allocation of resources, it is also important to recognize that those resources are returned to Northeast Ohio employers since few trained IT workers leave the region for employment elsewhere. In other words, employers have an important role in building a world class IT workforce through work based learning and they can be assured that this effort is a good investment for the region. Companies may not see an immediate direct benefit from all student work experiences they provide, but the region as a whole benefits greatly and such efforts impact all employers positively at the same time.

Post-Secondary Preparation (IT College Graduates)

As discussed earlier, IT graduates were extremely frustrated with the work experience requirements of employers and claimed this significantly handicapped their ability to find a job. In addition to their experience trying to secure employment, all graduates were asked to discuss how well their education/training prepared them for an IT career. They were asked to specifically discuss ways in which the curricula contributed to their knowledge and skill set to help them become competitive in the IT job market.

The views among respondents were mixed. While some indicated their college level instruction and training was beneficial, others indicated both could be improved or enhanced in some way. A small number of graduates stated that their post secondary experience provided the context needed for an IT career, with a blend of applied and theoretical knowledge.

The majority of the graduates, however, noted that in many instances their post-secondary course work did not completely prepare them for work in the IT field. Some of the graduates stated that the curricula taught at their post secondary institution was not relevant or transferable to the business environment and was more grounded in theory than technical application.

In most instances where degree areas centered on management, quality assurance, or business administration, the graduates stated that their post-secondary education generally provided the necessary concepts and a sound knowledge base, yet the course work “had little to do with the job” and that most of what they learned came from outside the scope of the classroom. Further, the respondents stated that they had to independently learn the more in-depth aspects of the course work on their own.

In instances where degree areas centered on programming, software development, networking, and multimedia, the graduates stated that while their post secondary education provided them with the basic concepts, their education was not sufficient in preparing them for an IT career. The graduates
Employer Skill Requirements (Continued)

Importance of IT Work Experience (Employers)

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In instances where degree areas centered on programming, software development, networking, and multimedia, the graduates stated that while their post secondary education provided them with the basic concepts, their education was not sufficient in preparing them for an IT career. The graduates indicated that there was a gap between the curriculum thought to be current and the technology in use today. Graduates felt that curriculum changes are not made in a timely fashion to keep pace with the changing nature of the IT field. They additionally noted that they found the equipment and software applications outdated, and expressed concern that professorial knowledge seemed limited and professors were not up-to-date on current aspects of the IT field. One graduate perceived that there are also gaps in the IT curriculum across colleges and departments. In particular, the graduate stated that curriculum for degree programs should interface because the IT field is “not just about computers.”

Hands-on experience was considered a more valuable asset than formal classroom education. Consensus among graduates seemed unanimous that getting as much hands-on practical experience as possible was essential in preparing them for an IT career and helping them find a suitable position within their field. In particular, those aspects of college-level curriculum that involved labs and projects where students would work in tandem to address a practical need for employers were frequently cited as beneficial. Graduates emphasized that internships, co-op programs, and project-oriented classes where student “teams” meet with employers to solve problems or make site visits to businesses to observe operations.
were valuable components of a college-level IT program. The team building exercises, noted the graduates, offered opportunities to experience the dynamics of interacting with others to bring a project to completion – differing personalities, working together to meet deadlines, motivating other team members, decision-making, delegating responsibility, and time management. Additionally, graduates stated that “cyber challenges” – collegiate competitions with other states – were helpful in sharpening technological knowledge and seeking creative solutions to problem simulations.

While consensus among graduates consistently echoed the view that experience is more important than the degree, it was also mentioned that job offers could be contingent upon a candidate completing a degree. Further, the graduates also pointed out that a strong grade point average is necessary to be considered for some jobs.

### INCUMBENT WORKER TRAINING—What are the sources of, and investments in IT training regionally?

#### Sources of Incumbent Worker Training

Training of incumbent IT workers are fulfilled through a variety of sources. One in five employers (21%) had at least one staff member who was dedicated to the training of IT workers either on a full or part-time basis. Seventeen percent of firms had at least one full-time staff member dedicated to training while 13% had at least one part-time person for training of IT employees. When the number of employees dedicated to the training of IT workers is summed and compared with the number of IT professionals in the region, about 3% of the IT workforce is focused on IT training.

#### Employer Investments in IT Training

When asked to report the proportion of training efforts which are “informal, on-the-job” or formal training by “outside firms” (on or off-site), on-site formal training was the least common (9% by outside firms and 14% by in-house staff). Informal “on-the-job” training comprised about one-third of all training efforts. Almost half of all training was accomplished off-site by either training firms or manufacturers of IT technology.

Employers were also asked about the proportion of their IT budgets committed to training on an annual basis. One-third of all employers allocate no financial resources to the training of their IT staff.

#### Employer Investments in IT Training

Half allocate some financial resources but it is still a small percentage of overall IT staff payroll that is dedicated to training (i.e., 1-2%). World class levels of investment in training and development of IT workers is assumed to be at 3%+ but only 16% of Northeast Ohio companies invest at this level.

#### Professional Development Among IT Graduates

When asked how the scope or function of their jobs in the IT field has changed over time, the majority of the graduates said they have experienced increased responsibilities leading to leadership and management opportunities. A small number of the graduates quickly advanced to management levels, while others advanced incrementally. Companies that promote team environments offered advancement opportunities through project management leadership, team leadership, and oversight of multiple teams. Graduates indicated that additional responsibilities such as oversight of Macintosh computers (in addition to those Windows-based), an increase in oversight of the number of computer users (from one department to multiple departments), devising and creating new product ideas, resolving product development issues, and management of projects have altered the scope of their work environment.
Professional Development Among IT Graduates

With the increased responsibilities came the need for training and development in specific areas such as making presentations, facilitating meetings, technical and business writing, coordination and management of projects and multiple tasks, and providing internal training to fellow employees. The graduates found training in these areas valuable to the performance of their jobs. The training in these areas was not only encouraged by their employers, but in most cases, subsidized by them as well.

Further, the graduates indicated that the constantly changing IT environment demands that they keep up-to-date on the latest technology. The graduates noted that they are continuously learning and developing new technological skills, the majority of which are learned while on the job rather than through formal training programs. Additionally, the graduates found it satisfying that the constantly changing IT industry presents situations where they are challenged on the job to formulate their own solutions and work through production problems.

A small number of the graduates emphasized that higher-level degrees were essential in the IT field. Graduates with an Associate’s degree stated that it was “not enough,” and that it was necessary to obtain a higher-level degree to gain deeper knowledge and skills and to be competitive. Additionally, two graduates said that the job they now perform (as compared to their first job) has evolved into one that reflects their area of expertise. Only one graduate indicated that very little change had occurred over time in his IT employment.

The graduates indicated that training, in addition to the knowledge and skills acquired from their post secondary institution, was essential to their employers during their tenure in the IT field. In all cases, the employers provided both internal (taught onsite by employer personnel) and informal (workshops, seminars) training, and more formal training through certification and degree programs. The majority of the employers subsidized most of the training programs.

Nearly all graduates have received some type of training toward professional certification, such as those of the Computing Technology Industry Association (CompTIA A+, CompTIA Certified Document Imaging Architech, and others) and the Association for Automatic Identification and Mobility. Many of the graduates cited their best training as being received on the job and through their own devices, such as through reading books and manuals, online research, and manipulating software.

“In IT, you must be dedicated to being a student the rest of your life.”

“When technology changes, it also changes how you think about problems… complications, how you deal with it and manage it.”

“If your school doesn’t teach you to learn other technologies, you’ll have a hard time in this industry.”
Additionally, a small number of graduates described discrepancies with job description postings as impediments to locating IT employment. The graduates emphasized that the degree and professional certifications are not as attractive to employers as is practical experience – experience in networking, applications, programming, databases, product development, and most aspects of the IT field. The graduates found that internships were also difficult to acquire if the candidate had little or no experience.

When asked to identify any barriers or issues experienced since working in the IT field, graduates reiterated the lack of job opportunities for those with little hands-on, technical experience. Many said that companies prefer experienced candidates, those with years of experience over entry level knowledge (as that of a college graduate). The graduates emphasized that the degree and professional certifications are not as attractive to employers as is practical experience – experience in networking, applications, programming, databases, product development, and most aspects of the IT field. The graduates found that internships were also difficult to acquire if the candidate had little or no experience.

The majority of the graduates cited the lack of opportunities in the Northeast Ohio job market as another barrier for IT employment. It is the perception of the graduates that opportunities will continue to be limited for IT job candidates unless more IT related companies invest in the Northeast Ohio region. The graduates indicated that Northeast Ohio does not “grow” IT companies that provide competitive and challenging opportunities for those in the IT field. Without IT related companies (those with IT functions or departments) basing their operations in Northeast Ohio, the graduates perceive that competition will increase for the limited number of opportunities available, causing candidates to seek employment outside of the region. Further, the graduates stated that as students, they were not aware of the IT opportunities that existed. Additionally, the graduates said that areas for advancement within the IT field are unknown to them and that they are uncertain as to where to seek IT opportunities within the region.

The graduates contend that, in some instances, their post secondary institutions did not fully prepare them for employment in the IT field. A large number of the respondents indicated an increasing demand for soft skills in the work place. These types of skills, according to the graduates, were not necessarily demonstrated in their course work. The graduates emphasized a need for skills such as project management, managing multiple tasks, leading teams, presentation skills, technical writing and communications, and facilitating meetings that should be included as part of an IT curriculum. Some of the graduates pointed out that higher education institutions should also offer course work or professional development training on how to be more flexible in the work place – the problem solving, management, and prioritization of multiple tasks.

Many of the graduates stressed that post secondary degree programs should be designed to allow for a mix of course work in business and user applications. For example, the graduates noted that a degree in software development should include course work in other technologies such as Internet security, database design, programming, networking, and operating systems. Also stated was the need for students to have more exposure to practical (as opposed to theoretical) technologies and exposure to technologies used in today’s IT market. The graduates emphasized that the IT equipment and software need to constantly be updated to better enable them to be competitive when they enter the job market.

Additionally, a small number of graduates described discrepancies with job description postings as impediments to locating IT employment. They found that employers were either too general or too specific in the descriptions posted for IT jobs. Some of the graduates said that this led to confusion between the tasks described and the tasks to be performed on the job. Some graduates also indicated that some job postings might require more experience than is necessary for the position. Further, the graduates perceived that when developing descriptions for jobs, companies do not consider the transferability of skills or experience. For example, if the job calls for experience with a specific programming language but the candidate has experience with several more complex languages but not the one required, companies often do not consider that the candidate could learn the new language based on his/her prior knowledge other languages.

Another barrier noted by graduates working in the IT field was the miscommunication between human resources personnel and IT managers. The graduates stated that human resources personnel conducting interviews seek different skill sets than those required by the IT managers. Also, the graduates indicated that human resources personnel are not familiar with as to how the IT manager wants a particular set of skills applied on the job, and thus, are not able to convey this to the candidate. Further, the graduates contend that the methods in applying for IT jobs through human resources personnel as opposed to an IT manager differ, and could present obstacles to obtaining and filling the job. As an example, one graduate applied for a programming job and was asked to program with a paper and pencil rather than with a computer, limiting his ability to exhibit his programming knowledge.

(Continued on Pg. 24)
SUMMARY OF ISSUES ACCORDING TO IT GRADUATES (Continued)

The graduate stated that some employers are reluctant to train entry-level candidates; therefore, the candidates are not able to gain the needed experience required for the job. As a result, a small number of graduates indicated that they have experienced bias by some employers with regard to being young in age. The graduates said they were told that not only did they not have the necessary experience, but also the employees they’d supervise would not work with them or respect them because they were younger in age. Further, the graduates said they have experienced situations where an older employee was not receptive to them due to being a younger employee.

An interesting issue discussed by the graduates was that some IT jobs are considered assets to a company while others are considered liabilities. In software development companies, IT workers are considered assets because these employees are perceived as the production and brain thrust of the company, and as such, generate revenue. In other types of organizations, such as financial institutions, IT workers are considered liabilities because they generate expenses to the company. Thus, as an expense, these IT employees are under pressure to do things “better, faster, and cheaper.” As a result, these graduates are uncertain about job security.

REGIONAL PARTNERSHIPS—Do the partnerships exist to build a world class IT workforce?

Existing Partnerships

Despite a strong call for greater alignment between employers’ needs and recent graduates’ skill sets, few employers (29%) partner with education and training providers. This may be due to the lack of perceived benefit from such programs, lack of opportunities to participate, or inability of educational systems to reach local employers. Whatever the reason, employers are very unlikely (92%) to have an arrangement with a community or technical college to provide specific training for employees.

Willingness to Collaborate

Interest among employers in participating in activities which bolster the area’s IT workforce is moderate. Considering that the size of most IT staffs are relatively small in Northeast Ohio (79% of employers had 10 or fewer IT workers even when larger firms were sampled), we might expect a keen interest in partnering with other firms to design and implement specific IT training programs for employees. While there is the greatest amount of interest within this area, only 27% of all employers felt their participation was probable. Interest in a similar program to build a strong pool of entry level employees was less popular (16%). About one in four employers are interested in joining forces with other employers to provide feedback to area colleges on important skills sets for IT graduates while collaboration on recruitment of IT workers from outside Northeast Ohio was of least interest to employers (11%).
Based on research findings, the following strategic priorities will help to significantly strengthen IT workforce conditions within Northeast Ohio. These priorities should be considered when developing a road map to address the gaps in talent that must be filled to make the region one of the top ten places in the world to live, learn, work, and invest by the year 2020.

**STRATEGIC PRIORITY:**

Increase the quantity of qualified IT professionals to meet employer needs for these occupations: Business Application Specialists, Programmers, Software Engineers/Architects, and Web Developers/Administrators.

When considering the types of IT workers that are in greatest need in Northeast Ohio, particularly as it relates to employer productivity and competitiveness, there is a need to consider the similarities and differences between the most common IT jobs, IT jobs with greatest numbers of job openings, and IT jobs that employers have the most difficult time filling.

(Continued on Pg. 26)
Business Application Specialists represent the most common IT profession in Northeast Ohio and are among the occupations with the greatest amount of job openings in recent years. Programmers, Software Engineers/Architects, and Web Developers are among the IT occupations with a sizable amount of former and future job openings. Employers are also having a difficult time filling these three types of positions and, more importantly, the void of these professionals has a negative effect on company performance.

The supply side research also corroborates a gap between supply and demand for specific IT career clusters. According to the comparison of 2007 job openings with the number of graduates produced in academic year 2006-07 from Northeast Ohio’s system of higher education, the greatest gap is in the Enterprise Systems Analysis and Programming/Software Development Career Clusters which includes Programmers and Software Engineers/Architects.

### IT Supply and Demand Comparison

<table>
<thead>
<tr>
<th>Career clusters by the National Association of State Directors of Career &amp; Technical Education Consortium</th>
<th>IT Occupations related to IT Cluster</th>
<th># Hired in 2006</th>
<th># Full Time Openings July 2007</th>
<th>Anticipated Future # of Full Time Openings</th>
<th>2006-07 Graduate Totals #</th>
<th>2006-07 Graduate Totals %</th>
<th>Gap Between Demand &amp; Supply</th>
</tr>
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<tbody>
<tr>
<td>Technical Support</td>
<td>Tech Support Reps (outside)</td>
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<td>Tech Support (Help Desk)</td>
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<td>668</td>
<td>372</td>
<td>662</td>
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<td>10%</td>
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<td>Network Systems: Design &amp; Administration</td>
<td>Network Specialists</td>
<td>961</td>
<td>371</td>
<td>662</td>
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<td></td>
<td>Systems Engineers</td>
<td>446</td>
<td>965</td>
<td>669</td>
<td>27</td>
<td>2%</td>
<td>938</td>
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<tr>
<td>Database Development &amp; Administration</td>
<td>Database Administrators</td>
<td>446</td>
<td>965</td>
<td>669</td>
<td>27</td>
<td>2%</td>
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<td>Interactive Media Technology (All Media Programs Combined):</td>
<td>Digital Media Specialists</td>
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<td>141</td>
<td>148</td>
<td>245</td>
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<td>NA</td>
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<td>NA</td>
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<td>B) Web Development &amp; Administration</td>
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<td>520</td>
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<td>C) Interactive Media: E-Commerce/E-Bus</td>
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<td>Business Application Specialists</td>
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<td>2453</td>
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<td>594</td>
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<td>Programming &amp; Software Development</td>
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<td></td>
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STRATEGIC PRIORITY:
Provide more work-based learning experience for IT students to enhance skill acquisition, improve their ability to secure employment upon graduation, and to satisfy employer needs.

- According to IT graduates, experience equals employment. Recent graduates were frustrated with the amount of work experience required by employers for specific jobs.
- “Real world” or hands on applications, projects, and opportunities were considered one of the most valuable components of the educational experience from the perspective of recent IT graduates who are now working in IT fields.
- Work based learning is a tool that allows employers to find future job candidates/workers and it also provides students with the opportunity to establish relationships with employers (i.e., further enhances the ability to find a job).
- According to the in depth interviews with employers, businesses want IT workers who can apply technical IT applications to the business setting. More important, many employers want applied experience within a specific industry sector since IT applications tend to vary by industry.
- The proportion of employers throughout Northeast Ohio who offer any kind of student work experience is low. Only about 20% of employers offered at least one form of work based learning experience in 2006.

STRATEGIC PRIORITY:
Ensure skill development of IT students is aligned with technical and soft skill needs so that graduates of IT programs are more employable and employers can be more productive and competitive.

- Communication skills, project management skills, inability to apply IT applications to the business setting, and willingness to adapt/keep pace with change were among the primary skill deficiencies described by employers during in-depth interviews.
- According to the quantitative employer survey data, HTML, Java, SQL, Visual Basic, XML, and C++ were among the programming applications that full-time IT employees depend on most within the workplace and should be integrated into teaching and learning.
- With respect to database skills, distributed database skills and other IT skills, no one application dominated the list as something that IT workers are “dependent upon”. However, several of the distributed database skills were noted to be used at least “occasionally” by the majority of IT workers including data warehouse applications, data mining applications, web-based programming, and client server programming.
- Soft skill development is paramount for IT workers as 100% of IT professionals use written communications, verbal communications, team work, business etiquette and time management skills within their existing jobs.
- Based on their experience within the workplace, recent IT graduates agreed that team building skills are essential. They also identified presentation skills as a critical need.
- A bachelor degree was the most common educational requirement for open positions in July 2007 (65% of all job openings).

STRATEGIC PRIORITY:
Consider blending entrepreneurial course work into programs that prepare students for these jobs: Network Specialists, Programmers, and Web Developers/Administrators.

- Nationally, the use of non-permanent workers (like temporary workers or consultants) has increased steadily since 2001. The same is true of Northeast Ohio.
- In 2006, 22% of all companies surveyed used temporary workers in at least one of their IT occupations and 42% used consultants to fulfill IT work requirements.
- Temporary workers were used most often for Network Specialists and Programmer positions.
- IT consultants were used most often for networking and programming functions as well as web development and administration.
- Almost all companies who used IT consultants in 2006 also anticipate using them again in 2008.

(Continued on Pg. 28)
WORKFORCE DEVELOPMENT PRIORITIES (Continued)

STRATEGIC PRIORITY:
Better connect IT graduates with available jobs.

- Most often, employers recruit workers from other companies within Northeast Ohio and do not recruit individuals directly from school. This finding is also substantiated by the amount of churn or turnover that exists in Northeast Ohio for IT positions. In 2006, one in four companies lost more than 10% of their IT workforce and it is estimated that employers with more than 25 employees overall are seeking to fill at least one IT position at any given time within our region.
- Many institutions of higher education report dedicating more and more resources to career service offices, career/job fairs, and other mediums to help connect their students/graduates with the job market.
- IT graduates have tried to use career service offices, career fairs, and on-line web sites like Monster.com or Careerbuilder.com with very little success. Only personal networks/referrals and internships are yielding job interviews and employment. In fact, most IT graduates did not believe there were gaps between supply and demand within this region because their job search processes were so difficult.
- Employers report little loss of IT workers to other areas of the state or nation. While the region is not currently losing IT workers, it is possible that this could occur in the future. Most IT graduates reported that they are not above relocating outside the region for better jobs and more competitive salaries.

STRATEGIC PRIORITY:
Encourage greater connection between the private sector and Northeast Ohio’s system of higher education for incumbent worker training and other areas of workforce development need.

- Overall investment in training and development of IT workers is somewhat low within Northeast Ohio. One-third of all companies dedicate no portion of their IT budget for worker training while one-half allocate anywhere from 1-2% for staff training. World class levels of investment in training and development of workers is assumed to be at 3% or more.
- Despite a strong call for greater alignment between employers’ needs and recent graduates’ skill sets, few employers partner with education and training providers. Employers are very unlikely (92%) to have an arrangement with a community or technical college to provide specific training for employees.
- Considering that the size of most IT staffs are relatively small within the region (i.e., 79% had 10 or fewer IT workers), we might expect a keen interest in partnering with other firms to design and implement specific IT training programs for workers. However, only 27% of all employers felt their participation was probable.
- Interest in a program to build a strong pool of entry level employees was less popular (16%).
- About one in four employers are interested in joining forces with other employers to provide feedback to area colleges on important skill sets for IT graduates.
- Interest in collaboration with other firms to recruit workers in limited supply from outside of Northeast Ohio was minimal at 11%.