Center of Excellence
for information & computing technology

IT Skills Panel Industry Forum Questions for Facilitated Discussion
Friday, March 22, 2013, 2:00 – 4:00 p.m., East/West Board Room, B201 (A & B)

1. In the questionnaire the group selected a majority of the technical knowledge/skills as "important" (typically 80% and above) and "difficult" to find an employee experienced with the technical knowledge/skills. Recently over 2,500 jobs (dice.com) were scanned for the same technical knowledge/skills listed in the questionnaire and there was only on average a 30% demand in the Seattle Metro area. Why do you think that is?

Soft Skills	Important %	Not Important %	Difficult %	Not Difficult %	Demand Seattle Metro Keyword, Dice.com (2,528 jobs)
Soft Skills	96%	4%	71%	21%	1%
Project Management	87%	13%	50%	30%	35%
Communication	97%	13%	62%	28%	50%
Collaboration	93%	7%	62%	24%	9%
Customer Service	79%	21%	59%	28%	34%
Self-Starter	93%	7%	57%	32%	4%

- The term "self-starter" can be expressed a dozen different ways.
- Often in terms of getting a job it's "who you know." Many job leads are found by attending certain IT events (informational, training, networking, IT associations, etc.)
- There is a disconnect between the generic jobs that human resources posts and the actual technical knowledge and skills required for the job. It's not surprising therefore that even though the IT industry professionals who completed the IT Skills Questionnaire prior to attending the forum, indicated such a) high demand for a majority of the IT skills and knowledge (including soft or employability skills) and b) listed many of them as difficult to find in prospective employees, dice.com demonstrated relatively low demand for the majority of technical knowledge and skills.
- Human Resources doesn't typically advertise for the actual job with the real skills listed within the job posting.
- Some companies use head-hunters and the required job skills and knowledge get "lost in translation."
- Also, with resume scanning software, as long as the resume of a candidate mentions the key words from the job posting they might get an interview even though they lack the requisite experience.
- Many start-ups go to IT events to recruit job candidates.
- It's important to note that multiple skills could be covered by a single term.
- Also, note that with most IT jobs the hiring manager is looking for a candidate that understands IT concepts, not just how to execute a task.

- An ideal employee pursues new knowledge, can grasp concepts quickly, and is not easily distracted. The best IT professionals enjoy "learning how to learn." They also can apply their skills in multiple ways.
- Human resources follow and publish a predictable bullet list of job responsibilities. Sometimes this approach works.
- Additionally, there is a contrast between hiring someone for their technical skills versus hiring someone for their soft skills. Sometimes the employer hires strictly for the technical skills and essentially hopes the new employee will either possess a satisfactory suite of soft skills, or will eventually develop them on-the-job.
- There are also different employer needs/expectations for a contractor versus a full-time, permanent employee. For the full-time employee there is a need for core IT technical knowledge and skills. For the contractor there is a need for the core IT technical knowledge and skills as well as a specific suite of technical knowledge and skills.
- When hiring a new graduate there isn't the expectation that they possess all of the new, developing, emerging technical knowledge and skills. However, they are expected to have the core IT technical knowledge and skills, for example understand the concept of algorithms.

2. Consistently, across the board the majority of you mentioned "mobile, cloud, big data" as the new and emerging technology trends. The three technologies have moved from "hype" to full-on "adopt".
- **What are we not anticipating, in terms of new twists and turns, creating new occupations, forcing employees to learn new skill sets, with these three technologies?**
- **What jobs might disappear, become outsourced, or turn into contract work (p/t, f/t-temp work) as a result of the evolution of mobile, cloud, or big data, social?**

- **General**
    - Gesture-based computing (motion and use of a computer) is a new, emerging technology.
    - Everyone is now a content producer.
    - A new demand for systems administrators is to design ways to manage lots of machines.

- o Voice technology will be a huge new development. The keyboard mouse will no longer be needed.
- o There is no longer a separation between home and work. Many employees work at home, after "normal" work hours, and on weekends. As far as telecommuting, it is interesting that Marissa Mayer (Yahoo) wants employees to return to the office and commit to working on-site. Does she then drop the expectation that the employee work just the 40 hours on-site and no working outside of the office?
- o A+, hardware, computer support specialists are going away. This was amended to "gone." It's cheaper to buy a new piece of hardware than spend money getting it fixed. There is a change in the philosophy around hardware; it's disposable. With technology changing so rapidly you don't fix it if it's two-years old. You buy the latest version/iteration.
- o There is demand for information security jobs (authentication).

- **Cloud**
  - o The cloud is in full adoption mode.
  - o "Traditional" IT people are nervous with the "move to the cloud" and "mobile" transition. Some adapt; however most lose their jobs as the core IT team shrinks. "Commodity" IT functions are outsourced (not necessarily outside the state or country but outside the company itself). For example, database and network administrators are disappearing to make room for cloud applications (MS Office 365), databases and infrastructure.
  - o There has been a move from a centralized administration of IT services to cloud-based as this allows the use all the devices. Additionally, security is a cloud-related issue; current firewalls may no longer be sufficient.
  - o Good business analysis and communication skills to be able to talk with employees to identify whether cloud services will meet requirements.
  - o Companies are eliminating server rooms. Technician Support is provided by technology vendors (like Dell). The jobs that remain are IT directors, planners, policy personnel.
  - o Cloud services are changing the way departments work in companies; there is less of a need for programmers/analysts, and more of a need for IT professionals to understand business requirements and articulate these to those moving towards cloud services. Cloud service providers will need this type of IT professional; technical IT professionals will move to cloud service providers (especially architects and analysts).
  - o Cloud—infrastructure jobs, corporations have a cloud interface career track.
  - o System administrators, network administrators work in data centers. With mobility and cloud there are opportunities for new jobs, but the reality is someone has to develop and maintain the infrastructures; there just won't be the need for as many system administrators/network administrators with the virtual environment.
  - o The systems administrator job will change. It has been predicted that this job will disappear, but they don't. The knowledge and skills needed for the job change, now systems administrators need to write code for the cloud.
  - o There is huge demand for data integration specialists. There is a need for these teams to integrate open technologies (big data, mobile, cloud, social).
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- **Software Engineering/Development, Programming**
  - Developers have to communicate with business people and work harder to understand their business issues/needs. The consumerization of IT where everyone has their device and wants access in the way they are used to having access. Programmers don't tell people any more you can't have that. Get rid of data center. Need the network to get into the cloud but that's it, so much of the hardware is going away. There is a proliferation of apps, development of apps; people are using their device as the gateway, and they want to use the applications they have.
  - "JavaScript's days are numbered." Software engineers don't like Javascript. RPG, Java programmers are not needed so much, but rather people are needed to administer software and structure in the cloud.
  - Programmers no longer tell employees "no". They will develop ways to access information the way people want it.
  - There are opportunities for growth in systems software engineers that design architectures that are more efficient.
- **Big Data**
  - The issue of privacy and how data is captured is becoming blurred. Detecting buying patterns is one way that an individual's privacy is invaded either voluntarily or surreptitiously. Increasingly people don't mind sharing personal information about behavior (consumer, professional, etc.)
  - Big data (especially in the healthcare industry) is an emerging huge market; this is outsourced at some HMOs, healthcare organizations.
  - Inside healthcare organizations people are still trying to get doctors to adopt new technologies. In healthcare organizations there will still be demand for the old careers and a huge emerging market in using the information not just to deliver care but make decisions about their business.
  - IT is creating a tension between the perceived freedoms associated with smart phones use versus the compliance requirements of HIPPA. Ensuring data safeguards and upgrading to next version of security is very hard.
  - Big data—there is demand in Seattle for IT professionals with big data skills and it is very, very hard to find these people. In Seattle SQL professionals need to understand the concepts and "get" the difference.
  - There is a need for new object-relational mappers. There was general consensus that SQL is "going away". There is a need for an IT professional who can write code and not need a database.
  - NoSQL and Mongo has its fans as well as detractors. From [Wired](#) (03.19.13) here is an explanation of NoSQL and Mongo:

    > MongoDB may be the most popular NoSQL database out there. Demand for the open source database is growing faster than every job skill other than HTML5, according to job search site Indeed.com.
    >
    > Like other NoSQL databases, Mongo is designed to house large amounts of data across many computer servers. It's an alternative to relational databases, which were designed to run on just one machine. But that's only part of the attraction. Mongo's success is largely a product of its popularity with developers, the people who build software applications. Part of the attraction

is that it's open source, meaning the software code behind it is freely available to anyone.

3. IT college students have to take a number of courses that address soft skills (communication, presentations, etc.) What should education be doing better to help students turn soft skills theory into the applied practice when they get to the work place?

- Apprenticeships/internships/team projects (put students in teams and have them develop a project). Do this for students as quickly as possible.
- There is a difference between technical writing and English 101. IT employees need to understand how to create documentation as well as write in a technical-manner. English 101 doesn't necessarily build that skill set.
- Students need to understand how to build a case to persuade their team or employer to adopt a particular business practice, or make a specific decision.
- With a course on project management, students learn how to meet deadlines based upon a set of deliverables.
- One IT professional received a bachelor's degree in Management Information Systems. He learned to write concisely, as well as to solve general problems and evaluate risk. An IT professional can't be risk adverse.
- Students need to realize how important ethics are when working as an IT professional. For example, when working with big data, how do they protect user information and respect the privacy of the user? This also applies to gaming.
- Common sense is another important attribute in an IT worker.
- The return on investment (ROI) is another concept that an IT worker should be able to put into practice.
- Students need to develop self-awareness and to know their strengths and weaknesses. They need see and put into practice the alignment between job responsibilities and their strengths.
- Students need to understand that liking to play or work with IT products is different than working in IT
- **Resumes and Interviews**
    - Interview skills, how to read a job description and how to tie it to your resume. Key words are very specific. Need a computer readable resume that gets you flagged, but also one that is readable by a person. It is very complex.
    - Don't forget the soft skills in your resume, especially what you did with those skills.
    - Practice interviewing. Don't drink coffee, know what the interviewer's company does, do ask the interviewer what s/he does at the company. Know your audience.
    - GenX/GenY—even after they are hired they don't know how to write a proper business email, memo.
    - Appropriate pictures on the company's Facebook; appropriate texts.
    - Internship program at Costco has seminars on appropriate corporate behavior.
    - There is a push back, in that they don't want to turn into "wing-tipper". However, with the initial first interview, understand the culture, dress appropriately for an interview, get the job and then gain the right to wear shorts.
    - For truly entry-level positions there is so much competition you need to know how to interview to have a shot.
    - For older workers that haven't interviewed in a while—they need to understand the current culture of they've been out of the workforce for a while.

- Have students attend job fairs—they then realize they need to take the interview very seriously.
- Some things to integrate: learning style assessment (will help with training and development). Behavior assessment—core behavioral characteristics; provide an opportunity to do a skill assessment—assess themselves against it and determine if they're ready for a job.
- Strengthsfinder could be used. It could be very interesting for students to see the differences, especially if everyone is in a technical class to see the differences you would find.
- Incorporate Montessori principles so each student has a unique and individual track through college.

General Input on Experience and Education
- For the colleges to survive in the days of online training, it will be important to get that the student that starts a degree program in 2013 will not be the same as those in the same program that starts in 2014. Colleges need to be flexible and have new courses; they will be outdated if they don't.
- The best program I have seen are at Northeastern University where one year of the entire degree focuses on hands-on experience as an employee that is related to the IT academic pathway. The graduate can then add "one-year of experience" on their resume.
- Some employers focus more on experience than the degree. If we are looking for a software engineer, we want three years of work experience. If experience in industry is part of a degree program, they get a good look. However, the majority of employers want a four-year degree in order to even get past the human resources department. I'm excited that Bellevue College, as well as other colleges, is providing the applied baccalaureate
- Theoretical courses need to be included in any IT academic pathway: logic, discrete math, Big O notation. Student need to know not just how to do hands-on work, but also understand the theory behind the practices. It's good to see the applied baccalaureate degrees, but they need the theory as part of the degree, and companies will dig for it in the interview.
- We need a wide variety of internships. We need to help small business bridge the gap to internships.

  Read Young, Gifted, and Slack: One of the biggest problems facing the world in 2013 is the prolonged—and seemingly intractable—crisis of youth unemployment. Put simply, too many young people lack employable skills in a world that has too few skilled workers. Source: The Economist

4. Washington State is now creating a number of applied four-year degree in a variety of IT disciplines. If you could tell the State to focus in *three areas* to meet your company's needs (specific occupations, as well as technical knowledge/skills), what would they be?

- Mobile
- Alternative data storage
- Systems Integration (architecture/ integration who understand business drivers, cloud architecture, systems integration)
- Usability (UX) is big right now. A UX degree would be great. Understanding the design of everyday things is a valuable for a UX professional to master.
- Business analyst
- Security (analyst), disaster recovery (including certification), security audits, including physical security (cameras and other "spyware"), biometrics, compliance, security laws,

- Software engineers to work with cloud applications, data management tools, identity management, authentication in the cloud
- Knowledge of mobile devices and applications, specifically developing applications on the android platform
- Ruby development/deployment
- Code management
- Virtual development (working as/with a virtual team)
- VMware & Hyperware
- IT policies
- Risk management
- Legacy systems and legacy migration – like migrate COBOL into Ruby

5. Do you believe certifications are important for an employee to have earned? Why or Why not? What certifications do you believe are important for employees, or a graduate applying for a job with your company, to have earned in for example: software development, systems or network administration, programming, security, etc.?

General Consensus: Certifications for the majority of the 30 IT professionals were not considered essential for four-year IT graduates. And, for those who did see value, it was very specific.

- Certificates demonstrate mastery of specific technical knowledge/skills.
- Java certifications have lost value.
- For contractors it doesn't matter if they have certifications; the issue is can they do the job.
- In gaming certifications are looked down upon.
- Top-end CISCO certifications are good. Low-end CISCO certifications aren't regarded as very good or important to have.
- Certifications might be important to human resources and may lead to at least an interview.
- Certifications for IT Pro are a plus.
- Certifications may increase salary or allow a candidate to "get in the door."
- Certifications don't work.
- They may differentiate one candidate from another but unless they are the higher level certifications, the rest are not that valuable.
- A lot of jobs prefer certification, few require them.
- They mean more to the individual.
- Higher level certifications—maybe business analysis, maybe enterprise solution from skills perspective, not product perspective.
- For a developer, I look for certification more, especially if I'm looking for a specific skills set
- SCRUM Master and PMP (Project Management) certifications are valuable these days. They may even be required in order to get hired.
- I wouldn't make it a priority for the college.
- Certifications are more useful for getting promoted than for hiring.

6. This is now a far out question that is about technology that you hear about and either you think it will never happen, or you think it will happen, make it to the market place, and is embraced with vigor by the consumer. You can also envision how it will transform IT and potentially create a whole new career pathway. For example, Robots were bemoaned as never happening as few as five years

ago. Now, there are already articles form reputable online and print news outlets and niche newsmakers warning of the perils of the Robots.

Notwithstanding the fear of Robots ☺ what are some transformative technologies that might not even be in the "hype" grid of an IT Trend/Technology adoption graph?
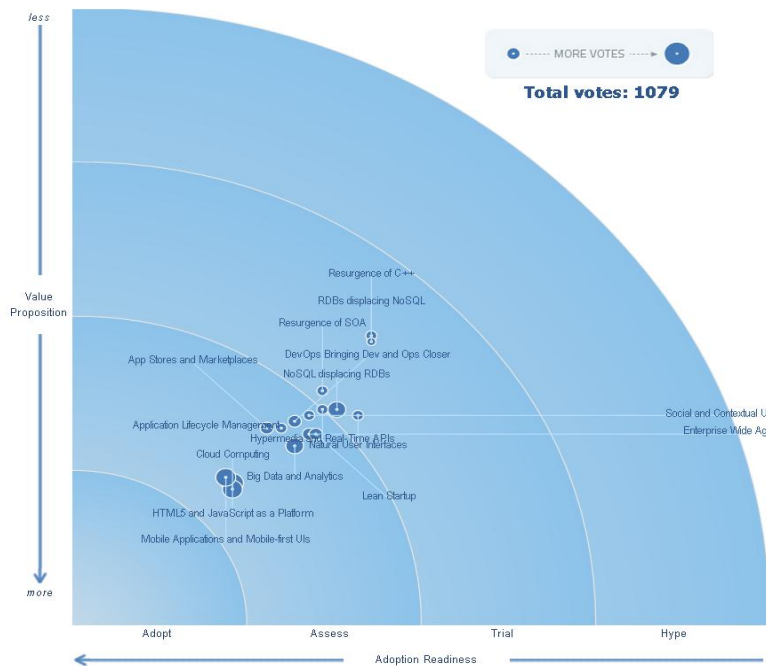
- [Maker-bot](), [fab-lab](), 3-D Printer – make your own things.
- UI motion (see [Minority Report]())
- [Google glasses]()
- [Leap motion]()
- Portable IT wallet
- Robotics
- Think about what aging baby boomers need. They have the money, the medical needs, etc.
- Quantum Data Storage, which is storage at the molecular-level instead of using transistors. Really small. We are reaching a limit on how small we can make data, so we are headed into molecular. [Quantum Computing]().
- Google glass, where the computer is part of you. I think that will be a game changer. It's somewhat here now with the I-phone and people are glued to the technology.
- Potential future directions: Consolidation of the network, to where there are only a few that have a full line of services. Perhaps Microsoft, Google, and a couple of others. The rest will be smaller companies that connect to them. Do smaller companies just end up feeding the big cloud vendors?
- There will be technology workers in the cloud and those who work in internal data centers/on premises at the healthcare or bank. They are very different jobs and career paths, and colleges need to train for both.

- Mapping the human brain
- Holographic displays
- Miniaturization

7. Below is a list of some of the technical knowledge/skills that appeared on the questionnaire. What did we miss? And, would you rank them as "important" and "difficult to find in an employee"?
- **Integration**
- **Security**
- **Planning**
- **Reporting**
- **Testing**
- **JavaScript**
- **Web Services**
- **Troubleshooting**

- Design
- Application Development
- Windows
- Engineering
- Curiosity
- Design - An understanding of the elements of design, having aesthetics.
- Data (understand what it is) and how to be an information architect.
- Project management
- Time management
- Best practices
- Understand how to motivate yourself to achieve (self-driven)
- Think globally
- The ability to work with diverse teams and international teams
- How to function virtually and with virtual teams.
- Testing
  - Development testing
  - QA testing
  - User interface testing
  - User experience testing

Read about other Washington State Round Tables: *Great Jobs Within Our Reach: Addressing the Growing Job Skills Gap in Washington State*

A report, "Great Jobs Within Our Reach," from the Washington Roundtable and The Boston Consulting Group, Inc. reveals a large and growing gap between the number of open jobs in Washington state and the number of skilled workers available in-state to fill those positions. If the state takes steps to fill the growing gap, it would mean 160,000 jobs across many sectors in Washington state by 2017, spread across the economy, and $720 million in new state revenue annually.

8. Can you give me an example of a new employee who ends as an ideal employee? What makes them an ideal employee? Can you give me an example of a new employee who turns out to not be what you hoped for/expected. What did they do to make you realize that?

- Curiosity. It's what makes the difference between those employees who succeed and those who don't.
- The philosophy of lifelong learning is essential; "go get that new skill."
- While it was postulated that this can't be taught, the ideal IT employee needs to "want to know" and asks, "Why not?" They have to want to do it anyway. They like to do things right.
- Be passionate about new opportunities. This doesn't necessarily show up in an interview.
- Many companies shoot down ideas from new employees (in big companies typically). The employee shouldn't be discouraged. And, working in a big company may not be right for the employee with a lot of new ideas. Maybe they should be developing their own start-up company.
- Empathy. Don't forget about who you are serving.
- Efficiency, time management, and the ability to prioritize are critical.

8. One of the things colleges across the state struggle with is placing IT students in internships with companies like yours. What could education be doing to increase the odds an internship/co-op relationship is established with your company?

- Respond to a company that wants an intern. It damages employer perceptions about a college when they don't even bother to respond when contacted.
- Host events.
- Have IT programs mimic the work environment. Very critical! It takes a long time to orient a new employee on how an office functions (how to use the copy machine, use the phone, etc.) Students should be learning how to function in an office environment.
- It is assumed that only big companies like Microsoft have intern opportunities. Colleges and students are missing out on internship opportunities with small- and mid-sized companies.
- In some instances, interns cost more to the organization than they bring value
- A team of interns would be of interest as they may bring more value than an individual.
- Bring a real industry project into the college for team of students to work on. Market to industry the types of projects that the students can do
- Challenge – students or teams of students develop concept in answer to a real industry project and make presentations to industry – industry can then select the best idea.

9. 50% of you indicate retirements wouldn't cause a huge hiring effort within your company? Why do you think that is?

- The workforce is young.
- IT workers don't retire.
- Who gets to retire today?
- Most IT workers, people in general, don't see retirement as achievable.
- Many boomers are staying in their jobs.