

OPPORTUNITIES FOR WOMEN IN IT

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INTRODUCTION

In 1969, women comprised approximately one-third of the workforce (Chu & Posner, 2013). Today, women make up almost half of all workers in the United States. Despite women's increasing workforce participation, women are still underrepresented in the field of information technology (IT) (Ashcraft & Blithe, 2010). Only one in four professional computing occupations in the United States are held by women (Beede, et al., 2011).

Diversity in IT is important for several reasons. Besides promoting equality, it also enhances innovation and productivity (NCWIT, 2014; Barker, Mancha, & Ashcraft, 2014). Innovative change is encouraged by drawing on a diverse knowledge base. Studies have shown that gender-balanced teams were more likely to experiment, share knowledge, and fulfill tasks (Barker, Mancha, & Ashcraft, 2014). Additionally, diversity expands the pool of qualified IT talent. The dearth of women in IT has the potential of slowing the U.S. economy. In terms of sheer numbers, more students in the IT pipeline are needed to fill the growing needs of the IT field.

This report explores opportunities for women in the field of IT. First, the current IT pipeline is examined. Next, the career opportunities available for women in IT are discussed. Finally, six areas of IT are explored and specific careers are presented. The goal of this report is to explore some of the opportunities for women in IT by showing the growing demand of the field and examining available IT careers.

THE CURRENT IT PIPELINE

The field of IT has grown significantly. Computer programming was first introduced into college coursework in the 1960s (Molnar, 1997; Murdock, 2008). By the late 1980s, elementary school children were learning how to use computers. Technology is now an essential part of a classroom instruction. Learning the basics of technology starting at a young age can lead to interest in pursuing careers in technology.

Even as the demand for high paying IT jobs continues to grow, too few students are learning IT at all educational levels. In 2009, for example, the College Board that administers advanced placement (AP) exams was forced to discontinue the second-level AP computer science exam because so few high school students were taking it (College Board, 2009). Meanwhile, only ten states currently allow computer science courses to fulfill core math or science requirements, if these courses are even being offered (Stewart & Atkinson, 2012). Although the overall participation in IT classes is low for all students, it is especially low for females. In 2012, 30,000 students took the first-level AP computer science exam, but only 20% were female (Levy, 2014). In Mississippi, Montana, and Wyoming, no female students took the AP test. As the IT field grows, it is crucial to expand the applicant pool and encourage more female students to explore IT.

While the total number of college students in IT is increasing, there are still not sufficient numbers of graduates to fill the growing number of jobs in IT. In 2012, total U.S. undergraduate enrollment in

computing majors rose 13.4% and degree completions at the bachelor's level increased 9.4% from the previous year, according to a survey of computer science departments (Zweben, 2014). While women earned 57% of all undergraduate degrees in 2012, only 18% of computer and information sciences degrees were earned by women (NCWIT, 2014). The low percentage of women completing IT degrees is especially surprising considering that in 1985, 37% of computing degrees were earned by women. Colleges are aware of the need to attract more female IT students and they are updating their programs and practices as a result.

There are several proven ways to interest and engage more students in IT at all educational levels. The National Center for Women & Information Technology (2014) encourages educators to select curricula that is engaging to students who are new to computing and to utilize an inclusive teaching style. To engage women in IT, educators should avoid gender bias, provide role models, and minimize stereotype threats.

Some college computer science departments are revamping their curriculum to broaden the program and attract more diversity. In 2009, Stanford's CS department added multi-disciplinary tracks to cast a broader net for students. In 2012, 10% of Stanford students take the introductory CS class every quarter, and over 90% of undergraduates take the course before they graduate (Gallagher, 2012). The course has reached gender parity in enrollment and grades. Other colleges and universities are beginning to implement similar initiatives to the ones undertaken by Stanford with the goal of encouraging more women to explore IT opportunities.

IT CAREER OPPORTUNITIES

Careers in IT are some of the most in-demand and highest-paid jobs on the market. For most of the past 20 years, employment in IT has grown rapidly (Csorny, 2013). Between 2001 and 2011, over 565,000 new IT jobs were created, which represents an increase of 22.2% while employment as a whole grew by only 0.2% (Stewart & Atkinson, 2012). Even during the recent recession, IT jobs continued to grow by 6.8% while U.S. jobs as a whole shrank by 4.5%.

The IT field is expected to grow 18% by 2022 (U.S. Department of Labor, 2012). In fact, computing-related occupations are projected to be the fifth fastest growing segment of the workforce through 2022. The growth of the IT field is driven by many factors, including the growth of mobile networking, cloud computing, data management, the increasing threat of cyberattacks, and the general trend of firms and individual consumers increasing their use of IT services (Csorny, 2013). The U.S. economy is growing increasingly dependent on IT for productivity growth and innovation (Stewart & Atkinson, 2012).

As the field of IT continues to expand, the need for technology experts and technology-savvy business professionals will also continue to grow. Due to the high demand for IT workers, the industry has created a large number of fast growing and high paying IT jobs (Csorny, 2013; U.S. Department of Labor, 2012). In 2013, the overall unemployment rate in the United States was 7.4%, but the unemployment rate for jobs in IT and computing was only 3.6% (U.S. Department of Labor).

In 2013, bachelor's degrees in computer science yielded one of the highest starting and median salaries for new graduates (NCWIT, 2014). The gender wage gap is actually smaller in IT than compared with the average gender wage gap. On average, a woman in the United States earns \$0.77 to every \$1.00 a man earns. Women in IT and computing-related occupations, however, earn \$0.91 to every \$1.00 a man earned (U.S. Department of Labor, 2013).

In addition to high salaries, employers are offering increasingly desirable perks to IT employees. Some of these include unlimited vacation and sick days, flexible scheduling, telecommuting, pet friendly office spaces, on-site fitness facilities and group running clubs, comprehensive wellness programs, free food and drink, technology stipends, complimentary club cars, transit reimbursement, and even vacation stipends (Mlot, 2014). Many companies are also developing mentoring and training programs specifically for women in IT in attempt to attract and retain female employees.

IT CAREER AREAS

Careers in technology are among the fastest-growing and best-paying jobs in America. According to U.S. News and World Report's annual survey (2014), three of the top ten jobs in the United States are in IT, including #1 Software Developer, #4 Computer Systems Analyst, and #9 Information Security Analyst. The field of IT is broad and it offers opportunities for everyone. According to Steve Ballmer, then-CEO of Microsoft (2005), "The number one benefit of information technology is that it empowers people to do what they want to do. It lets people be creative. It lets people be productive. It lets people learn things they didn't think they could learn before, and so in a sense it is all about potential."

The field has grown dramatically and it is much more than the stereotype of a lonely programmer writing code in a windowless basement. One way to characterize the numerous areas of IT is by looking at the six I's of IT: (1) Illumination Technology, (2) Imagination Technology, (3) Innovation Technology, (4) Inspiration Technology, (5) Integration Technology, and (6) Investigation Technology.

Illumination Technology is characterized by guiding, teaching, motivating, and exciting. This area of idea combines tech passion with leadership, interaction, and collaboration. Some of the career opportunities in the area of Illumination Technology include:

Software Trainers

- Empower users with hands-on experience, while providing guidance and instruction
- Median salary: \$52,000 (Glassdoor, 2014)

Media Specialists

- Specialize in all things digital to drive results and achieve goals
- Median salary: \$49,000 (Glassdoor, 2014)

Technology Teachers

- Spread knowledge and grow student skills centered around technology
- Median salary: \$51,910 (U.S. Department of Labor, 2014)

Curriculum Developers

- Use expert knowledge to create content and curriculum for target audience
- Median salary: \$60,050 (U.S. Department of Labor, 2014).

Imagination Technology involves animating, entertaining, and creating. The area of Imagination Technology is the intersection of art and technology. It is well suited for creative visionaries. Career examples in this field include:

Video/Multi-Media Producers

- Oversee projects from conception to completion while providing direction and feedback
- Median salary: \$71,350 (U.S. Department of Labor, 2014)

Branding Designers

- A specialized field of design responsible for brand development
- Median salary: \$76,000 (Indeed, 2014)

Graphic Designers

- Utilize design expertise to visually communicate and stylize all media
- Median salary: \$42,500 (Glassdoor, 2014)

Game Creators

- Create video games. Working in a collaborative group, apply technological skills such as coding and programming with design skills
- Median salary: \$85,000 (Liming, & Vilorio, 2011)

Animators

- Create animation and visual effects for movies, television, and video games
- Median salary: \$61,370 (U.S. Department of Labor, 2014)

Innovation Technology is a field for dreams who want to introduce, create, construct, and apply. This area of IT involves the igniters who spark new technologies. The creative aspect of computing is a lure for many women. Career opportunities in Innovation Technology include:

Developers

- Create computer programs, web applications, and the underlying systems that run devices
- Rated as one of the best paying jobs for women in America ((Dill, 2014)
- Median salary: \$93,350 (U.S. Department of Labor, 2014)

System Programmers

- Specialized area requiring a great degree of hardware and software knowledge
- Rated as one of the best paying jobs for women in America ((Dill, 2014)
- Median salary: \$74,280 (U.S. Department of Labor, 2014)

Mobile Application Engineers

- Apply software development knowledge with the passion to improve user experiences to engineer innovation
- Median salary: \$73,000 (Glassdoor, 2014)

Software/Hardware Engineers

- Design and develop computer systems and create rapid advances in IT
- Median salary: \$100,920 (U.S. Department of Labor, 2014)

Inspiration Technology combines vision, leadership, guidance, and entrepreneurial thinking. This area is characterized by energizing, guiding, visualizing, and leading. Inspiration technology employees challenge the norm and search for the next big idea. Some career examples include:

Chief Information Officers

- Responsible for the processes and practices supporting the flow of information throughout an organization, as well as the general technology infrastructure
- Median salary: \$152,500 (Glassdoor, 2014)

Project Managers

- Manage key components of critical projects to ensure goals and deadlines are met on a regular basis
- Median salary: \$87,500 (Glassdoor, 2014)

Development Training Managers

- Coach and lead team members while providing guidance and instruction
- Median salary: \$95,400 (U.S. Department of Labor, 2014)

Communication Managers

- Apply strong written and verbal communication skills to the development and implementation of strategic communication strategies
- Median salary: \$75,525 (Glassdoor, 2014)

Product Sales Managers

- Lead a successful team by product knowledge, training
- Median salary: \$69,000 (Glassdoor, 2014)

Integration Technology is characterized by solving, fixing, operating, and constructing. This area of IT encourages problem-solving and hands-on skills. It is well suited for people who enjoy building, tinkering, constructing, and exploring how things work. Some of the career examples in the area of Integration Technology include the following:

Health Information Specialists

- Ensure health care industry standards are consistently met in regard to recording and maintaining patient information
- Median salary: \$34,160 (U.S. Department of Labor, 2014)

Business/Network Analysts

- Design, analyze, test, and evaluate network systems
- Rated as one of the best paying job for women in America (Dill, 2014)
- Median salary: \$79,680 (U.S. Department of Labor, 2014)

Application Software Testers

- Collaborate with team to test and evaluate software to detect flaws, breaks and errors
- Median salary: \$64,500 (Glassdoor, 2014)

Network Technicians

- Analyze computers, detect network-related problems, troubleshoot, and resolve varying issues
- Median salary: \$45,000 (Glassdoor, 2014)

Security Specialists

- Perform IT forensic duties to ensure security levels are maintained
- Median salary: \$61,610 (Glassdoor, 2014)

Investigation Technology is characterized by finding, solving, exploring, and researching. This area of IT involves problem solving and logic. There has been a recent upswing in the number of women pursuing one area of Investigation Technology, forensic science, perhaps owing to what some have dubbed the "CSI effect." As TV shows and popular media depict more women using technology and computer skills to solve crimes, it changes cultural stereotypes. Some of the career opportunities in Investigation Technology include:

Cyber Crime Investigators

- Expert in using computer and digital forensics to help fight cyber crime
- Median salary: \$86,170 (U.S. Department of Labor, 2014)

Crime Scene Analysts

- Apply science and technology skills to investigate crime scenes
- Median salary: \$52,840 (U.S. Department of Labor, 2014)

Business Intelligence Analysts

- Review, analyze, and evaluate business systems to identify areas for improvement
- Median salary: \$68,750 (Glassdoor, 2014)

Healthcare Specialists

- Provide quality health care services and support to those in need
- Median salary: \$34,160 (U.S. Department of Labor, 2014)

IT Technicians

- Maintain and oversee software and tools, while providing support to all users
- Median salary: \$48,900 (U.S. Department of Labor, 2014)

CONCLUSION

The IT field is growing significantly. By 2022, it is estimated that the field will have grown by 18% (U.S. Department of Labor, 2012). In addition to its fast growth, the IT field also features some of the best paying jobs in America, both in terms of starting and median salaries. Although IT jobs are plentiful and high-paying, there are not enough job applicants to fill demand. As IT continues to grow, it is crucial to expand the applicant pool.

One important way to increase the number of IT workers is to encourage more women to join the field. IT offers many benefits to women. The gender wage gap is smaller in IT than it is in other fields. On average, women in IT occupations earn \$0.91 to every \$1.00 earned by their male counterparts (U.S. Department of Labor, 2013). In comparison, the overall gender wage gap is \$0.77 / \$1.00. Some of the best paying jobs for women are in the IT field, including developers, system programmers, and network analysts (Dill, 2014).

Despite the increases in the number of IT jobs, interest in these majors and careers has declined among women in recent years. If current trends continue, the IT field will face a shortage of talent and reduced innovation, productivity, and competitiveness (Ashcraft & Blithe, 2010; Thiele, Miller, & Berg, 2013). With the demand for IT talent outstripping supply, we cannot afford to leave half of the population untapped. It is important to educate young women in the opportunities available to them in the ever-growing IT field. As this report revealed, IT careers are high-paying and in high-demand, and the field holds many opportunities to women to consider.

REFERENCES

- Ashcraft, C., & Blithe, S. (2010). *Women in IT: The facts*. Washington, DC: National Center for Women & Information Technology.
- Ballmer, S. (2005). AACIS unlimited potential grant announcement. AACIS. San Antonio, TX.
- Barker, L., Mancha, C., & Ashcraft, C. (2014). *What is the impact of gender diversity on technology business performance: Research summary*. Denver, CO: National Center for Women & Information Technology.
- Beede, D., Julian, T., Langdon, D., McKittrick, G., Khan, B., & Doms, M. (2011). *Women in STEM: A gender gap to innovation*. Washington, DC: U.S. Department of Commerce.
- Chu, A., & Posner, C. (2013). *The state of women in America: A 50-state analysis of how women are faring across the nation*. Washington, DC: Center for American Progress.
- College Board. (2009). *Important announcement about AP computer science AB*. Retrieved from College Board: http://apcentral.collegeboard.com/apc/public/courses/teachers_corner/195948.html
- Csorny, L. (2013). Careers in the growing field of information technology services. *Beyond the Numbers: Employment and Unemployment, 2*, 1-8.
- Dill, K. (2014, March 14). *Top 20 best-paying jobs for women 2014*. Retrieved from Forbes: <http://www.forbes.com/sites/kathryndill/2014/03/14/top-20-best-paying-jobs-for-women-2014/>
- Gallagher, B. (2012, Dec 27). *No women in CS? Well, not for long*. Retrieved from TechCrunch: <http://techcrunch.com/2012/12/27/stanford-bridging-gender-gap/>
- Glassdoor. (2014, June 16). *Salaries*. Retrieved from Glassdoor: <http://www.glassdoor.com>
- Indeed. (2014). *Salary search*. Retrieved June 20, 2014, from <http://www.indeed.com/salary>
- Levy, K. (2014, January 15). *Not one girl took the AP computer science test in some states*. Retrieved from Business Insider: <http://www.businessinsider.com/no-girls-took-ap-computer-science-test-2014-1>
- Liming, D., & Vilorio, D. (2011). *Work for play: Careers in video game development*. Washington, DC: BLS Occupational Outlook Quarterly.
- Mlot, S. (2014, January 10). *The perks of working in tech*. Retrieved from PC Mag: <http://www.pcmag.com/article2/0,2817,2429399,00.asp>
- Molnar, A. (1997). *Computers in education: A brief history*. Chatsworth, CA: THE Journal.
- Murdock, E. (2008). *History, the history of computers, and the history of computers in education*. Long Beach, CA: California State University, Long Beach.

- NCWIT. (2014). *By the Numbers*. Denver, CO: National Center for Women & Information Technology.
- NCWIT. (2014). *NCWIT scorecard: A report on the status of women in information technology*. Denver, CO: National Center for Women & Information Technology.
- NCWIT. (2014). *Top 10 ways to engage underrepresented students in computing*. Denver, CO: National Center for Women & Information Technology.
- Stewart, L. A., & Atkinson, R. D. (2012). *Looking for jobs? Look to IT in 2012 and beyond*. Washington, DC: Information Technology & Innovation Foundation.
- Thiele, L., Miller, K., & Berg, K. (2013). *Overcoming gender challenges in ICT*. Omaha, NE: AIM.
- U.S. Department of Labor. (2012). *Employment by detailed occupation: 2012 and projected 2022*. Washington, DC: Bureau of Labor Statistics.
- U.S. Department of Labor. (2013). *Median weekly earnings of full-time wage and salary workers by detailed occupation and sex*. Washington, DC: Bureau of Labor Statistics.
- U.S. Department of Labor. (2013). *Unemployed persons by occupation and sex*. Washington, DC: Bureau of Labor Statistics.
- U.S. Department of Labor. (2014). *Occupational Outlook Handbook*. Retrieved from Bureau of Labor Statistics: <http://www.bls.gov/ooh/>
- U.S. News & World Report. (2014). *The 100 Best Jobs*. Retrieved June 13, 2014, from U.S. News & World Report: <http://money.usnews.com/careers/best-jobs/rankings/the-100-best-jobs>
- Zweben, S. (2014). *Computing degree and enrollment trends: Undergraduate enrollment grows for sixth straight year and Ph.D. production reaches an all-time high*. Washington, DC: Computing Research Association.