Declining Talent in Computer Related Careers

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ABSTRACT

The United States has been experiencing an information Technology talent shortage for several years. This has caused employers to be creative in finding talented computer related talent. Many colleges have trending declines in enrollment in computer related majors. The Bureau of Labor Statistics and Department of Education Statistics reveal some truths about the decline in computer related talent. Additional research has discovered possible answers to the problem of computer talent declines.

Introduction

Interest in Computer Information Systems (CIS) and Computer Science (CS) degrees is declining and it appears the trend began for 2004, according to (Pollacia & Lomerson, 2004). Research to identify the causes of the decline is far from complete. It is believed by some that the lack of interest in CIS and CS college majors begins in high school. According to the Bureau of Labor Statistics Computer related careers expect to grow 13.1% from 2014 to 2024. This growth is the 4th largest predicted career growth in the U.S. Only healthcare occupations are expecting higher growth. Yet, the growth in college students in CIS and CS major is not keeping up with the anticipated growth and the current need for computer professionals (2004). In the early 2000s many companies met the shortage of computer professionals by recruiting from other countries.

The choice of college degree major is important to the student because it becomes the foundation for their careers. Choosing the wrong major can be expensive to the student and it can retard his or her career. The choice of college major affects the schools and colleges for universities because enrollment affects course offering and faculty staffing. It also affects internships and placement. The choice of degree major affects businesses because the availability of talent in industry disciplines affects salaries and recruiting. Competitive edge for the United States may also be a concern for industry leaders.

Problem Statement

The continuing decrease in college computer majors, expected baby-boomer retirements and growth in technology is predicted to create a shortage of computer professionals in the U.S. While the shortage of qualified Information Technology (IT) graduates has not become a significant problem yet, it could create a problem in the near future.

Research Method

The Department of Education and the Bureau of Labor Statistics have conducted considerable data collection regarding undergraduate, graduate education and college graduate employment. Data acquired from the Department of Education and the Bureau of Labor Statistics was used to avoid redundant work and the accuracy of the data could be assumed.

Literature Review

McInerney, DiDonato, Giagnacova, & O'Donnell studied why students choose Information Technology (IT) related majors as undergraduates (2006). McInerney, et al, wanted to understand student perceptions about IT majors and careers as opposed to other careers and majors. Life experience before college was a factor in students' choices. If students did well in certain subjects in high school they tended to develop an interest in that field and it may affect their choice for a college major. A major factor resulting from McInernery's research on career decisions included the quality of teaching, courses which offered at an appropriate level of difficulty. "K–12 students

have a negative perception of computing; and reports say the innovation rate in the field has decreased", (Violina 2009).

Interest in Computer jobs, in America, has been declining since 1998 but women's interest in computer careers has declined at a rate of 80%, according to the Higher Education Research Institute. A study of high schools students found that, for women, a perceived barrier to choosing IT for a career was balancing work and home-life (McInerney, et. al, 2006).

Employers are dealing with a talent shortage in Information Technology (IT). Kastrul (2006) thinks the talent short is due to the belief that IT is no longer a viable career path. In colleges of business or computer science, one popular belief is that student preferences are career driven—that is, that university enrollments thrive or decline in response to perceived hiring opportunities in the industry upon graduation (Kuechler, McLeod & Simkin, 2009). Some experts suggest that students may be concerned about self-image regarding their selection of a college major. Another possible factor affecting choice of major is the student's perception of job satisfaction. A fourth influence on selection of a college major is difficulty for the required courses or the perceived rigor for the program. For example students may decide not to choose a computer related degree because they believe it requires too much mathematics.

Friends, family and high school teachers can also affect the selection of a college major. It is not unusual for a high school student to choose a career path because a parent is employed in that career. According to Smith (2003) IT employer expectations for IT professionals are increasing, regarding skills and commitment to the company. These increased expectations may be a barrier to choosing IT as a career.

Ali & Shubra (2010) agree that there has been a sharp decline in computer related college majors. However, in the years since 2008 there have been signs of a slowing in the decline. The enrollment issue is being addressed by reaching high school students, secondary education technology teachers, guidance counselors and by building partnerships with other institutions.

Analysis

Information Systems and Computer Science majors are often grouped in studies of careers and college enrollment. According to Vego (2008) newly declared enrollment in computer science majors declined by 70% from 2000 to 2005. Vego's study reported that sharp declines in computer degree enrollment also happened between 1980 and 1986. So, periodic declines are not unusual.

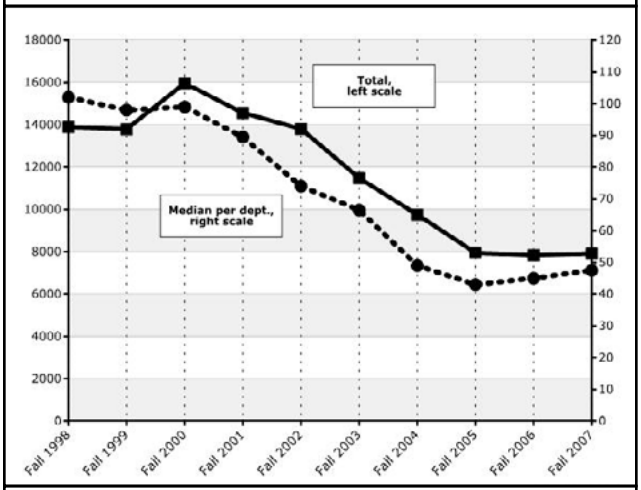
A Department of Education study series published in 2013 tracked college graduates and their careers for 10 years after graduation. The career results showed a decline in the number of graduates holding a bachelor's degree in the Computer and Information Systems field. The percent the U.S. population over 50 years of age with a degree in Computers was 8.9%. Americans ages 30 to 49 years old with a Computer or Information Systems degree was 13.8% and ages 25 to 29 years old was 5.3%. The total percentage of college graduates with a degree in Computer or Information Systems is only 2.9. Top degrees earned were Business/Management 20.4%, Education 13.7% and Social Sciences and History at 9.7%. In 2013 in the U.S., adults with a computer related degree ranked 12th out of 17 degree fields.

Some suggestions for improving enrollment in computer majors are:

- Offer multidisciplinary and cross disciplinary programs
- Fix the computer science image
- Move toward a Bachelor of Arts degree
- Increase women's enrollment in CS
- Train high school computer science teachers
- Make CS courses fun (Ali & Shubra, 2010).

The U. S. Department of Education, National Center for Education Statistics (2012) reported Computer Informa-

Figure 1
Newly Declared CS Majors



Source: CRA Taulbee Survey

Figure 2
Undergraduate College Characteristics:

Percentage distribution of 2007–08 bachelor's degree recipients and enrollment characteristics: 2012

Bachelor's degree major	%
Computer and information sciences	2.9
Engineering and engineering technology	6.0
Biological and physical sciences, science technology, mathematics, and agricultural sciences	7.3
General studies and other4	3.0
Social sciences	15.2
Humanities	11.7
Health care fields	7.6
Business	23.3
Education	8.2
Other applied	14.9

Cataldi, E. F., Siegel, P., Shepherd, B. & Cooney, J. (2014)

tion Systems and Information Science majors make up only

Ali & Shubra's suggestions do not specify a plan to execute. But, the suggestions can be summarized by simply saying, increase the supply of students in computer majors by establishing relationships with high schools, community colleges and undeclared majors. Faculty could participate in high school career days, sponsor computer technology competitions for high school students, guest lecture at community colleges and build transfer credit courses at the high school and community college level.

Conclusion

High school and college age students have many misconceptions about information technology careers and these misconceptions are likely based on past trends. In the late 1990's and early 2000's outsourcing for IT services was a trend. This was followed by a trend of insourcing of IT talent. Both trends were probably the result of declining IT talent developed by colleges. Yet, the talent shortage perpetuated the misconception that IT was not a good career choice (Kastrul, 2006). The 2007 Tech Appeal Index found that "there has been an increase in technology professionals' fear that jobs will be outsourced overseas.

College students have dropped out of technology related courses due to lack of preparation in high school. The U.S. GAO found that "out of the several hundred students who left technology fields, 40 percent of those left the program due to reported problems related to high school science preparation." (Warlick, 2009). The GAO study listed the top three challenges for high schools offering computer related courses were; rapidly changing technology, lack of staff support or interest, and lack of curriculum resources.

Perceptions among young professional regarding the future of IT jobs is the technology decline of the early part of the 2000's and concern for another dot-com collapse. It is also difficult for IT graduates to break into IT careers because the IT talent shortage is forcing employers to look for experienced people before they hire entry-level graduates (Kastrul, 2006). The stereotype that IT professionals are "geeks" also makes the IT career choice unattractive to young people. The IT profession is identified as male-dominated, overworked, and underappreciated.

IT salaries do not seem to agree with the indicators that show a shortage of IT talent. Since 2001, IT salaries have not increased significantly more than other career disciplines. Supply and demand would state that if there is a talent shortage compensation for IT people would increase to attract more talent. However, studies have shown the talent gap is being filled by insourcing IT talent from other countries such as the Middle East, India and China. Most recently, businesses are discovering that insourcing talent brings its own challenges.

Recognizing the talent shortage and the decline in computer-related college majors is the beginning for developing solutions. Colleges should develop relationships with local high schools to help over-come teacher and technology challenges. Colleges could also build partnerships with businesses and offer education opportunities for employees. The future for IT in business and colleges has to be met together.

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