

DECLINING CIS MAJORS AND STUDENTS' PERCEPTIONS OF THE IT PROFESSION

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Abstract

It is widely known that over the last 6 years there has been significant decline in the number of U.S. students who choose Computer Information Systems (CIS), Management Information Systems (MIS) and Computer Science (CS) as a major. Studies show that there are several reasons for this decline, most of which involve students' inaccurate perception of the IT profession, particularly with respect to job prospects and career opportunities. This paper examines current research to compare students' perceptions of IT to the actual current and projected IT profession. This comparison may provide valuable information for CIS/MIS educators when counseling or recruiting students who are considering CIS/MIS as a major.

Keywords: IT profession, computer career, declining computer majors

Introduction

All statistical evidence points to a steady decline in the number of students who are electing to major in a computing-related field, such as Computer Information Systems (CIS), Computer Science (CS), or Management Information Systems (MIS) (Kessler, 2005; Lennox, 2005; Patterson, 2005). The decrease in computing enrollments coupled with a large number of pending baby-boomer retirements is expected to create a substantial shortage of skilled IT workers in the U.S. Although it has not become a serious crisis, if this trend is not reversed soon, employers will begin noticing a shortage of skilled potential employees in IT areas within the next few years (Chabrow, 2004; Kessler, 2005; Murphy, 2005.)

What are the reasons for the dramatic decline? Research has been conducted to determine the factors that influence a student's decision concerning a CIS major. This research shows that students perceive that there will be limited opportunities for their career in the IT industry when they graduate. This paper will look at students' perceptions of the IT job market and compare them with the actual situation to determine if these perceptions are accurate.

Background

The number of students majoring in computing degrees has fluctuated greatly over the last twenty-five years. According to Computing Research Association's Taulbee Survey (Zweben, 2004), undergraduate Computer Science (CS) degrees awarded nearly quadrupled in the early 1980s to over 42,000 degrees per year. This was followed by a period of swift decline and a leveling off during the 1990s of approximately 25,000 degrees per year. During the late 1990s, CS degree production again surged to over 43,000 in 2001. Since 2000, however, there has been a steady decline in the number of CS degrees with a total of 14,185 awarded in 2003/2004. In addition, the number of students that have declared CS as their major has declined steadily and is now 39 percent lower than in the Fall of 2000 (Vegso, 2005). Figure 1 shows the enrollment figures for 1971-2004 for incoming first-year students who indicated that Computer Science was their probable major. Some predict that this trend will probably continue for the next ten years (Vesgo, 2005).

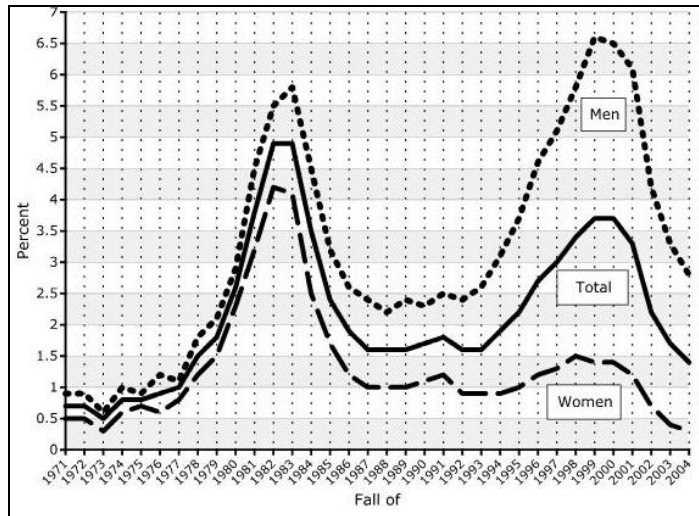


Figure 1. Computer Science listed as probable major among incoming first-year students (Vesgo, 2005)

Current figures appear to indicate that student majors in Computer Information Systems (CIS) or Management Information Systems (MIS) are also declining. Although figures are not compiled for CIS/MIS nationwide, the levels of CIS/MIS majors at the authors’ university and statewide appear to mirror the trends of CS majors. The authors own CIS department has seen a 32 percent decline in CIS majors since 2000. Examination of the enrollments in CIS/MIS for other Louisiana state universities indicates that at the statewide level there has been an even larger decrease (43 percent) in the number of students seeking a CIS/MIS degree since 2000.

Reasons for the Decline

A recent study surveyed CIS/CS/IT faculty at universities that offer these degrees (Lenox, 2005). Seventy-six (76.1%) of the respondents reported that enrollment had decreased in the past two years. When questioned about the reasons as to why the respondents felt that enrollment had declined at their institutions, sixty-seven (67%) blamed the outsourcing of CS/IT jobs overseas, sixty (60%) stated the economy in general, sixty (60%) cited the dot.com failure, forty (40%) indicated that the slow down was cyclical in nature, and twenty-seven (27%) stated the decline in students’ analytical abilities.

The author’s own recent research has provided some information concerning the cause for the enrollment decline (Lomerson, 2005; Pollacia 2006). A survey was administered to students in freshman-level introductory computer courses offered by the College of Business to ascertain their differential knowledge of the various computer career fields and to determine the factors that influenced their selection of college and major field of study.

The students were asked if they had ever considered a college major dealing with computers (Table 1). If the student selected one of the choices indicating they were not in a computer related major, they were directed to a follow-on question based upon their selection. If they chose “Yes, but I did not pursue it” or “No,” they were also directed to a follow-up question. One encouraging fact to emerge from this section was that 26% of the respondents had considered a computer-related major, but had decided upon some other major.

Table 1: Did you ever consider a college major dealing with computers?

Answer Choices (select one)	Responses	
Yes, I am currently studying a computer-related major.	36	25%
Yes, but I did not pursue it.	38	26%
No.	71	49%

The follow-up question asked the students to indicate the reason why they did not chose a computer-related career. The results uncovered a variety of causes for the disinterest in a computer career. For example, several reasons involved personal likes and dislikes (i.e. I don't like computers or I don't want a technical career), while others indicated a lack of accurate career information, and the perception of a weak job market. The survey also confirms that students have limited knowledge of the fields of study or career opportunities in CIS.

One particularly surprising result was the fact that 68% of the respondents reported choosing their major using only self-developed information. They appear to have given limited influence to family, high school counselor, peers, or the popular press. The authors initially believed that high school counselors played a large role in the student's career decision-making process, but the results indicated otherwise. The survey results show that students have a high level of dissatisfaction with their high school counseling experience.

A related study produced very similar results (Crampton, 2006). Respondents in this study were business students in introductory business classes. The respondents indicated that they were knowledgeable about careers in management, marketing, accounting, and finance; and were least knowledgeable about information systems. This suggests that while the students are part of a generation known for its pervasive use of technology, they have little knowledge of, or interest in, computer-related careers.

The study also shows that factors related to the profession itself had greater importance when selecting a major than factors related to the university program in that profession, the influence of high school counselors, teachers, friends, or family. These factors are related to career outcomes and characteristics of the profession itself, such as long-term salary prospects, the probability of working in the field after graduation, the starting salary, job security, and the prestige of the profession.

The survey also asked the respondents to indicate the source(s) of information upon which they based their selection of college major. Of the information sources listed, the sources of highest importance were television and movie portrayal of the occupation, the college/departmental website, brochures, and other printed material. Presentations by faculty, current students, or invited speakers were all rated very low, as were informational CD's and DVD's. Unfortunately, these students are deeply influenced by television and movies when making career choices. This is not good news for our profession, where the IT professional is most often shown as the "geek", "nerd", or as being stuck in an office cubicle writing computer code.

Comparison to Reality

In actuality, students' perceptions of the short-term and long-term career opportunities in the IT profession are not aligned with reality. The Bureau of Labor Statistics Occupational Outlook Handbook indicated that the largest job gains will come in the fields of financial services, technology, health care (Bureau, 2006.) The handbook states "Among all occupations in the economy, computer and healthcare occupations are expected to grow the fastest over the projection period (Table 2.) In fact, healthcare occupations make up 12 of the 20 fastest growing occupations, while computer occupations account for 5 out of the 20 fastest growing occupations in the economy. In addition to high growth rates, these 17 computer and healthcare occupations combined will add more than 1.8 million new jobs."

Table 2: Top Ten Fastest-growing Jobs by 2014

Home Health Aides	60%
Network Systems and Data Communications Analysts	58%
Medical Assistants	55%
Physician Assistants	50%
Computer Software engineers, applications	48%
Physical therapist assistants	45%
Dental hygienists	44%
Computer Software engineers, systems	44%
Home care aides and dental assistants	40%
Database Administrators	38%
Network and computer systems administrators	38%

Other employment analysts write that the recent upturn in the U.S. economy has resulted in continued growth, and is particularly good for IT. The hiring in IT is slated for continued growth (Paulson, 2006.) Annie Fisher, a senior writer at Fortune, writes:

Software engineers are in demand, too. The number of software engineering majors has plummeted by about 40% over the past decade. "Companies will compete for a scarce resource by offering more money," notes Dale Welch, a partner at Boston-area staffing firm Winter, Wyman & Co. "This year we're seeing starting offers as high as \$90,000 for top MIT grads. The norm seems to be between \$60,000 and \$70,000." That's a big jump from average starting pay of \$45,000 just two years ago, and the trend seems likely to continue for several more years (Fisher, 2006.)

MONEY Magazine and Salary.com, a leading provider of employee compensation data and software, (Money 2006) researched hundreds of jobs and compiled a list of the "Top 10 Best Jobs in America". The careers shown in Table 3 were rated the highest.

Table 3: Top 10 Best Jobs in America

1. Software Engineer
2. College professor
3. Financial adviser
4. Human Resources Manager
5. Physician assistant
6. Market research analyst
7. Computer IT analyst
8. Real Estate Appraiser
9. Pharmacist
10. Psychologist

The criteria for rating the jobs included projected job growth, annual salary, work environment, annual job openings, stress levels, flexibility in hours, creativity, and the opportunities for advancement in the field.

The reality is that IT is one of the fastest growing areas of employment, with high salaries and earning potential. Two of the most highly rated 10 best jobs are in IT. When we compare the students' perception of the IT profession to the current and projected factors, it is readily seen that students' perceptions do not align with reality. Much of the research indicates that students think that there are no jobs in IT, that all good jobs are being offshored to China or India. They have a perception that the profession is not "cool", as it is portrayed on television and in movies. It is apparent that students are not receiving enough accurate information concerning the IT profession, particularly when they are in high school and are considering their college major.

Conclusion

We are faced with significant decreases in computer-related majors in our colleges and universities. Several studies attempt to understand the reasons for this dramatic decline. Many of the reasons why students opt out of computer-related careers are due to inaccurate or insufficient information concerning IT careers. What was surprising to the authors was the large number of students who reported choosing their major using only self-developed information. We were surprised at the limited influence of family, high school counselor, peers, or the popular press. The authors initially believed that high school counselors played a significant role in the student's decision-making process, but the results of our study indicated otherwise. The results show that students have a high level of dissatisfaction with their high school counseling experience. Other similar studies have similar conclusions.

We have tried to show that the students' perceptions of the IT profession are significantly different from the real situation. The Bureau of Labor Statistics Occupational Outlook Handbook shows that 5 of the top 20 fastest growing occupations through 2014 will be in the Information Technology area. All indications are that the salaries are high with good earning potential, and offer a nice quality of life. This is not the perception of many college students who think of the computer professional as a "geek" or "nerd", who do nothing but program inside of an office cubicle.

While we may not be able to "win over" every student who has an interest in computers, there is obviously much that can be done to improve the quality of information given to students, especially when they are still in high school. In addition, this lack of knowledge might be remediated effectively by discussing career topics as part of introductory computer classes. This may help to counter any inaccurate information acquired by the student prior to enrolling in college and, at the same time, provide the very knowledge that the student needs to make an informed career choice at a point in their academic pursuits when this choice is still viable. We need to be more proactive as advocates of the IT profession to attract the brightest minds to study technology.

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