

# Outsourcing, H1B Visas, the Economy, and Enrollments in Information Technology

Marvin Albin

[malbin@usi.edu](mailto:malbin@usi.edu)

Mehmet Kocakula

[mkocaku@usi.edu](mailto:mkocaku@usi.edu)

University of Southern Indiana  
Evansville, IN 47710

## Abstract

Enrollments in information technology (IT) nationwide have fallen drastically since 2000. A number of factors have been identified as reasons for the decline include outsourcing/offshoring, the dot com bust, the downturn in the economy, and the H1B visa program. Others have suggested that the IT field has lost its glamour and the curriculum has become stagnant and has not reflected what employers want or what attracts students. This is a review of the named causes and suggestions for curriculum changes that could help stabilize and recover the loss in enrollment. The key is changing the perception while at the same time changing the curriculum.

**Keywords:** IT enrollment, outsourcing, offshoring, H1B visas, IT curriculum

## 1. INTRODUCTION

"It's kind of ironic to have somebody graduate from Stanford Computer Science Department and there's not enough H1B visas, so they have to go back to India...And I have people who have been hired, who are just sitting on the border waiting." David Broder quoted Bill Gates in *Knight Ridder Tribune Business News*, March 19, 2006.

Is that the problem? What about the job possibilities of graduates from your Computer Information Systems (CIS) and Computer Science (CS) programs? Is it only the students from foreign countries who hold student visas who can't get jobs?

Bill Gates was in Washington that week to testify before Congress to support increasing the number of H1B visas so that more workers from foreign countries could be brought into the US to work in technology jobs for which there supposedly are not enough US citizens to meet the demand. The limit of

65,000 H1B visas annually was proposed to be increased to 115,000. In 2005, the 65,000 limit was reached in August. Gates said, "If you are graduating from a reasonable university in this country, with a degree in computer science, you have many job offers." (Broder 2006)

Over 800 companies now sending jobs overseas or choosing to employ overseas labor according to Lou Dobson (Brandel 2005).

The downturn in the economy combined with the use of H1B visas and outsourcing has convinced many would be technology students to avoid choosing CIS or CS as majors. Enrollment in IT programs at Colorado University fell about 60 percent from its peak in 2000. (Williams 2006) Washington State University's IT enrollment is down 60 percent; the University of Virginia's is down 50% (Gibson 2005). Enrollment in CIS/CS/Computer Engineering programs

nationwide fell 40 percent from 2001 to 2003.

Is there a connection among outsourcing, the granting and increasing of H1B visas, the downturn in the economy and enrollments in information technology (IT)? It is fairly easy to build a case for any one of these factors to show cause for the decline in enrollments in IT, but did they come together and produce the significant decline that has occurred?

Each of the factors is explored independently first and then suggestions are presented to help restore the attractiveness of the IT field for study by students are identified.

## 2. H1B VISAS

For its first 100 years, the USA had an open door policy regarding immigration. Everyone was welcomed without limits. The first limitations were regarding "undesirables" and later exclusions were passed for citizens of certain countries. It was nearly the twentieth century before immigration laws were passed regarding types of work being performed and it wasn't until the 1990's that legislation was passed to allow immigrants to work in certain fields. (Murthy 2000).

The Immigration Act of 1990 established an annual quota of 65,000 H1B visas. The cap was raised to 80,000 in 2000, 87,500 in 2001, 130,000 in 2002, and 195,000 in 2003 after which it returned to 65,000 for 2004 and 2005. Now Congress is again considering raising the limit at the request of IT companies and their outsourcing partners from India. Most of the visas have been used for IT professionals. (Kuhl 2003)

While testifying in Washington, DC, in March, 2006, Bill Gates said that the "high-skills immigration issue is by far the No. 1 thing" on the agenda for Microsoft and for the electronics industry generally. "This is gigantic for us."

Arguments used in support of increasing H1B visas include the U.S. Bureau of Labor Statistics report of unemployment among computer and mathematical operators at less than 3 percent.

A lawyer in Detroit, Rona Lum, has begun to specialize in working with small businesses to help them obtain H1B visas. She charges

a flat \$1,000 fee for an information technology worker and \$2,500 for a physician. (Cain 2005) The employer files paperwork with the Department of Labor, Bureau of Citizenship and Immigration Services, and the U.S. Department of State. Lum says that her clients must prove to the U.S. government that they have tried to find employees here first.

This contrasts greatly with other reports. McAleavy (2004) reports that the jobless rate for computer scientists was 5.2 percent in 2003 and some estimate that 10 percent of the jobs were being filled annually by workers from overseas.

The loss in computer-related jobs here is having a negative impact on college IT enrollments. The Computing Research Association in Washington, DC says that undergraduate enrollment in computer technology and engineering was down 21 percent in 2004-2005 compared to the prior academic year (Computing Research Association 2004).

## 3. OUTSOURCING

Forrester Research Inc reports that 400,000 tech jobs have been sent overseas and it expects that number to climb to 3.3 million jobs by 2015. The non-partisan Economic Policy Institute says U.S. jobs in software-producing companies alone fell by 128,000 or 10 percent from 2000 to 2004. (McAleavy 2004).

John Wade, CIO at Saint Luke's Health System in Kansas City, MO, is quoted as saying, "Every service company today has to have an offshoring component. You can't afford to say 'We'll use only U.S. labor' and that's creating a problem for our country." (Brandel 2005. Many CIO's see outsourcing, insourcing, offshoring, near-shoring, and rural sourcing as an economic necessity. Saint Luke's doesn't currently use offshore out-sourcers, but every three years a formal review is done to determine whether IT costs could be reduced by using that option.

Outsourcing is not the great costs savings many think it will be. Savings are more in the 20-30 percent range rather than the 70-80 percent range that a first look might suggest (Brandel 2005). Most don't first consider that managing offshoring costs about 8

percent of the contract's value and businesses need to retain 7-12 percent of their original head count to manage outsourcing relationships (Brandel 2005).

An official at the Washington Alliance of Technology Workers, a union group, asks, "Why major in computer science when technology jobs are headed offshore?" (Ernsberger 2005). In a second wave (thought to be at hand), which promises to be bigger and more disruptive than the first, sizable numbers of skilled, reasonably well-educated middle-income workers in service-sector jobs long considered safe—accounting, law, financial and risk management, health care and information technology—could be facing layoffs or serious wage pressure.

India has become a favorite for high-end telecommunications, software development and R&D work primarily because workers there have an attractive combination of English language skills and technology skills. Microsoft is steadily moving most of its customer-service functions, except for its "premier" customers, to India. Sangeeta Gupta, a vice president of the National Association of Software and Service Companies, predicts that IT and business operations outsourcing business will be a \$50 billion industry by 2008 (Ernsberger 2005).

Harvard economist Richard Freeman says "If there's a whole lot of guys who do the same work as you can, that's not so good for you. If the labor supply is big, you're going to be in trouble." (Ernsberger 2005). India turns out about 150,000 engineering grads every year and China produces 250,000.

The negative impact of outsourcing on IT jobs is easily documented.

#### 4. CURRICULUM STAGNATION

According to Klawe and Shneiderman (2005) the field of computer science faces a crisis as a result of:

- Declining student enrollment
- Reduced government and industry support for basic research
- Low public interest, even antipathy
- An unsympathetic political climate

In addition, according to some, the curriculum has been much too static and has relied too much on programming (Denning 2005).

Another factor appears to be the perception that especially CS and CIS programs are only about programming. Most students today are not attracted by the prospect of being a programmer. The percentage of all college freshmen planning a major in computer science dropped to 1.4 percent in 2004 down from a peak of 3.4 percent in 1998 and a low of 1.6 percent during the previous downturn in CS enrollments in 1992-93. Will the apparently improving job market bring student interest back up? It is not likely. According to Klawe and Shneiderman (2005) students are finding other career fields most glamorous such as bioinformatics and molecular biology. They say students believe good careers in computing were lost in the dot-com bust and will not return because of offshoring.

#### 5. SUGGESTIONS FOR CHANGE

Potential students of IT will be more attracted to programs that include things like digital government, social computing, health care, and services sciences. IT programs can be re-oriented to deal more directly with these issues. A first course that is not a prerequisite could be offered to cover more glamorous topics to entice students into the major. This course could include a study of web site design, mobile devices, and multimedia including animation and podcasting. An introductory course in multimedia computation attracted large numbers of students at Georgia Tech including many women and it had a retention rate of over 97 percent. (Tew, Fowler, Guzdial 2005)

A good example of the potential can be seen from the growing enrollments in Infomatics schools that generally focus on these areas by combining technology with other fields. The new Computer Science Teachers Association sponsored by ACM is another attempt to increase the attractiveness of student IT by making high school teachers more aware of what can be done and preparing them to tell their students about it.

Perception is the key; not publicity. After Bill Gates visited several campuses in February 2004 making the case that IT was still a good career field, there was little change in enrollment. Denning and McGettrick (2005) have proposed developing modules of less

than a semester in length. They suggest these topics:

#### First year

- Programming and multimedia
- Great innovators in computing
- Computers in support of space travel
- Building your own computer
- Securing your computer
- Robots

#### Second Year

- Building search engines and other software tools
- Great innovators in computing
- Forensics
- Puzzles and logic
- The web and digital libraries
- Computer graphics and animation

#### Other possible modules

- Benefiting from e-learning
- Biological computing
- Choosing a computer
- Environmental computing
- Health computing
- e-government
- e-commerce
- Mobile computing

Faculty may have to participate in professional development to prepare to teach these topics.

John Rockart of MIT believes that a new curriculum is needed (Gibson 2005). It should be a business technology curriculum with more project management.

Michael Corbett, president of a consulting firm for outsourcing, advises moving from "content" to "context" jobs as a way to avoid having a job outsourced (Brandel 2005). Context-oriented jobs are those in which you need to understand how technology connects to the user. That should be incorporated into the curriculum.

### 6. The Future

Company recruiters are coming to college campuses with more IT jobs than in the past, sometimes exceeding the number of qualified graduates to fill them according to college placement administrators.

We must give our students real-world experience with business and management in addition to the technical side. Businesses today are looking for employees with skills beyond traditional programming and IT expertise. The demand for this need breed of IT professionals is growing.

The solution is two-fold. Changes in perception and changes in the curriculum. We can overcome the negative influences of H1B visas and offshoring.

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