Information Technology (IT) Growth in enrollment in Higher Education in India.

A brief overview by Eges Egedigwe
The Problem – Decline in Enrollment

- An analysis of enrollment results indicates that the popularity of computer science (CS) as a major among incoming freshmen at most Colleges/Universities in the US has dropped significantly in the past four or five years.

- The proportion of students who thought that they might major in computer technology with concentration in programming has fallen to levels unseen since the late 1980s. CRA, March 2006 - http://www.cra.org/CRN/articles/march06/vegso.html

- What should be done about the rapid decline in enrollment in computer science programs?
IT Boom in most colleges in India.

- As interest in computer science drops in the U.S., India and China are emerging as software engineering hubs with cheap labor and a skilled work force.
- In fact, India has been working hard to import IT work.
- The big question to ask is - what factors account for the increase in enrollment in computer science programs in institutions of higher learning in India?
The Ingredients to the increase in Enrollment.

- Several factors account for the success and growth of IT enrollment in Indian Schools.
- These include, but not limited to, culture, population and manpower.
- *Others are Low salaries, Stable political system, Democracy, Open economy, and Expatriate network.*
- Some of these factors are based in more general and societal context that is hard to emulate once the context changes, while others are of the nature that they can be adapted and emulated in other contexts as well.

Cultural - Indian culture is more family oriented rather than individualistic. This induces people to conform to established frameworks and systems – a favorable platform for Indian colleges and university.

The Success of the SPI Efforts in India,
http://www.cse.iitk.ac.in/users/jalote/papers/IndiaSPI.pdf
Population:
- size:
  - 1,027,015,247
- Population urban:
  - 285,354,954 (27.78%)
- Physical size
  - 3.3 square kilometres
- Density:
  - 324 persons per square kilometre

Software industry got an opportunity to grow fast and it grabbed it and went on a high growth trajectory. This trajectory required infusion of a large number of new engineers in the organization every year, which the Indian population is capable of providing.

Mala Ramanathan, AMCHSS, SCTIMST, mala@sctimst.ac.in, www.sctimst.ac.in, July 2007
The Success of the SPI Efforts in India, http://www.cse.iitk.ac.in/users/jalote/papers/IndiaSPI.pdf
Manpower:
- Software manpower – Due to the opportunities the software industry offers, best of the people go to software engineering.
- The personality of the people joining the software industry also seems to be different - This manpower is ambitious and wants improvement in the way the organization works, which creates a need for process orientation and improvement.
- Age of Engineers - Average age of the engineers is in the 20s and that of managers is late 20s to early 30s. This helps in various ways, one of which is that engineers and project managers are quite receptive to change, as they have not invested too much in some specific way of working, and indeed want changes. And another is that youth allows for hard work, positive approach to life, etc. which helps considerably.

The Success of the SPI Efforts in India, [http://www.cse.iitk.ac.in/users/jalote/papers/IndiaSPI.pdf](http://www.cse.iitk.ac.in/users/jalote/papers/IndiaSPI.pdf)
- **Low salaries** – A successful career requires a college or university system that is both highly advanced and produces a large number of graduates in software - the two does not always go together as the case of Japan indicates.

- **Stable political system** - This ensures that customers need not worry about tanks rolling in the streets next week to overthrow the government or about paying bribes to corrupt government officials. A stable political system has the potential to breed a stable economy, which may translate to peace of mind – favorable for academics. Indian political system has been stable for while now.

---

Democracy. Repressive regimes do not foster the kind of independent, critical thinking that makes good software developers for any economy. This is not the case with Indian, which has translated to thinking in the right direction.

Governance is Participatory, decentralized, & responsive

Mala Ramanathan, AMCHSS, SCTIMST, mala@sctimst.ac.in, www.sctimst.ac.in, July 2007
Open economy. The Indian social and business climate, to a great extent, encourage and reward entrepreneurship. A trait that translates favorably to the academic community.

Expatriate network - It also helps if, as in the Indian and Chinese cases, a sizable diaspora exists in the customer countries to provide the indispensable human contacts.

What are the prescriptions?

- Faced with the challenges of low enrollment in computer science programs and off shoring, what should we do?
- The decline in enrollment added to the development of off shoring raises a new challenge for those of us entrusted with educating future software professionals in the industrialized world.
A conversation/interview with a computer engineering Professor at the University of Hyderabad (UoH) suggests a recognition of the impact of off shoring on the software engineering process.

It is not enough to give our students the tools and languages that will get them a job on graduation day when legions of programmers, paid a fraction of Western salaries, have also mastered them.

Programming should be taught as a creative activity. For a graduate to be successful in software development, s/he must possess the kind of inquisitive and critical mind that such systems encourage.

University of Hyderabad, July 26, 2007
To bolster our competitive advantage on the global software scene, US universities must continue to provide a broadly based education that includes a strong scientific basis but does not exclude the humanities.

Along with education, software engineering research should take outsourcing into account.

Most project management tools do not provide sophisticated enough support for distributed development – which is the order of the day.

Significant improvement is needed in the area of process model.

Sebastian Mallaby: [http://www.washingtonpost.com/wp-dyn/content/article/2006/01/02/AR2006010200566.html](http://www.washingtonpost.com/wp-dyn/content/article/2006/01/02/AR2006010200566.html), Jan 2006
Another research area that should get a boost from off shore development’s growth is requirements engineering.

To be competitive, our graduates must adapt to the new reality and become the best at what they do by using the right tools and methods. Anything else is futile.

Sebastian Mallaby: [http://www.washingtonpost.com/wp-dyn/content/article/2006/01/02/AR2006010200566.html](http://www.washingtonpost.com/wp-dyn/content/article/2006/01/02/AR2006010200566.html). Jan 2006
What will make you truly irreplaceable is not “Security by obscurity” but to show exceptional productivity and to deliver stable code - bug-free, extensible, reusable.

Cultivate system thinking and whole-life-cycle skills.
Any recommendations for our High Schools?

- At the high school level, the system needs teachers who serve as experts available for consultation, rather than lecture on technical knowledge or set exercises of technical skills.