



27 December 2012

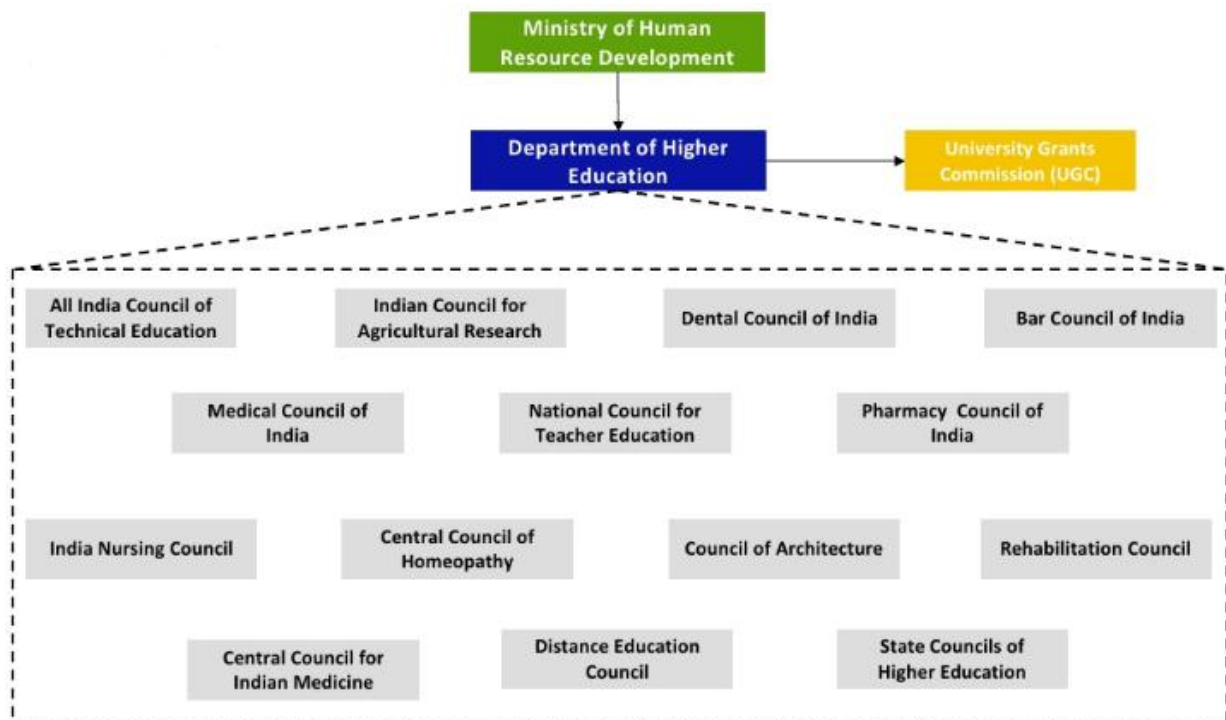
# IT/ICT Adoption in Indian Higher Education

## 1. Higher Education in India – A Quick Glance

Higher education plays a pivotal role in the development of a country, as it is viewed as a powerful means to build knowledge based society. In India, higher education imparted by universities is facing challenges in terms of *Access, Equity and Quality*. The Government of India has taken several initiatives during the Eleventh Five Year Plan period to increase *access* to higher education by adopting state specific strategies, enhancing the relevance of higher education through Curriculum reforms, Vocational programs, Networking, Information Technology adoption and Distance Education along with reforms in governance. However in terms of Gross Enrollment Ratio (GER), India still lags behind the worldwide average and emerging countries like Brazil and China.

The Indian Higher Education System has established itself as the largest system in the world in terms of number of institutions and third largest in terms of student enrollment (*after China and USA*). While several new institutions have emerged due to significant increase in private sector participation over the last few years, concerns remain regarding the quality of education being imparted to students.

The main governing body at the tertiary level is the *University Grants Commission*, which enforces its standards, advises the government, and helps coordinate between the center and the state. Indian higher education is decentralized with separate councils responsible for the regulation of different institutions. The diagram below depicts the different councils of Higher Education functioning under Ministry of HRD, GOI.



As of 2011, the institutions break up in India is as below:

Institution Type	Count
Central Universities	42
Deemed Universities	130
Institutes of National Importance	33
Institutions established under State Legislations	5
State Private Universities	73
Private Universities	90
State Universities	275
Autonomous Colleges and Affiliated Colleges	31,000 (approx.)

(Source: UGC and MHRD Reports)

### 1.1. Some Quick facts about Indian Higher Education

- There are 14.6 million students undergoing Higher Education in India as of 2011.
- There has been a significant rise in enrollment from rural population in Higher Education. The GERs in rural areas have been rising steadily and expected to reach 12.84% by 2020.
- A growing number of women are expected to enroll in Higher Education Institutes. Currently over 6.1 million women are enrolled in Higher Education and is expected to grow to 12.15 million by 2020.
- There is a high demand from working professionals for Executive Education programs.
- Three Indian universities were listed in the *Times Higher Education* list of the world's top 200 universities — Indian Institutes of Technology, Indian Institutes of Management, and Jawaharlal Nehru University in 2005 and 2006. Six Indian Institutes of Technology and the Birla Institute of Technology and Science - Pilani were listed among the top 20 Science and Technology schools in Asia by AsiaWeek. **The Indian School of Business** situated in Hyderabad was ranked number 12 in global MBA rankings by the Financial Times of London in 2010 while the All India Institute of Medical Sciences has been recognized as a global leader in medical research and treatment.

(Source: UGC Higher Education in India 2008 – 11<sup>th</sup> Five Year Plan Vol. II)

### 1.2. Spends in Higher Education

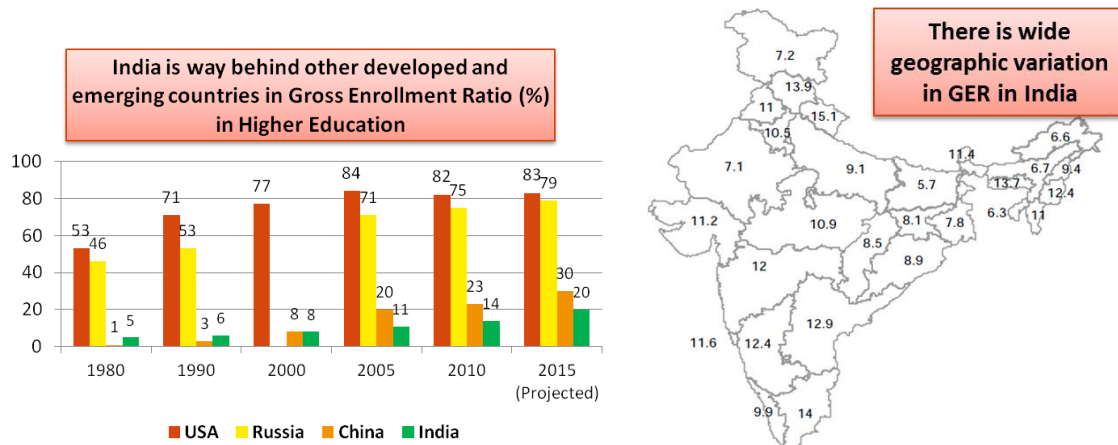
- Current estimates indicate that spends on Higher Education in India to be nearly INR 46,200 crores.
- Private institutions account for majority of the spend
  - Public Institutions (8%)
  - Private Institutions (92%)
- Majority spends in public are for general courses while spends in private institutions are for professional courses.

(Source: EY Analysis)

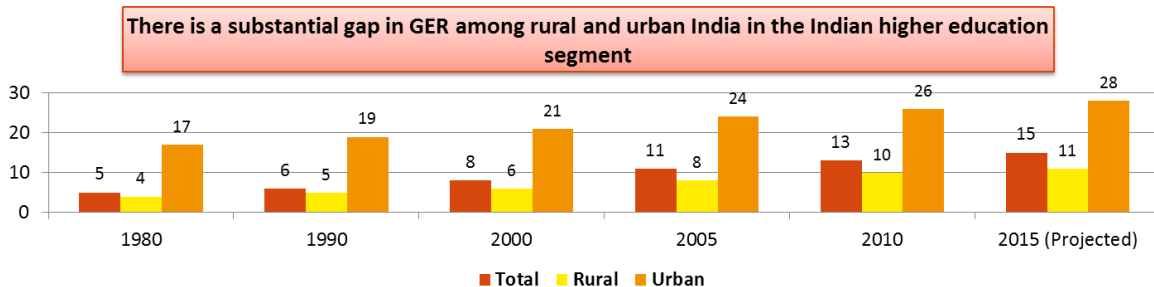
- Education is the 3<sup>rd</sup> largest expenditure group for an average Indian household.
- Nearly 55% of the Indian middle class households have started saving for higher education of their children.

(Source: MAX New York Life: NCAER Survey)

### 1.3. Challenges in Indian Higher Education



(Source: EY-FICCI report 2009, 2011)



The 2011 Ernst & Young – FICCI report on Higher Education noted the following as some of the key challenges for India in terms of Access, Equity and Quality of Higher Education.

1. Insufficient infrastructure to meet the growing demand for higher education. In 2011, 14.6 million students enrolled in higher education in India. By 2020, 40 million students will have to be enrolled if GER target of 30% has to be met. This implies an additional capacity of over 25 million seats would be required within the next decade.
2. There is wide disparity in Higher Education GER across states, urban vs. rural areas, gender and communities that have to be bridged.
3. Faculty shortage (45% professor and 53% lecturer positions were vacant in 2007-08), Deficient physical infrastructure, ill-equipped libraries and outdated curricula continue to plague our higher education system.

The following sections will try to answer “How IT/ICT is acting as an enabler and a catalyst to fuel the growth of Higher Education in Colleges and universities”. Also, the challenges and opportunities ahead of the Higher Education Institutions are discussed in brief.

## 2. IT Adoption in Indian Universities

Use of ICT for promoting education and development has always been a part of policy and plan documents on education. At the moment, the decision makers at both central and state are favoring inclusion of new computer and internet based IT/ICT in education (adopting cloud based virtual classrooms/universities and mLearning initiatives). The Government of India has implemented several national as well as state specific schemes that run concurrent to large number of privately led IT initiatives at school and higher education levels.

However there is significant disparity in ICT usage between institutions in urban areas and those in semi-urban/rural parts of the country. The quality of ICT infrastructure and its use is limited in a large percentage of Autonomous/Affiliated Colleges especially due to lack of trained IT staff, connectivity issues and shortage of funds. The rapid increase in mobile penetration and evolution of 4G wireless technologies such as WiMax/LTE it is expected that broadband connectivity issues can be resolved by the end of the 12<sup>th</sup> five-year-plan (2012-2017) in semi-urban/rural parts of the country. The GoI should take new initiatives to rope in the private sector to provide low cost compute infrastructure for collaboration and research to colleges similar to “Akash” tablet initiative for school children.

The draft National policy on Education framed in 1986, and modified in 1992 stressed upon employing Educational Technology to improve the quality of education. The **Vision, Mission** and the **Policy goals** as laid in the policy are:

### Vision

The IT/ICT policy in Education aims at preparing youth to participate actively in the establishment, sustenance and growth of a knowledge society leading to all round socio-economic development of the nation and enhanced global competitiveness.

### Mission

Device, catalyze, support and sustain IT/ICT and enabled activities and processes in order to improve Access, Equity and Quality.

### Policy Goals

To achieve the above, the IT/ICT policy in Education will work towards,

- Creating an environment in the states to develop IT/ICT knowledgeable community
- Creating an IT/ICT literate community who can deploy, utilize, benefit from IT/ICT and contribute to nation building
- Create an environment of Collaboration, Cooperation and Sharing, conducive to the creation of demand for an optimal utilization of and optimum returns on the potentials of IT/ICT in school/higher education
- Promote universal, equitable, open and free access to state-of-the-art IT/ICT enabled tools and resources to all students and teachers
- Promote development of localized quality content and enable students and teachers to partner in the development and critical use of shared digital resources

- Promote development of professional networks of teachers, continuing education of teachers; guidance, counseling and academic support to students
- Promote research, evaluation and experimentation in IT/ICT tools and enabled practices in order to inform, guide and critically utilize the potentials of IT/ICT in education
- Motivate and enable wider participation of all sections of society in strengthening education through appropriate utilization of IT/ICT.

Following are a few case studies that clearly show the growing footprint of IT/ICT in Higher Education.

- a. **The National Mission on Education through Information and Communication Technology (NMEICT)** is envisaged as a centrally sponsored scheme to leverage the potential of IT/ICT, in teaching and learning process for the benefit of all the learners in Higher Education Institutions in any-time any-where mode. Content generation and connectivity along with provision for access devices for institutions and learners are the major components of the mission.
  - i. So far, nearly 400 universities have been provided 1 Gbps connectivity or have been configured under the scheme and more than 14,000 colleges have also been provided VPN connectivity.
  - ii. A number of other projects have been sanctioned for innovative use of IT/ICT. Some of them are:
- b. Creation of e-content for 996 courses in Phase-II in Engineering, Sciences, Technology, Humanities and Management has been undertaken by IIT Madras.
- c. Consortium for Educational Communication has been tasked with creation of e-content for 87 undergraduate courses
- d. UGC has cleared a proposal to publish e-content for 77 post-graduate courses
- e. **National Programme on Technology Enhanced Learning (NPTEL)**, a joint initiative of the IITs and IISc provides E-learning through online Web and Video courses in Engineering, Science and Humanities streams aiming to enhance the quality of Engineering education in the country by providing free online courseware.
- f. **The National Knowledge Network (NKN) and Connected Digital** has launched an initiative to cover 1,000 institutions besides providing digital campuses, video-conference classrooms, wireless hotspots, laptops/desktops to all students of professional/ science courses and Wi-Fi connectivity in hostels. A major development during the year has been the launch of *Aakash* – the low cost computing tablet on 5th October, 2011. An amount of Rs. 47.72 crore has been released to Indian Institute of Technology, Rajasthan, for the projects pertaining to acquisition and testing of low cost computing devices under the scheme of **NMEICT**.
- g. Using the A-View software developed under the NMEICT, there has been a 14 day teachers' empowerment program conducted for batches of 1,000 teachers at a time by IIT Bombay and are contemplating on a plan to conduct a 2-week long teacher training program for a batch of ten thousand teachers at a time. This program, developed under NMEICT, could become the bedrock for successful implementation of the proposed National Mission on Teachers.

- h. Under the N-List program of INFLIBNET, being run under NMEICT, lakhs of e-books and thousands of high quality paid e-journals have been made available to colleges and universities with a view to inculcating research culture in teachers and students. The model needs to be scaled up for maximizing the coverage and productive usage of the resources made available.
- i. IIT-Bombay has started the program of CDEEP (Centre for Distance Engineering Education Program) as emulated classroom interaction through the use of real time interactive satellite technology (Centre for Distance Engineering Education Program, India, 2007).
- j. The launch of EDUSAT brought satellite connectivity to large parts of rural India. Indira Gandhi National Open University (IGNOU) is leveraging satellite, television, and Internet technologies to offer online courses.
- k. Private sector participation like HP's *Technology for Teaching Grant* has transformed the ICT infrastructure in institutes like Anna University and Jadavpur University.
- l. In 2007, the Distance Education Council (DEC) allowed all premier institutes in the country to offer online courses. Since then IIM-C, IIM-B, IIM-K, XLRI and other management institutes have started offering courses in association with private players like Hughes, Reliance, NIIT, etc.
- m. IIT-Kanpur has developed Brihaspati, an open source e-learning platform.
- n. An increasing number of private players like Hughes Global Education, Manipal Education Group, Centum Learning, UEI Global, Shiv Nadar University, etc. are offering online education courses in association with leading Central and State Universities leveraging with good ICT infrastructure.

### 3. Technology Trends in Indian Universities

Technology will play a bigger role in transforming higher education imparted by universities to the next level. The tools help to create a social, highly collaborative and personalized environment with innovative solutions that will enhance the way students learn, communicate & collaborate and study both on and off campus.

Some of the exciting Technology trends in Indian Universities are:

#### **Digitization of Books (E-Text Books)**

There is an increased trend towards creation of a digital repository of books to create a digital learning environment for students. The digital version of the books embedded with text, pictures along with video, simulations and visualizations help students learn the concepts in an interactive way. The National mission on Education through ICT plans to generate new online course content for UG, PG and Doctoral education. Efforts are already underway to prepare course content for 130 courses (UG and PG).

**Content Delivery using IT/ICT**

Higher Education is purely a content driven play where educational content is delivered through innovative use of ICT. There is an increased trend in higher education institutes to render content through Radio, TV and Satellite

**Open Education Resources**

Many Indian universities are contemplating Technology enabled free access of education resources. AICTE – Indian National Digital Library in Engineering & Technology (AICTE – INDEST) is a consortium set up by the Ministry of Human Resource to enhance greater access and generate annual savings in access of bibliographic databases. UGC has also launched its Digital Library Consortium to provide access to peer reviewed journals and bibliographic databases covering subjects such as arts, humanities, technology and sciences

**Virtual Technical University**

The National mission on Education through ICT is working on a war foot to establish a virtual technical university to impart training to UG/PG students along with new teachers.

National mission on Education through ICT

**Mobility**

With the proliferation of mobile phones on campus, colleges everywhere are compelled to capitalize on feature-rich phones that are capable of much more than just voice calls. Adoption of the BlackBerry, iPhone and other smart devices that have Internet access allows students and faculty to perform a wide range of assignments. Tasks like administration, sharing class notes, downloading lectures, instant messaging, etc., are possible anywhere cell phone service is available.

Mobile phones are also being used to access computer files from remote locations. With services like “Soonr”, students who have forgotten to bring an assignment to class can use their cell phone to access the completed work on their home computer and show it to the professor.

**Social Learning**

The emergence of Web 2.0 and social networking such as blogs and wikis, as well as new online video repository and delivery websites such as YouTube, iTunes U and Big Think is influencing a new trend in higher education. The emergence of smartphones such as the iPhone and other intelligent devices has enhanced mobile learning (referred to as m-learning). These technologies create new channels for content delivery, online video expansion and podcasting. Also, the adoption of virtual reality websites such as “Second Life” has provided higher-education institutions with new venues for class gatherings and learning.



A combination of Web 2.0 tools viz., Blogs, Wikis, Podcasts, Mashups, and Social Networking Communities are transforming the traditional learning environment into something more social and personalized. While traditional Learning Management Systems (LMS) like Blackboard, Sakai, Moodle or Web CT are course-centered and driven by faculty, the new trend in education is to create a “learner-centric” system.

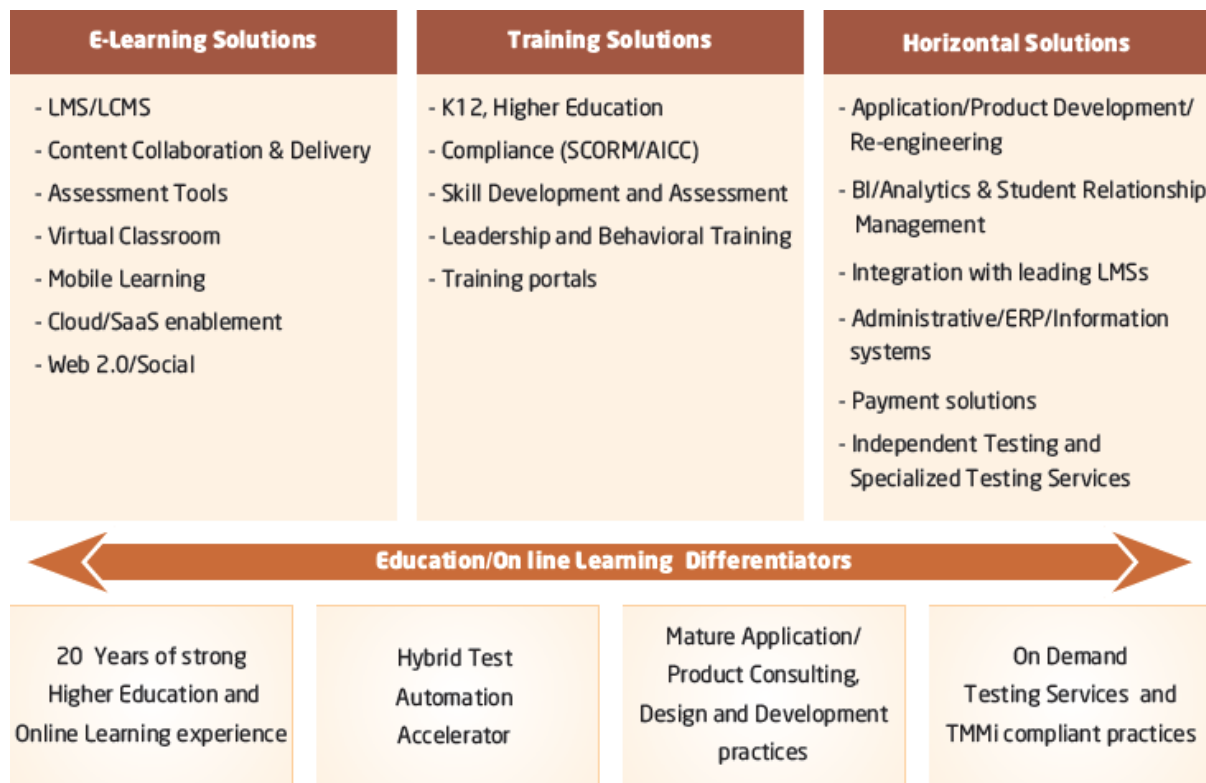
#### 4. Calsoft Labs Offerings to Education sector

Calsoft Labs has been working in the Education space for more than a decade in software development for a wide spectrum of Distance Learning solutions from Virtual Classroom platforms and Payment Gateways for educational institutions, to Virtual Learning Environments (VLEs) for students. We leverage our in-depth technology expertise in Cloud enablement of Learning platforms and Mobility to deliver Online Learning solutions to top universities and K12 schools across the world.

Our solutions have enabled more than 1,000,000 students to have the best in class learning experience in instructor led and virtual learning environments. Our focused offerings to Higher Education Institutions, Universities and Schools are as follows:

- LMS/LCMS Development and Integration
- mLearning Platform Development
- Cloud Migration and
- Online Assessment
- Payment Solutions+

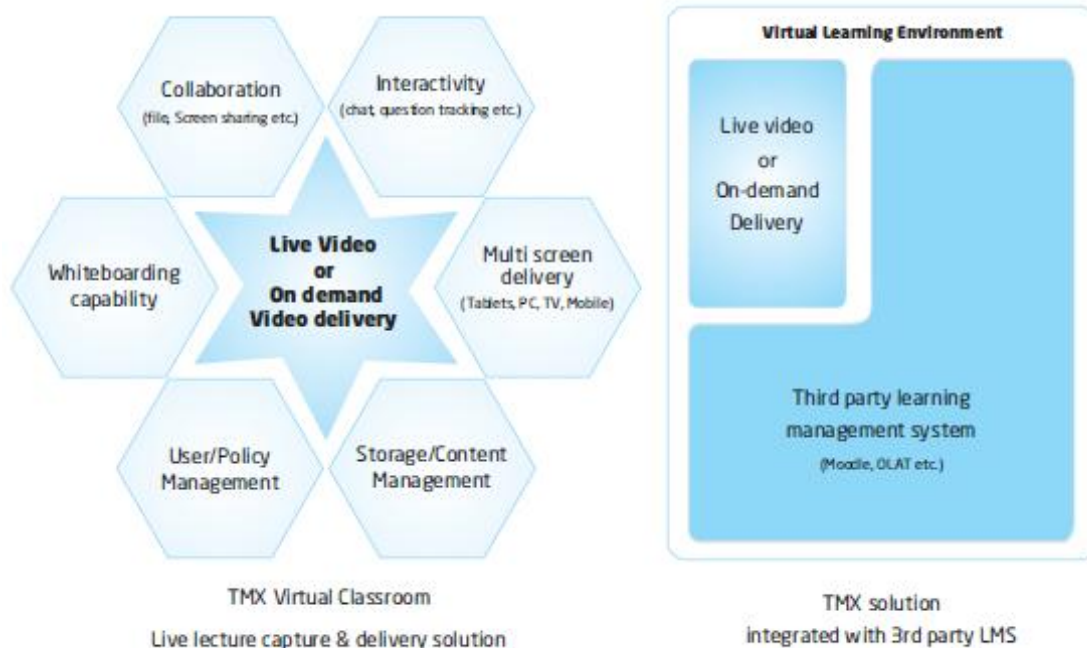
+ We have been supporting a leading payment solution company in the US in engineering their full suite of payment solutions, thereby enabling more than 675 distinguished public and private higher education institutions representing a total enrollment of more than 4.8 million students.



Our Cloud-based synchronous classroom platform could be a game changer for Higher Education Institutes with the following benefits:

- Multi-screen, multi device content delivery
- Anytime-Anywhere learning collaboration
- Low CAPEX and effective administrative tools

The cloud based virtual solution promises to improve Access, Equity and Quality of Higher Education.



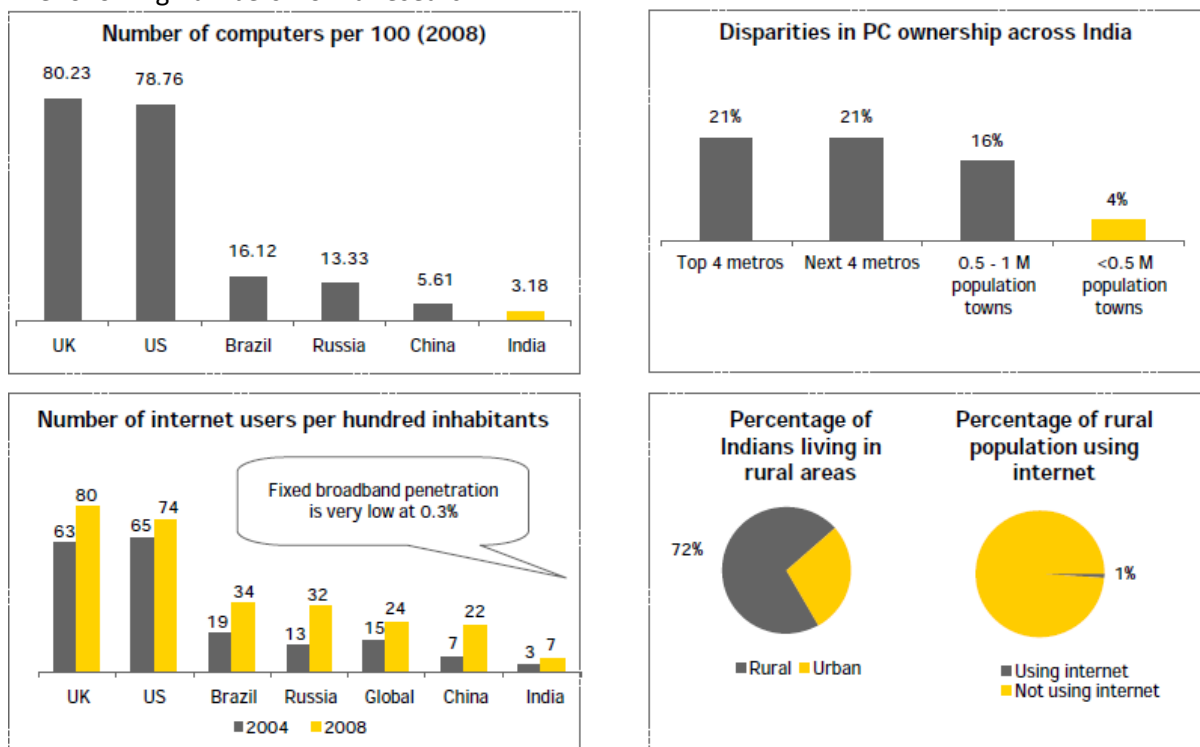
## 5. IT/ICT Adoption in Indian Universities – Challenges

The key challenges affecting the utilization of IT/ICT in Indian Higher Education fall broadly into the following categories:

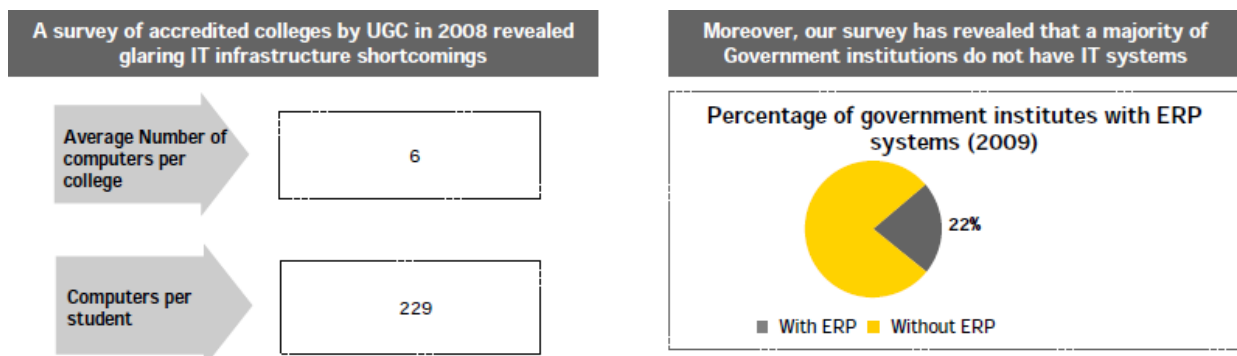
- Lack of required Knowledge and Technology readiness
- Implementation challenges that have contributed to the failure of past initiatives
- Linguistic barriers to dissemination of knowledge

- I. **India faces the challenge of low technology and people readiness** in order to realize the true potential of ICT in higher education with penetration of computers and internet, especially in the rural areas being extremely poor.

The following numbers from a research



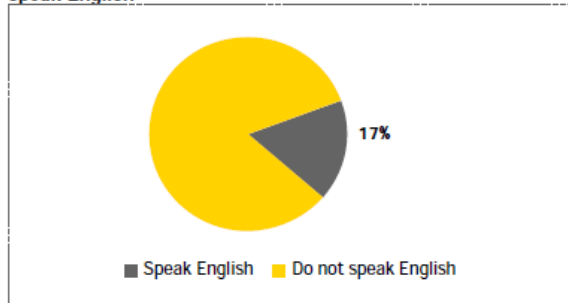
### II. Penetration of ICT systems in higher education institutions is extremely poor



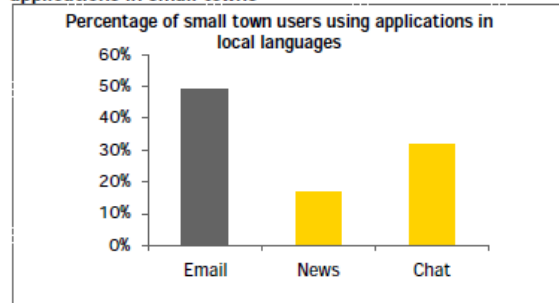
Sources: International Telecommunication Union; The Internet and Mobile Association of India (IAMAI) report "Vernacular Content Market in India,"; UGC: Higher Education in India 2008

### III. There are linguistic barriers that need to be overcome to improve the ICT adoption and penetration.

Out of 368 million literate rural Indians, only 17% can speak English

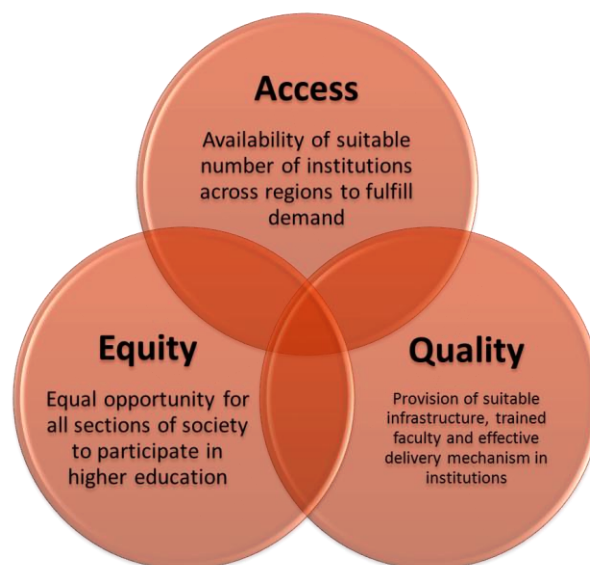


There is heavy usage of local language internet applications in small towns



## 6. IT/ICT Benefits to Universities

The innovative use of IT/ICT is believed to be a game changer that can significantly strengthen India's higher education system and propel the country into becoming a "*Knowledge Superpower*". The innovative use of IT in Higher education addresses the three fundamental challenges of *Access*, *Equity* and *Quality*.



The adoption of IT/ICT in higher education facilitates the following:

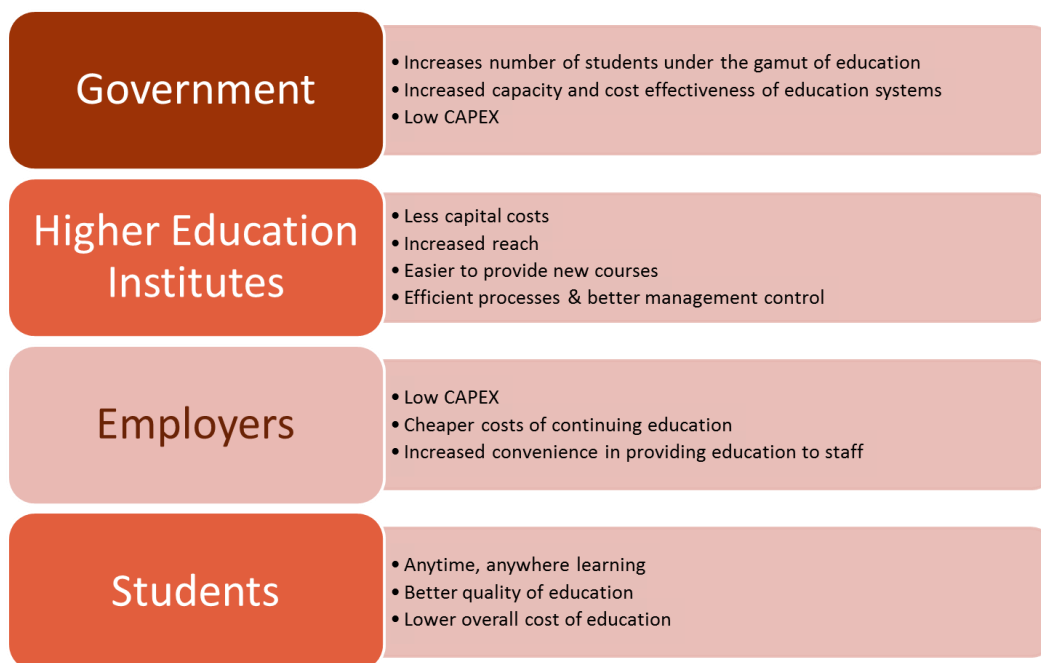
- Improving the access to the system through online education
- Improving the quality of teaching especially across remote locations
- Increasing transparency and strengthening systems, processes and compliance norms in Higher Education Institutes
- Measure students learning participation and effectiveness
- Analyze student behaviour to maximize students involvement, optimize retentions, and improve placements

- Analyze students' performance, placement, application volume, website analytics, and social media metrics for brand audit

Apart from this IT/ICT can perform multiple roles in Higher Education to benefit all stakeholders. To give an example:

- **Mode of Course Delivery:** Distance Learning with course delivery through Internet (virtual class rooms) satellite and other mediums
- **Provide a Collaboration Platform:** ICT provides a platform linking universities and other agencies for collaborative research on many technology projects and course content development.
- **Administrative Support Functions:** ERP systems implemented in universities help complete student tracking and management aspects including admission, enrolment, fees payment, examination and graduation etc.

The benefits to the different stakeholders in Higher Education system through IT/ICT can be seen in the diagram below:



## References

1. Making the Indian Higher Education System Future Ready – FICCI Higher Education summit 2009 ; An Ernst and Young Report
2. Wikipedia - Higher Education in India ;  
[http://en.wikipedia.org/wiki/Higher Education in India](http://en.wikipedia.org/wiki/Higher_Education_in_India)
3. A report to the people on Education ;2010-11, Ministry of HRD , Government of India
4. ICT IN INDIAN UNIVERSITIES AND COLLEGES ; A report by Neeru Snehi
5. National Policy on ICT in Education; Ministry of HRD , Government of India
6. Educational Technology, [http://en.wikipedia.org/wiki/Education Technology](http://en.wikipedia.org/wiki/Education_Technology)

## ABOUT Calsoft Labs

Calsoft Labs provides specialized concept to market Product Engineering and Embedded Design and Engineering services for both mature and established, early stage product and technology companies in select market segments – ISVs, New Media Companies, Networking and Datacom OEMs, Computer hardware manufacturers, Semiconductor companies and Consumer electronics companies. Over the past 20 years, Calsoft Labs has developed and tested a number of software products with complex business logic and workflows that are successfully deployed with several Fortune 500 organizations globally.

Some of our differentiators are:

- ALTEN Calsoft Labs rated in "Execution Zone" in outsourced software product development & among Top 7 players in “Computer peripherals and Storage” - GSPR 2012 Report by Zinnov Management Consulting
- Have helped more than 100 customers develop and deploy some of the most complex software products in the world.
- Deep domain experience in addressed markets: Calsoft Labs offers a repository of Solution accelerators and Test frameworks to help customers get to market faster.
- Agile, Flexible and Reliable partner with a successful track record spanning two decades.
- SEI – CMMi Level 3 certified organization with mature processes designed to address ADMS & product engineering workflows.
- One of the few companies with experience across all layers of Cloud stack(SaaS, IaaS and PaaS)

- Established Cloud practice providing Cloud consulting, Cloud enablement and Engineering, Big Data & Cloud Analytics, Mobile enablement for OEMs, Enterprises and ISVs

## USA

2953, Bunker Hill Lane, Suite 203, Santa Clara, CA 95054.

Ph: +1 925 249 3000 - Fax: +1 925 249 3031

## INDIA

Robert V Chandra Tower, B3, # 149, Pallikaranai,  
Velachery Tambaram Main Road, Chennai – 600 100

Ph: +91 44 4282 9000 - Fax: +91 44 4282 9012

No. 196, Bannerghatta Road, Opposite HSBC,  
Arekere Circle, Bangalore 560 076

Ph: +91 80 2648 5111 - Fax: +91 80 2648 5108

*© 2012 Calsoft Labs. All Rights Reserved.*