

# STUDENT FIRST!

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## DISRUPTIVE INNOVATION IN EDUCATION: Looking to Technology





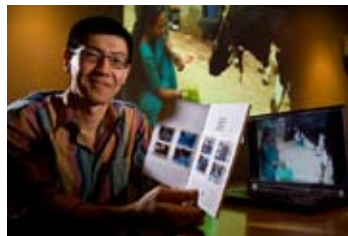
# Disruptive Innovation in Education: Looking to Technology

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**Editor-in-Chief:** Parth J Shah

**Managing Editor:** Baishali Bomjan

**Editor:** Sujatha Muthayya

**Correspondents:** Mehjabeen  
Jagmag

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Happy Reading!

**School Choice Team**

India's future depends greatly on how quickly we are able to find answers to two fundamental questions that we face in our K-12 education system today: "How do we improve learning outcomes of students? How do we improve the quality of teaching and curricula?"

I believe technology can be the disruptive force that answers these questions. Millions of children, regardless of where they are located, can today learn the best curriculum from excellent teachers around the world with the use of online lessons. Adaptive learning techniques can let kids learn at their pace and follow a learning path most suited to their need. We can also improve teacher quality on a large scale by using online teacher training tools.

There is a lot we can learn from experiments and innovations being designed across the world. The US, UK, Korea and some other countries are making significant investments in experiments and innovations in digital content, school models and teaching methodologies. Digital learning content platforms such as LearnZillion and Khan Academy, when customized to the Indian context, are powerful resources that can significantly improve the quality of learning available to kids. Blended learning models which combine small group instructions with computer aided learning could also be piloted to see their impact on learning outcomes in India.

India is probably five years away from offering widespread access to technology infrastructure—4G broadband internet and cheap tablets. Let us make 2012 the year in which we collaborate, experiment and invest in educational innovations that will help build the necessary ed-tech ecosystem needed to exploit technology to improve our K-12 education system.

In the end, I am delighted to become the Chairman of the Board of Trustees of Centre for Civil Society and look forward to embarking on an impactful journey with you all.



Ashish Dhawan  
Chairman  
Centre  
for Civil Society

## Technology in Education: Towards Personalised Learning

Technology is the most powerful force in Joseph Schumpeter's much-celebrated 'perennial gale of creative destruction.' As the markets in education grow, though there is much that Indian education policy needs to do to enable markets in education, new technologies would begin to play that critical role of 'creative destruction.'

The ideal education is personalized education. Kings and nobles, and their equivalent today, have private tutors. These tutors not only have good command over the subject matter but also are skilled in understanding the different styles of learning, inclinations and interests of their pupils—they adapt their teaching to the individual pupil. Is it possible that what the rich enjoy could also be available to the ordinary?

That's exactly what technologies have been doing historically in multitude of areas. What only royals could afford earlier—ice in summer, indoor plumbing, motorised transport—is now available to not-so-royal people. All thanks to technological innovations and robust markets to take those innovations to people. The ideas in this issue of Student First! are first impressions on a new canvas of personalised education. Three cheers to technology and personalised learning!



Parth J Shah  
Editor-in-Chief



# Use of Online Education in K-12 sector in India

BY PRATEEK PRASAD, Consultant, School Choice Campaign

There is an increasing activity emerging within this space the companies working in the online education space that cover online and blended the online education space in India. New businesses are learning courses. Some of India are:

Type of online education	Indicative providers
Online Learning	WizIQ, Tutorvista, EDUCOMP Online, Everonn Classontheweb.com, classteacher.com, iPerform
Blended Learning	Reference Based Learning: EDUSAT, ViCTERS, gyanpedia.in Online Assessment: 100percentile.com, mathguru.com

It is estimated that the online education market in India is worth about US\$15m for the K-12 segment and is pegged to grow to about \$120m by 2012.

### ...With growth being led by demand for supplementary education

It is assumed that this growth would be led by students attending private schools and belonging to middle class families that are seeking supplementary education in India. The demand for this is so extensive that in just a short span of time,

online education companies such as EDUCOMP have reached out to 15M students and 26,000 schools.

### ...And supported by increasing broadband usage

The growth of online education is also going to be assisted by increasing broadband penetration. As per World Bank Data 2010, India had about 7.7m broadband subscribers by 2010, up from about 3m broadband subscribers in 2007. This number is expected to go up to 100 million by 2015.

### KEY CHARACTERISTICS OF ONLINE EDUCATION IN INDIA

Courses are supplemental in nature...

Online education courses are predominantly supplemental in nature and are not offered under the prescribed academic curricula in the country. They therefore do not offer any academic credits towards the student's education.

### ...With scope for student interaction being varied

In online learning courses, students

can move at their pace through the content. However, interaction between students and between the student and the teacher is limited to the time the course is being conducted online. As an example, educomponline.com provides the feature where students can interact with one another as long as they are in a virtual classroom.

In blended learning environments, online and offline learning are integrated. Therefore, while a student can interact with other students and with the teacher during the course, he does not have the option of moving at his own pace through the content. For instance, EDUSAT classes are conducted in a classroom in the presence of a teacher and students.

#### ...With customers typically being individuals or institutions

The typical customers for online education courses are individuals such as parents or students and institutional customers such as public or private schools. As an example, public schools in Haryana use the EDUSAT service implemented by the private sector company—ILFS Education and Technology Services with EDUCOMP's SMARTCLASS product being in use across many private schools in the country.

#### No government regulations or standards...

There are no government regulations, specified standards or certifications for online education in India. Therefore in areas such as follows it is the private sector itself that comes up with its own standards:

1. Standards for teaching online or in a blending learning environment
2. Standards for training and monitoring teachers

#### 3. Standards for quality control of:

- a. Online education courses
- b. Online education content

#### ...With policy on ICT in education still being drafted

A 'National Policy on ICT in School Education' is being drafted by the Ministry of Human Resource Development (MHRD) and is expected to cover online learning as well. As it is still being drafted it is not clear what it will or will not cover.

Consultative meetings held by the MHRD with relevant stakeholders have highlighted that the current issues facing ICT in education are:

- Lack of adequate investment
- ICT infrastructure
- Teacher capacity building
- Challenges in development of quality e-content and delivery

At the least it is expected that the policy will come up with answers to the above issues.

#### Teacher professional development is company-led...

Companies that offer online courses and impart blended learning maintain their own standards on provision of education. Typically, teachers are expected to be subject matter experts with preference being given to those that have post-graduate (master's) qualifications in their subject. Having a specific education degree or teaching experience over and above this is considered to make a candidate more desirable.

Similarly, companies adopt their own approaches on training and monitoring of teachers. These approaches can broadly be classified into three categories:

1. No Training/Monitoring: Platforms like gyanpedia.in allow students and teachers to upload content themselves. It is a free platform—in terms of cost and oversight, with the quality of the content not being monitored.

2. Minimal Training/Monitoring: Basic training is imparted to the teachers on the use of online platform with limited to no provision for monitoring. For instance, wiziq.com and EDUSAT.

3. Extensive Training/Monitoring: Online tutoring companies (learninghour.com, tutorvista.com) that typically hire tutors to teach online, maintain stringent quality standards and impart extensive training to the teacher. The tutor typically undergoes 1-3 week training on computer usage, the basics of online training, communication skills, and familiarisation with the content and methodology. The tutors are also monitored on a regular basis. For example, learninghour.com has a dedicated quality team that samples the recordings of sessions on a regular basis. There are strict penalties for tutors not adhering to learninghour.com quality standards. All tutors also go through a monthly evaluation where they are tested again to ensure they are keeping abreast with the latest course.

#### ...As is online content development and quality

Companies that develop online content themselves usually have a team of experts. These teams typically comprise of subject matter experts, instructional designers, visualisers and technical experts. Some companies also use open education resources.

There are no standards for assuring the quality of the content. However, the school curriculum acts as a

framework for the content and the quality of the content is determined primarily on the basis of the client requirements.

#### ...And online courses

The quality of the online courses across areas such as content, delivery, assessment and monitoring are maintained by individual companies that provide these courses.

### CASE STUDIES

#### EDUSAT (Educational Satellite)

The Haryana government has launched the biggest ICT-based education initiative in the country through the EDUSAT program that is implemented with the help of IL&FS Education and Technology Services. Under this, education content is being broadcast through five channels to cover the entire gamut of education, viz. Primary Education, Secondary Education (two channels), Colleges and Technical Institutions. In the first phase, Satellite Interactive Terminals (SITs) were made functional in 261 schools.

The resource persons were selected from the Haryana Education Department and provided training on ICT-based education. The script for individual topics prepared by these resource persons is evaluated by an internal evaluator of the Department and then by an external evaluator from outside the Department.

While initially, only live lectures were being broadcast, it was decided that all the good lectures would be recorded, so that quality material is available for subsequent years. Leading private organisations were engaged to develop content for the programs of entrance examinations, training in soft skills,

and for training of teachers in use of ICT in education.



#### ViCTERS (Virtual Classroom Technology on EDUSAT for Rural Schools)

The ViCTERS program has been implemented by the Government of Kerala. The objective was to empower the teachers to use modern technology for teaching in class through use of computers and other IT related equipment; in other words to promote blended learning.

The project has been implemented in a decentralised manner with schools directed to set up computer labs on their own. Kerala high schools now have over 35000 computers (numbers varying from 5 to 65 per school) through this model of decentralised implementation, while it was less than 2000 computers in the year 2002.

Close to 54000 high school teachers have been trained for the use of this technology. It has enabled them to obtain hands-on information on teaching, grading and implementation of the system from the expert faculty of SCERT (State Council Educational Research and Training) Kerala.

#### EDUCOMP

Educomp is India's leading K-12 education company and has over the years, pioneered various initiatives in the online education space. Notable among them are:

- 'Teacher-led' content system called SmartClass.

- Development of India's largest K-12 content library, with over 15000 modules of rich 3-D content that is aligned to Indian as well as international learning standards.

- Roots 2 Wings, India's first structured pre-school learning system.

- Online learning initiatives like

- [mathguru.com](http://mathguru.com): Online portal for mathematics and guides on study for grade 6 to 12 students.

- [learninghour.com](http://learninghour.com): Provides retail online tutoring to children in India, the US and the Middle East on all curricular subjects and tests preps.

- [wiziq.com](http://wiziq.com): Provides teachers a platform to teach students on their own terms and even facilitates payments for their teaching and tutoring services.

- [educomponline.com](http://educomponline.com): A comprehensive portal for all schools where Educomp implements its SmartClass technology. It provides a host of teaching and learning solutions that includes rich digital media learning materials and assessments.

- Education Process Outsourcing through a pioneering platform called Learning Hour.



#### Everonn

Everonn is one of the pioneers in computer education in schools and colleges. It has set up several initiatives in online education such as:

- Virtual and Technology Enabled Learning solutions (ViTELS) across India to provide quality education to geographically dispersed students. Everonn does this by creating virtual classrooms for providing education and instructions using satellite technology.

- It develops integrated content for an Indian and global audience, for schools, colleges, corporate and retail segments.

- It sets up the computer lab infrastructure in schools and colleges where IT Education is imparted through well-trained Everonn faculty.

- [classontheweb.com](http://classontheweb.com): It is an exhaustive curriculum-based eLearning portal that caters to all the academic needs of students. The portal has been designed especially for students of Classes VI to XII and includes numerous visuals and animations to help increase student understanding and retention.

- iSchool is an initiative that aims at making education a lively and pleasurable experience. It arms teachers with the power to help

students grasp complex concepts through the use of digital media mapped to curriculum.



### Gyanpedia

Gyanpedia.in is an interactive portal for collating, organising, and circulating content generated in schools in India through an open web-based platform. The initiative with support from the Digital Empowerment Foundation (DEF) aims to give a boost to nationwide e-learning and e-education efforts. It has an online presence of over 50,000 students and covers 10 states.

### Classteacher.com

The company has two main online education products, namely:

- ePathShala: This is an in-class technology-aided learning solution similar to SmartClass of Educomp. ePathshala delivers content using interactive whiteboards and has a current installed base of around 44 schools.

- iPerform: It is a web-based learning aid and testing solution, aimed at K-12 students of the English medium private schools in India. The site offers learning content that is closely linked to curricula and also offers online tests with increasing levels of difficulty to monitor the student's progress. In addition to this, the site also provides doubt clearing services, where doubts on specific topics raised by students are responded to within 24 hours.



# What technological solution does India need to enhance quality of learning for hard to reach children?



**LISA HEYDLAUFF**

Founder Director, Going to School

Perhaps it's not the next App that we need in India, because there are a lot of people working very hard on that, but we do need to equally focus on creating the off-line tools that will get millions of children online: the design driven simplicity of a travelling story wall chart, brightly coloured 3-D blocks, a giant storybook, a TV and radio series. These are the ways that children are used to accessing information. Creating accessibility for the poorest children is about building that cardboard bridge between where they are now, and where we want to invite them to go. Coders can work to build this bridge with a team of artists and product designers who are used to communicating without words.



**K SATYANARAYAN**

Director, New Horizon Media

A bank of free videos (like the Khan Academy) of the best teachers, teaching the basics of math, science, the local language and social studies, targeted at children in the age group of 6-14, in every single Indian language. The technology required for creating the videos is very inexpensive and widely available and the videos can be viewed on the increasingly available handheld mpeg players, mobile phones, tablets, net books and laptops. All that needs to be done is for someone to identify the best teachers and shoot the videos. Every child, especially hard to reach children, will then be able to learn from the best teachers.



**P NAVEEN KUMAR**

Director, ProEdu Foundation

Technology is playing a greater role in the present education system in India. With the pitching of big giants like TATA through TATA Class edge, there will definitely be great improvement in child learning levels. But more than 75% of Indian children go to government schools where basic amenities like water, sanitation, classrooms and power are lacking. Unless and until basic issues are addressed, technology would make very little difference in education. Infrastructure quality and attitude of teachers in government schools needs to be improved before taking technology in to the classrooms.

# Q & A with

## Sugata Mitra and Suneet Singh Tuli



The annual School Choice National Conference organised by the Centre for Civil Society on 21 December 2011 brought together Suneet Singh Tuli and Sugata Mitra to explore the role of technology in education in India.

Suneet Singh Tuli, President of DataWind and mastermind of the Aakash tablet has made regular appearances in the media following the celebrations and controversies surrounding the tablet since 2011. Sugata Mitra, Professor of Educational Technology at Newcastle University, is best known for pioneering

the Hole in the Wall Project, where he and his colleagues left an internet-connected computer in a New Delhi slum and observed children play, learn and teach their peers how to use the device.

Tuli and Mitra both believe that technology can address the problems of access and quality that faces the Indian education system today. Their vision, though seemingly similar at the outset—introducing learners to computing devices—have distinct opinions of its use and place in learning. While Tuli sees his tablets as supplementing teacher-centred learning methods, Mitra advocates a learning environment devoid of teachers.



We recap excerpts of our interaction with them:

BY MEHJABEEN JAGMAG, Senior Associate, School Choice Campaign

**Q:** Accessing quality education is one of India's biggest challenges. What contribution can a tablet or a computer make to address this challenge?

**Sugata Mitra (SM):** Technology can offer evolved solutions to accessing

education. Currently, increasing teacher salaries is deemed to be one of the solutions for improved education. You cannot ensure a teacher to teach well in a remote area, just by increasing their remuneration. If you increase their

pay, they may choose a higher standard of life in a better area. How does one get quality education in areas where you cannot bring good teachers, then? You use technology. That's where people like Tuli and I come in. We help the government



Organised Mediation Environment (SOME), where children can learn without a 'teacher' present. When you have access to the collective consciousness of the human mind through a tablet or a computer, it will change education in ways we cannot even imagine.

Traditionally, education approached the human brain like a hard drive that needed to be filled up for 12 years. Now you can store all of that data on a pen-drive. Why do I need to stuff data in my head, when I can call on the collective wisdom of billions of people through Google? Education has to change to accommodate these advances.

figure out how to provide students with a good education, through technology.

Suneet Singh Tuli (ST): I agree with Sugata. I think technology that is as low cost and pervasive as a calculator is very powerful. That level of access to personal and private computing internet devices changes the teaching-learning process. I try and explain to people how learning changed over the years in engineering school. All the tests were open book, and it didn't gauge your ability to memorise, but your understanding of concepts. That access to information is critical to how we learn.

**Q: What challenges have you (ST) faced with the Aakash tablet?**

ST: There were lots of challenges that came with the decision of making it in India. After sub-contracting the work to a manufacturer in Hyderabad, we realised the Telangana problem. There are a lot of challenges, with the governments' policy and thought process. For example, during a launch event the tablet was tested by 500 students, but none of the e-books on the Tablet were a part of their curriculum. Moreover, of the 500 students several have

iPads, who will probably fail the device on the basis that it didn't meet their requirements because it isn't as cool as the iPad, or have a processor that's as powerful as the iPad. There are challenges in every element and how the government plans to integrate Aakash into the curriculum needs to be thought through. They're making the effort, the intentions are correct and eventually the pieces of the puzzle will fall into place.

**Q: What role can technology play in improving teaching quality?**

SM: I think the human element in teaching can be done away with eventually. I don't want to sound terribly cruel but Plato once said that writing will reduce the capacity of the human brain to remember, which sounds unreasonable today. Technology can make things that seem unreasonable today, possible tomorrow.

Take for example the role of e-mentors, popularly called 'Granny Cloud'. The internet makes it possible for a group of people living in a country as far away as England to read and talk to and mentor students in India by logging on to Skype. These e-mentors facilitate a Self

**Q: What can the Indian education system do to keep up with the changes technology brings?**

ST: Our thinking may not change as fast as the rest of the world that has been able to adopt these changes. Moreover, government policy doesn't change that easily. Some changes take generations to materialise, but we need to learn along the way. As long as you get incremental benefits to justify the



change, it's good. I'm often asked if the tablet is a 'magic pill'. My answer is, it doesn't have to be. Do you mean that till I get a magic pill, I shouldn't move forward? No. As long as the tablet can resolve some problems in our education system, improve students' lives in some way, we could be on the path to a very significant change.

# Defusing the Rhetoric of Computers for Education

BY KENTARO TOYAMA, Researcher, School of Information at the University of California, Berkeley



If you have ever had the privilege of introducing a child to a personal computer (PC), you have seen the glowing eyes and the ear-to-ear smile that accompany pure joy. This excitement over a device that is closely associated with information, knowledge, and desirable jobs, leads to the instant assump-

tion that computers will necessarily have a positive impact on education. Indeed, anecdotal evidence suggests that computers in a school can raise attendance—students like them, and parents want to see their children learn about them. Rigorous research studies also show that under certain circumstances, com-

puters can enhance specific learning outcomes. And, of course, there are subjects such as computer programming which are best learned on a computer.

But, it's worth using our critical thinking skills—exactly the kind that we wish to impart on the next gen-

eration—to examine the topic more closely. Are computers really the magic tool for education that they are often believed to be?

The issues are complex. PCs can have positive and negative impacts, sometimes simultaneously. And, net impact depends on the specific circumstances—teachers' facility with computers; students' level of basic education; the purpose for which PCs are being used; the budget available for the total cost of owning, operating, and maintaining computers, etc. Below, I offer several analogies to better understand the potential, and the actuality, of PCs in education.

First, it's helpful to recall the history of television in education. In the 1960s, television was hailed as a miracle technology for education. Some thought that TV would eliminate the need for schools altogether. After all, television was different from all previous technologies—it broadcast aural and visual content. With a device that could pipe educational programs straight into living rooms, why would students need to go to school at all? They could simply watch television all day!

Today, that notion evokes laughter. Not only has television failed as an educational panacea, but many believe it interferes with learning. Wise parents limit children's exposure to television, and good teachers constrain their use of video, if they use it at all.

The lesson—which we should have learned one after the other for cine-

ma, radio, phone, and TV—was that technology in and of itself cannot deliver quality education, because learning is a social process that requires capable human educators.

This brings us to the second analogy: Computers are to classrooms, what treadmills are to athletic teams. If a cricket team is doing poorly, no one imagines that purchasing state-of-the-art treadmills will make it a winner. Yet, we often hear that in the face of teacher absenteeism, undertrained teachers, and uninvolved parents, computers will fill the gap. Nothing could be further from the truth. Students might find computers a novelty at first, just as athletes might try out new treadmills in a spurt of training. But both students and athletes, if they are uninspired by their teachers and coaches, will rapidly bore of new technology. People are what matter; the equipment is at most secondary.

The treadmill analogy also illuminates cost-benefit tradeoffs. Certainly, it would be nice to have treadmills for every sports team, but if you had to invest either in quality coaching or quality treadmills, you should choose the former. A good coach can design a good regimen using low-tech equipment, but a treadmill without a coach will sit idle. It's because of this that no one suggests that the treadmill is the key to national fitness, and that every sports team (or every village) must be equipped with one.

Some might protest that while sports haven't changed much, the 21st century requires new cognitive

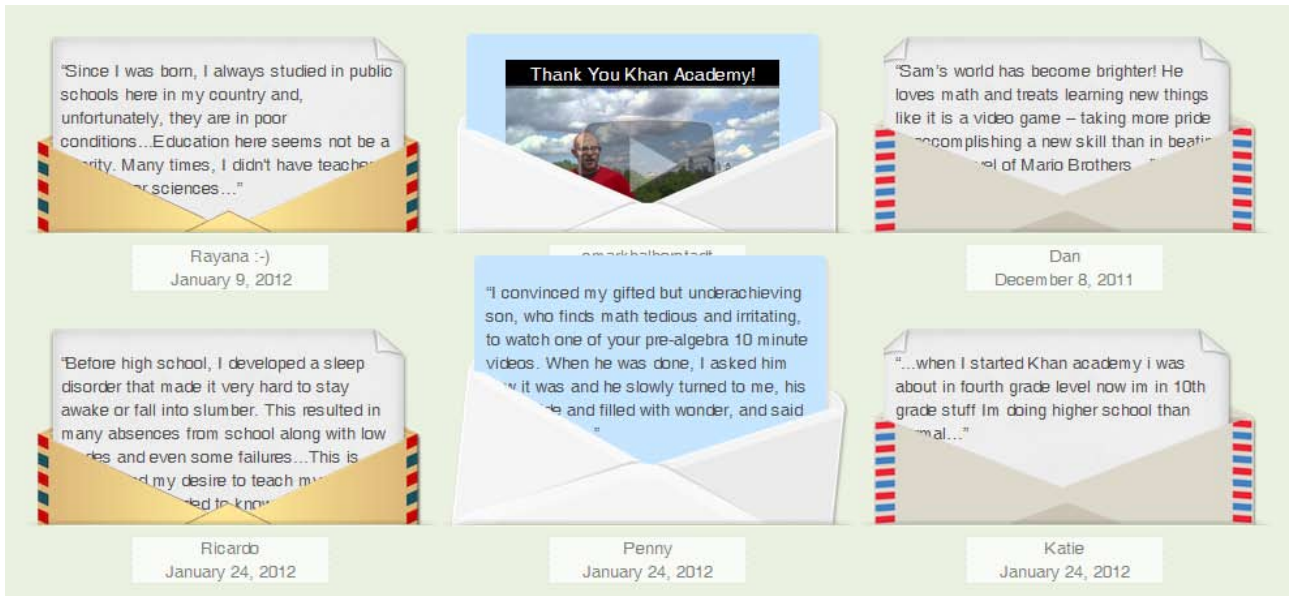
skills. Computers are everywhere in the modern workplace, the claim goes, and it's a disadvantage not to know how to use them. Such claims fly in the face of a simple fact: Just about everyone today over the age of 45 grew up with little or no exposure to computers during their education. Yet, many people in this category are today's leaders in government, business, and other sectors. How can this be?

The reality is that even if the tools of modern life have changed, the underlying skills needed to wield them have not. Basic knowledge, diligence, self-confidence, critical thinking, soft skills, and the ability to learn and adapt in a changing world—these things have been important from the beginning of human civilisation. Writing a persuasive e-mail or Twitter tweet is fundamentally no different from writing a political pamphlet in a previous century.

At heart, computers—and other educational technologies—are at most 'amplifiers' of pedagogical capacity, not a cure for underperforming educational systems. It's not that computers must be excluded from education, but that their use must be carefully considered in the context of other priorities, and then, too, only where there are already wise administrators and good teachers.

# Khan Academy: A Global Classroom

BY MEHJABEEN JAGMAG, Senior Associate, School Choice Campaign



The story of Salman Khan of Khan Academy fame has been rehashed in newspapers, on television, in e-journals and on TED (Technology, Entertainment, Design) Talks. For the uninitiated, the FAQ section: <http://www.khanacademy.org/about/faq> and media links: <http://www.khanacademy.org/#talks-and-interviews> on his website is a great place to start. Backed by the Bill & Melinda Gates Foundation and Google, the online forum caters to the education needs of four million students every month and boasts of 2600 videos (and counting) online.

Lesson plans range from Algebra to Art History and include problem-solving exercises for GMAT and IIT-JEE exams. The Academy records learning outcomes through performance graphs, empowering

both the student and the coach to see what each learner excels at and she/he needs help with. The Academy has also led to a new style of teaching—where the teacher is not the only one doing the teaching in the classroom. The online lecture becomes a ‘co-teacher’ of sorts, enabling students to understand concepts at home too.

Salman Khan’s pet project became an overnight phenomenon in America because there was a need for a Khan Academy. In his TED Talk, Khan explains why. Unlike the average classroom format of a lecture followed by homework, followed by a lecture, the academy allows students to work at their own pace on their problems until they understand the concept. The Khan Academy tries to address

the “Swiss cheese gaps” that form in a students’ foundation. Formal school and examinations identify these gaps, but do not address it. In most cases, the student moves on to the next class.

The recent Annual Status of Education Report (ASER) 2011 and Quality Education Study identify the same gaps in the Indian education system. Data from the Quality Education Study shows that students from top schools fall below the international average. Moreover, misconceptions are not corrected as students move from lower to higher classes, students learn through rote and demonstrate poor awareness of general facts and skills such as reading maps or using language effectively. ASER’s rural indicators are similar. Children who cannot

read four out of five letters rose from 8.82% in 2006 to 9.39% in 2011. Children who cannot identify four out of five single digit numbers remain largely unchanged from 2007 to 2010 from 7.62% to 7.59%. The pace of learning in schools too is slow. Three out of four students that enter grade three or higher without grade two skills don't learn these skills even after another year of schooling. Meanwhile, education spending increased by 108,621 crores in the last four years, from 96,365 crores in 2005-06 to 204,986 crores in 2009-10 (Economic Survey 2010-11).

With MHRD's (Ministry of Human Resource Development) promise of delivering 220 million tablets to Indian students by 2014, will a free online tool like the Khan Academy, created to supplement classroom

education and improve the quality of learning, work for India?

An early study in 2002, circulated by UNESCO titled Technologies for Education cautioned policy makers against assuming that 'technology' is equal to computers and an Internet connection, and that providing technology would change the way students learn. Khan's argument is compelling. He says the online forum helps "humanise education", which he does not calculate as pupil to teacher ratio (PTR), rather pupil to valuable teacher time ratio. When a child understands the basic concepts online, it gives teachers more time to solve problems with teachers.

For a country with poor teacher attendance, pupil-teacher and teacher-classroom ratios, and a shortage of 1.2 million teachers,

greater pupil to valuable teacher time ratio is imperative.

However, it seems like a long way to go for the Khan Academy to work in India. To begin with, more tutorials need to be made available offline. Starting with four computers and 24 students, NGOs like World Possible is working on bringing educational resources to offline computers in India. More lectures need to be translated in more regional languages. Of the 2600 videos, 274 videos have been subtitled in Hindi, 1243 videos have been dubbed in Bangla and 397 have been dubbed in Urdu.

Most importantly, Indian students, parents and teachers must log on to these forums to join a community of learners who learn by themselves, for themselves.

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## School Choice Campaign

Centre for Civil Society

A-69, Hauz Khas, New Delhi - 110 016.

**Phone:** +91 11 2653-7456 / 2652-1882, **Fax:** +91 11 2651-2347

**Email:** schoolchoice@ccs.in

[www.schoolchoice.in](http://www.schoolchoice.in) | [www.ccs.in](http://www.ccs.in) | [www.righttoeducation.in](http://www.righttoeducation.in)

