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Will these four technology trends change education in India?

From virtual reality to big data, the tech frenzy has hit education too, but will it go beyond gimmicrky?

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Photo: iStock

From virtual reality to big data, the tech frenzy has hit education too, but will it be able to go beyond gimmickry?

By Shweta Sharan

Can technology change education?

We are told that the day isn't far when a child in India can teach Hindi in real time to a child in Africa through interactive whiteboards that use touch detection. This might seem like a scene from a Ray Bradbury novel but how do we separate the signal from the noise, and distinguish gratuitous technology from technology that can solve problems?

A few months ago, an education start-up in Chennai called QED wanted to test if students learned better from bots than they did from (human) teachers. They performed a simple experiment with 100 to 150 students. Around 60% of the students performed better when their doubts were cleared by bots instead of teachers.

It's too soon to wonder whether computers can replace teachers based on a small experiment but can technology surprise us?

Let's say you are a student with dyslexia. You may find it easier to learn from a bot than a teacher because you could be motivated to go to the next level, like in a game. But can bots make you love a subject the way a teacher can?

Priya Ramakrishnan, a high school science teacher in a CBSE school in Bengaluru, often uses technology to hook her students in the first 10 minutes of the class. Says Ramakrishnan, "While technology has many uses, it cannot understand and fulfil the psychological need of a child. It cannot teach empathy."

According to a recent report brought out by Google and KPMG, the online education in India will possibly grow from its current $247 million and reach $1.96 billion by 2021. Tracxn tells us that in 2012 alone, there were 2,400 ed-tech start-ups in India and more than 200 new ones coming up every year since then.

Will one of them strike gold?

Cutting a frog without cutting a frog

The beauty of virtual reality, or VR, in education is that in 10 minutes, it gives us an experience of a subject that a textbook cannot.

Picture this. You can cut a frog without cutting a frog. You can go inside the leaf that you are studying in botany class. Let's say you are in class and the teacher is explaining one of the laws of friction in physics. He or she gives you the definition but won't you retain the information better if you can actually apply force in the virtual world with your hand and see how far the block is going?

Vipin Goyal heads strategy and operations at Veative, a Delhi-based company that's bringing VR into education by building a lot of VR content aimed at the education market. A lot of VR modules in science and math are currently already available for middle and high school. The laws of friction module in physics is one such example that Veative has experimented with.

Goyal insists that the idea is not to disrupt the way we all learn. "VR and AR (augmented reality) can enhance course material to a point where learning abilities grow multi-fold and students retain much more than they would with just textbooks," he says. "In short blasts of 10 or 12 minutes, VR changes the way a student experiences a subject."

Anand Gurnani is the founder of Vamrr, a company that is trying to integrate the companies in India that are using virtual, augmented and mixed reality. Gurnani says, "With AR, all you need is a mobile phone experience information from multiple disciplines at the same time. All content will be in the form of asset libraries, which an educator can use to immerse students in a learning experience."

Last year, I worked on a project for I Love Mondays, a company that uses VR to help teenagers make educated career choices. Interested in medicine but don't know what it's like? No problem. You can put on a VR headset and experience a bypass surgery by Dr Devi Shetty at Narayana Hrudayalaya. The cost won't be a problem forever. You can always use a controller in the lowest cost bracket.

We were able to cut costs drastically because we found more affordable software and hardware.

Mala Mary Martina, CEO of I Love Mondays, says, "VR provides immersive experience and helps one visualize almost accurately, thereby accelerating learning and decision making."

Learning communities of the future

The biggest way technology has enabled education in India? It's the massive open online course revolution. A MOOC, as they are commonly called, is a course that is open to participants from anywhere in the world and is delivered online. Coursera and Udemy are famous examples.

Last month, 16-year-old programmer, designer and entrepreneur Harshita Arora launched Crypto Price Tracker, a cryptocurrency price tracking app. A self-taught designer who lives in Saharanpur, Uttar Pradesh, she got her inspiration from her computer science teacher at school but learned how to use software like Affinity

Designer on her own from Youtube and Udemy back in 2015. She learned iOS app development in Swift from Treehouse and a course on Udemy.

Arora left school during Class IX because she wanted more time to focus on learning technical skills and build projects. Her journey to a successful app at such a young age is due to all the learning she got from MOOCs.

The downside? "A lack of 1-on-1 mentoring, which is often the most effective to learn new skills. But I like websites like codementor.io, which do a great job at matching people with questions in programming with people who have answers," says Arora.

Can MOOCs rejig the education ecosystem? Arora explains, "It would be good to do an in-depth survey on what happens to students after months or years of their life and how taking that online course transformed their lives. More feedback would mean better technology and products."

Seventeen-year-old Harsh Deep from The International School Bangalore (TISB) credits MOOCs with changing his life. Deep was nine when he started learning how to program. His journey began when he took Michael Hartl's tutorial Ruby on Rails, a website development backend framework that allows developers to build databases and other backend functions.

A few years later, he decided to give Harvard's CS50x a try to learn computer science fundamentals, and in Class XI, signed up for the University of Washington's Machine Learning track.

Deep even used what he had learned in his IB school extended essay and thinks that it was his self-learning that led to great internships, one of which was a remote internship for a photography firm in the US that specialized in 360-degree panorama footage. The self-learning also helped him get into University of Illinois at Urbana–Champaign, which is ranked fifth in the US for its computer science undergraduate programme.

Deep is sceptical about Indian universities opening up to the MOOC culture: "Universities abroad give significance to the overall value of a candidate and what they do outside, instead of just schoolwork. I feel that India's processes don't do that at all and are only based on grades."

Deep is not sure about schools aligning themselves with this trend either. "In my previous school, they tried implementing this online learning program for math. It was made by a high-profile company, but it was not effective and had many bugs. The teachers did not know how to use it too well. The system was rather poorly designed and didn't really reflect the same things the students were learning," he says.

The biggest complaint against MOOCs is that people don't complete the courses. Deep has a different take on it.

"Completion rates don't matter when you got what you wanted from MOOCs. For example, I am not the sort who finishes a MOOC, but I take the sections that give the right amount of background and intuition on the topic that allows me to put it in practice," he says. "It might be disheartening for a MOOC teacher to see numbers decline towards the end of a course but there are people who enormously benefit from it and whose lives and career paths change because of it."

Abhinav Tripathy is an 18-year-old student from Greenwood High in Bengaluru who lives off MOOCs. He was 14 when he tried the CS50 course offered by Harvard University and loved it.

"Today, the MOOC ecosystem has come a long way. We have active discussion groups, community meetups by the course, local hackathons, and hackathon tours by the course staff," says Tripathy. "I did a project at IIIT Bangalore where we were developing a web portal to digitize rural medical facilities in India. All the students there talked about MOOCs and how institutes need to take initiatives to incorporate them. Also, my previous school was Delhi Public School in South Bangalore. My math teacher there, Ms Sayeesubbulakshmi, actually won an award for using Khan Academy in her teaching."

Khan Academy is the non-profit online education platform, started by American educator Salman Khan (no relation to the Bollywood actor), which provides quality learning material for free.

The rise of AI tutors

To most of us, artificial intelligence, or AI, brings up images of adaptive software that can move one step ahead and predict test performance, scores and provide solutions to long-term learning problems, even becoming AI assistants and teachers.

But the beauty about this technology is that we can apply it in unconventional ways. For instance, a friend mentioned that he wanted to use AI to analyse a child's drawings in order to detect early signs of developmental delays or problems.

Let's take Khan Academy. Every "home-schooler" or teacher swears by it as a resource. Teachers can use it to provide instructions, take tests, grade the children and give feedback. Where intuitive technology comes in is that teachers can get real-time feedback on performance, both on individual and class levels.

This intelligence is key, for how else can a teacher optimize time, scale resources and achieve results? Khan Academy has also taken its tech to local language users in Karnataka.

Can AI adequately fill learning gaps in children? Many teachers stress on how learning also involves physical and multi-sensorial activities. Technology, at least in its current form, cannot exercise a child's kinaesthetic abilities, integrate visual and tactile information, and engage global senses.

One interesting AI project in education is pushing this boundary. Anshul Bhag and Nikhila Ravi are building OpenEd.ai, a non-profit that develops and promotes open-source AI for education. Both collaborated on LingoLens, an app that lets users "see" their world described in the language they want to learn, using deep image captioning.

According to Gurnani, applications in education that use AI in unconventional ways are the ones to look out for. "Prakshep is a company that is not into education, but they use satellite imagery and machine learning to help farmers uses predict the real-time outcomes of crops and in that process, educate them about better means of optimization."

Big problems, bigger data

A few years ago, Akshara Foundation, an NGO working in education, partnered with HP data scientists to do something interesting. They analysed data on government schools in Karnataka and data scientists were able to identify links between resources and outcomes.

They found out, for instance, that the engagement among government school girls was low in the 11-to-14 age group. Using the data and the correlations they derived from it, they were able to reduce drop-out dates by introducing separate bathrooms.

This may get us excited about the possibilities, but Ashok Kamath, chairman of the Akshara Foundation, insists that it will take at least four years before we have enough data to really know the its potential. Akshara is now building an open-source platform called the Karnataka Learning Partnership (KLP).

Kamath and his team showed how by using KLP, one could get all the data on government schools in a specific area in Karnataka, including the number of boys and girls enrolled, the programmes they have conducted, school maintenance grants, learning material and more. KLP now has 44,000 schools in its database, including child-level data for all children in these schools.

The data is collected through math workshops, assessments and gram panchayat contests. "Let's say we find out that 20% of our teachers are untrained," says Kamath. "You can step in and do something about it. We get reports on the percentage of children good with subtraction, multiplication, division, fractions, or decimals, as defined by the national curriculum framework. We get the complete picture."

What makes the data more airtight is that it's built with both on-the-ground, dynamic reporting and technology. KLP also shares its reports with the officials on the ground to strengthen the process.

How do you make the platform work better? Get more NGOs to add their data. The more you use the platform, the more intelligent it gets. It's a great way to address the many big problems at the bottom of the pyramid.

A lot of textbook publishers like Oxford University Press, Pearson and even the very conventional S Chand have ventured into digitizing their learning content.

Last year, I visited many schools that had digitized their textbooks completely. Most of the content, though, was nothing to write home about, and the VR/AR material seemed to be rudimentary. For instance, the VR content that I saw in a school in Bengaluru was about the solar system. It was nothing but the school's textbook lesson converted into VR format, with unimpressive animation and dull voice overs.

Deep says, "That is how the first wave of technology adoption comes."

Shweta Sharan is a journalist and runs a forum on Facebook called Bangalore Schools. She is also the founder of **Education Revolution***, an upcoming website that will mobilize the main education stakeholders in India—the students, the teachers and the parents.*

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