

He is willing to think the unthinkable about education and educational delivery

‘Teachers not required? Absolutely untrue’

India, South Africa, Cambodia, Gateshead... Wherever Sugata Mitra works, he provides pupils with a computer and leaves them to it. And they learn. Helen Ward meets a global education superstar



IN OXFORD, a bunch of suited professionals have gathered to listen to some of the most inspiring and innovative thinkers in the world at the TEDGlobal conference.

Sugata Mitra, professor of educational technology, is holding his audience rapt. He flicks on a film of two children peering at a computer screen. These are not the goggle-eyed zombies of middle-class western parental anxieties. They are in India and they are poor. Desperately poor.

The computer monitor is a metre off the ground, embedded in an external wall, with a mouse embedded beside it. The boy, who is about eight, is working the mouse, and his “student”, a six-year-old girl in a yellow dress, is straining to see. The camera pans down and we see she is on tiptoes and barefoot.

Professor Mitra’s “Hole in the Wall” experiments are now well known – his work inspired the book *Q&A*, which was made into the Oscar-winning film *Slumdog Millionaire*. And he is not short of an admirer or two. “He is clearly highly gifted – probably a genius – and has tremendously exciting ideas about how education could be better for the poor,” says James Tooley, professor of education policy at Newcastle University, who has worked with Professor Mitra in India and Newcastle.

Like the Indian children with the computer, the man himself is driven by curiosity: to discover if there is anything children cannot teach themselves when they are given access to the internet.

He gave the Oxford talk in 2010 and it was immediately posted on the TED website. It has since been viewed more than 500,000 times. In the talk, Professor Mitra describes his teaching

“method”. He leaves a computer with a bunch of kids, tells them there’s some “stuff on it that I don’t really know about... and then I leave”. It gets a laugh.

He explains that he has done this in all the remotest places of the world: all over India, in South Africa, in Cambodia, even Gateshead. And what is really funny is that it works. Children, aged eight to 13, can learn by themselves without teachers present, if they work in groups and if they have access to the internet.

Professor Mitra, 59, is an avuncular figure with a grey moustache and curly, dark hair. He speaks in educated tones and laughs along with his audience, gesturing constantly, and opening his arms when asking questions: “What else can children do? Can Tamil-speaking 12-year-old children in a south Indian village teach themselves biotechnology?”

In answer to that question, he explains that he gave a computer and the task to 26 children in Kallikuppam and then left. When he came back after two months, they told him they understood nothing – “apart from the fact that improper replication of the DNA molecule causes genetic disease”. Another laugh.

The next stage, though, was to increase the children’s learning through the “granny method”. A 22-year-old who worked for an NGO (non-governmental organisation) was invited to help teach the children. She did not know the subject, but was simply to ask the children to explain it to her and praise them when they did so. Through this method, the children’s scores rose to the equivalent of school-taught children. This is where the laughter stops.

He had discovered what seemed to be an educational impossibility, but one he has since expanded into “the granny cloud” – in which 200 real grandmothers from England use the internet to be supportive to Indian children as they effectively teach themselves.

Professor Mitra himself is the product of an avowedly traditional education. He went to Jesuit schools in



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CV

- 1973** BSc in physics, Jadavpur University, Calcutta
- 1975** MSc in physics with specialisation in quantum biology and acoustic holography, Indian Institute of Technology, Delhi
- 1978** PhD in the theoretical solid state physics of organic semiconductors, Indian Institute of Technology
- 1979-80** Research associate, Indian Institute of Technology
- 1980-81** Research fellow, Technical University of Vienna
- 1981-82** Senior scientific officer, Indian Institute of Technology
- 1982-83** Manager, product development, Indian Institute of Technology
- 1983-87** Head, technology division, United India Periodicals
- 1987-90** Director, publishing systems, United Database (India)
- 1990-2006** Chief scientist, Centre for Research in Cognitive Systems, National Institute of Information Technology
- 2006** Professor of educational technology, School of Education, Communication and Language Sciences, Newcastle University
- 2011** Visiting professor, MIT Media Lab, Cambridge, Massachusetts

Ahmedabad, the largest city in Gujarat, India, and then in Delhi. "It was very, very strict. Rote learning, that sort of thing – hard work and discipline," he says.

His family life was similarly academic. His father was an educational psychologist and one of the first Indian psychoanalysts, which meant that Professor Mitra "grew up in a house full of psychoanalysts and their patients".

His career began with a PhD in solid state physics and he went on to research energy storage systems, first in Delhi and then in Vienna. His interest in computer networking led him to join a newspaper group and set up the first local area network publishing system in India in the early 1980s.

"[Prime minister] Indira Gandhi came to inaugurate the system, so I have a favourite photograph of me explaining computers to her. She listened to this whole thing. I'm sure she didn't understand a word, and at the end she said: 'That's lovely. Shouldn't you have a hair cut?'"

From here, he moved on to direct the publishing systems of India's largest telephone directory publishing company before joining the National Institute of Information Technology (NIIT) in Delhi in 1990, where he was head of research and development. It was while he was there that the "Hole in the Wall" experiments started.

When his son Shounak – now 29 and working in Denver as a software writer – was five or six, Professor Mitra realised he was learning about computers by observing his father. "He used to stand behind me and watch and after a while say, 'Why don't you do this?' I figured he was learning by watching, which goes against the grain of the teacher, which is that children learn by doing," he explains. "It was, in a way, the seed of the whole thing."

The other starting point was remoteness, the fact that in every country there are areas where teachers cannot or will not want to be. The internet solved this, connecting children in these places to knowledge. They need access and encouragement, but the rest, it seems, comes naturally.

The work, repeated and built on, has led to his thesis that education is a "self-organising system" – an idea that spans many disciplines but emerges from physics. The concept is that the structure of a system arises from the actions of its parts, not from external forces.

In 2006, Professor Mitra left NIIT after being appointed to a chair at Newcastle University and "buying a heavy overcoat". Since then, he has not looked back. "He absolutely loves England and absolutely loves Newcastle. He has adapted incredibly well," Professor Tooley says. "He's very charismatic and his ideas are very exciting. He is willing to think the unthinkable about education and educational delivery.

"In many ways, some of the best people in education are those who come from outside and haven't got sucked into ways of thinking from an early stage."

In Newcastle, Professor Mitra's work blossomed even further when he started work with schools in Gateshead. Teacher Emma Crawley has worked with him for the past three years at St Aidan's CofE Primary School, an outstanding school in a deprived area.



PICTURE THIS: 'Skype grannies' in Britain are logging on to help children in India gathered around a computer screen.

His research at St Aidan's has included many experiments. For example, for a 40-minute session once a week Mrs Crawley sets her Year 4 class a question. The children then arrange themselves into groups of four to research the answer. And it works.

"I use it to teach curriculum material," Mrs Crawley says. "While they are working, I am observing the dynamic of the class, thinking about what they have found out and how to bring that together at the end."

It will not come as a surprise to hear that Mrs Crawley has become one of Professor Mitra's many global fans. But there is little doubt that his conclusions also raise some uncomfortable questions. And he knows it. In his talks, he often alludes to a comment made to him by the science-fiction author Arthur C Clarke: "If a teacher can be replaced by a computer, then they should be."

So, could his work, which began by looking at how to provide education to areas where there are no teachers, end up by replacing them with computers in much wealthier places in order to cut costs?

"It is a big danger," he admits. "One of the things my work suggests is that we need one computer for every four children, which is a straightforward cut of 75 per cent, and one I'm quite happy about because there is enough evidence it will work.

"But the other way of misrepresenting the work is to say 'therefore a teacher is not required', which is absolutely untrue. We have curricula, we have examinations, and children desperately need their teachers to handle the system. Until the system itself changes, there is no question about the teacher's role."

So it would require wholesale systemic reform? What would happen then? "Imagine," he replies, "if Government says, 'OK, now GCSEs are abolished'. Then I would say, yes, the teacher's role changes very dramatically."

Of course, it may seem a pipe dream, even impossible, but to Professor Mitra the impossible is where he feels most at home.

Professor Mitra's roadmap for learning

Current
A self-organised learning environment is an area where there are computers with internet access. The computers are arranged to allow four children at each computer. The room is publically visible to allow supervision at a distance. Children can call up the "granny cloud" – volunteers

who can encourage and chat to children via Skype. This is also known as a self-organised mediation environment.

Future
The development of what Professor Mitra refers to as a self-organised assessment method, in which children can assess their learning accurately.

"We need a curriculum that is driven by questions – self-organised and self-populating," he has written.

In the long term, this may result in a wholly unrecognisable curriculum.

"[In the future] the curriculum [might develop so it] focuses attention towards a couple of simple but really deep

questions," Professor Mitra has said.
"Something that will go around in his [the child's] mind, so the next morning when he wakes up he thinks, 'I have to go to school because yesterday we saw a fractal, but today I want to see what's inside the fractal.'
"It should be full of expectation, of hope and of friendship."