

How NPTEL democratising education and going into the next level

Annai Vailankanni College of Engineering, near the small town of Kanyakumari, faces all the challenges of an institution situated far away from the large cities. Teachers are hard to find, and good teachers are even harder to retain for long. Students and teachers struggle in equal measure to grasp sophisticated engineering concepts, with some teachers finding it difficult to even finish a 50-minute class well. So the principal JD Darwin, found a quick solution: make them watch educational videos from the Indian Institutes of Technology (IITs).



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The National Programme on Technology Enhanced Learning (NPTEL) is now more than a decade old. Conceived initially and still coordinated by IIT Madras, NPTEL is funded by the ministry of human resources development (MHRD) to take quality education to remote areas. Over the decade, NPTEL has become the most extensive and most viewed education channel in the world, with 18,210 videos on YouTube so far. Till now, 860 courses have been recorded and put online, with each course containing at least 20-30 lectures. In the past two

semesters, Vailankanni College started showing videos of IIT professors teaching their regular courses. "Our students are poor but clever," says Darwin.

"But they are not exposed to quality education." Before the advent of NPTEL in the college, only a year ago, many lectures used to be over in 30 minutes, with the students whiling away the rest of the lecture time. Now the classes are utilised well, and the students get a glimpse of how IIT students learn. Around the country, a large number of colleges are now making NPTEL videos available in campus classes. There are a few, like Arunai College of Engineering in Tiruvannamalai, which has made viewing of NPTEL videos compulsory. In other cases, students from around the country are viewing the lectures on their own either as a substitute or as a supplement to class lectures. Recently, NPTEL launched certification programmes, which have also become popular among students. Colleges use NPTEL videos strictly according to their curriculum.

But some students want to go beyond this, and use the videos to supplement their course work. Ritvik Singh, a student at the Jodhpur Engineering College, uses these videos to learn stuff not taught in college. He took three courses recently, one of which was a certification programme on basic electronic circuits. Like millions of students around the country, Singh is a fan of online learning. "You can watch these videos again and again," he says. Ritvik Singh got a full score in the basic electronics course. So did Lakshmi Narayana of Srivasavi Engineering College in Tadepathiguda in Andhra Pradesh. Lakshmi Narayana even thinks he understood the online courses better than those in his classroom. This course, conducted by TS Natarajan of IIT Madras, is the mostviewed NPTEL course and among the most popular video courses in the world.

Srinivasan has been a long-time advocate of online learning, but with a difference. He regularly shows equipment and experiments in his lectures. He thinks even showing experiments online are not enough to learn well. Early in his course, Natarajan shows a slide with this message: There is only one way to learn to do anything — just do it. That is how you learn dancing, singing, swimming. Electronics should be no different. This is a major weakness of the online learning system, but probably not for long.

"My future model is like a library, where you go and get kits for you to do things and learn." He thinks simulation and such do-it-yourself kits will be an integral part of online education one day. Preliminary ideas for NPTEL started at the turn of the century, when MS Ananth,

then dean and later director of IIT Madras, wanted to take education to rural areas. He had been visiting some of these colleges and saw that many were short of teachers. A workshop and some brainstorming led to some initial ideas, and IIT Madras put up some videos online. The MHRD later gave `36 crore to set up studios inside IITs, and NPTEL took off in a big way. "Our aim was to have a virtual university with admission requirements," says Ananth. As it stands, NPTEL is still far short of that.

The lectures are of various kinds, some with students and some with the instructor speaking directly to the camera. Some professors sit on a chair and talk with slides while others use the blackboard and perform in actual classroom environments. Some lectures are widely viewed around the world. In any case, the courses closely mimic the traditional classroom model: a series of long lectures followed by quizzes and a written examination for certification. NPTEL videos are thus not very different from those developed by Massachusetts Institute of Technology and other top US universities.

"We are aware that this open loop system cannot continue for long," says IIT Madras director Bhaskar Ramamurti. IITs are already discussing how to take the courses to the next level. It could mean courses specially tailored for the online medium, or those that take constant feedback from the students while they watch the videos. Some online courses around the world have evolved to these levels. The best example is Udacity, a startup from Stanford that now focuses on courses for professionals. Even in its current form, NPTEL has attracted the attention of the technology industry. TCS and Cognizant were some early supporters; some of their employees have even taught courses on NPTEL.

Now some others have supposedly expressed interest in using the courses for their employees. "Private companies are now considering using NPTEL courses as part of their recruitment process," says Andrew Thangaraj, associate professor of electrical engineering and NPTEL coordinator at IIT Madras. The experience is inspiring some IIT professors to move in a different direction. G Venkatesh, professor of electrical engineering, gets the students to watch his lectures before they come to the classroom. They then spend two hours in class on quizzes and solving problems. Venkatesh is yet to put his videos on NPTEL, and his flipped classroom is an experiment in future education. A few startups are brewing here too.