Online Science Is a Stretch for Asia

Asian mega-universities are providing rural populations with an opportunity for postsecondary instruction. But most have been unable to deliver the type of scientific and technical training that is vital to developing nations

TOKYO—Indonesia's Universitas Terbuka boasts of having the world's largest student body. But its 530,000 students don't ever meet. Instead, they are scattered across the Indonesian archipelago. Thailand's Sukhothai Thammathirat Open University (STOU), with 220,000 students, is in the same league, part of a boom in distance learning over the past few decades that has swept through many developing countries in Asia.

Faced with surging demand for higher education, these nations see distance learning as an economical alternative to more bricks-and-mortar university campuses. But these resulting mega-universities, generally seen as a vital complement to conventional universities, lack one vital component: With the exception of the Open University of Sri Lanka (OUSL), few offer science or engineering majors. Indeed, only a handful offer any technical courses at all.

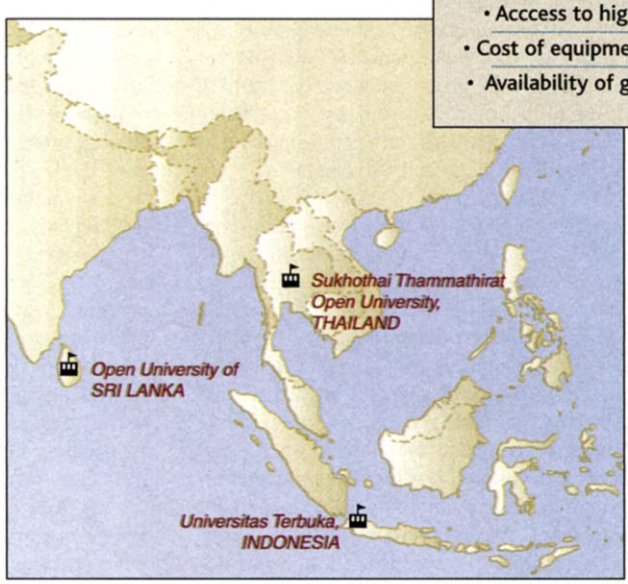
These universities have avoided science and engineering courses for good reasons, says John Daniel, assistant director-general for education at the United Nations Educational, Scientific, and Cultural Organization in Paris and the author of *Mega-Universities and Knowledge Media*, a book on global distance learning. "It is difficult to provide the experimental component," he notes. In addition, "science is more challenging to teach at a distance, because you have to take the new student gradually and carefully through mathematical and scientific background." Finally, tight budgets don't allow for much in the way of lab equipment and facilities.

These logistical and financial hurdles have proven too high for even the region's best distance learning universities. Daniel calls STOU, which began with correspondence teaching, "the most successful of the larger mega-universities" and notes that its textbooks and other printed learning materials have been adopted by many of the country's conventional universities. But aside from some technical offerings in areas such as public health and agricultural extension work, STOU does not offer science and engineering majors.

Somchin Sutavarak, vice president of planning for STOU, agrees with Daniel that the difficulty and expense of providing for laboratory work is a major problem. Building a network of laboratories would have been prohibitively expensive, he notes, and even using laboratories at conventional, primarily urban universities would not have helped STOU's target population, which is scattered throughout the country's vast rural areas. "It is doubtful that students could learn pure science courses efficiently," Sutavarak says about the school's decision not to provide comprehensive scientific training. A final factor is salaries too low to lure potential faculty members away from the private sector.

BARRIERS TO ONLINE SCIENCE EDUCATION IN ASIA

- Acccess to high-quality labs
- Cost of equipment and facilities
- Availability of good instructors



The same refrain is heard across the region. Malaysia's Multimedia University, located in the new city of Cyberjaya south of Kuala Lumpar, offers business management courses partly over the Internet. But science and engineering students "need to attend classes for practical reasons," says a university official.

Despite the challenges, STOU is now studying the feasibility of establishing a school of engineering. Officials hope to identify which engineering disciplines are most in demand and which would be most amenable to distance education, including the necessary laboratory work.

That problem was solved early on by OUSL, which since 1987 has offered a full range of degree programs in the natural sciences and engineering. The school opened in 1980, and E. M. Jayasinghe, dean of the Faculty of Natural Sciences, says establishing science and engineering programs was a priority for OUSL, because "the conventional universities cannot admit all the qualified, eligible students."

Sri Lanka has some logistical advantages over its larger brethren. At 19,000, its student population is a much more manageable size. The island is just 430 kilometers north to south, with the vast majority of the population concentrated at the southern end. This places most students within a short trip to three strategically located study centers where OUSL maintains its own laboratories. OUSL is able to maintain laboratories and staff to run them thanks to the backing of the government, which provides about 75% of OUSL's annual budget. In comparison, Thailand's open university depends on student fees for most of its revenue, getting only about 20% of its annual budget from the government.

At OUSL, science and engineering students work primarily on their own, using textbooks. But laboratory work, under the direction of OUSL instructors, is an integral and compulsory part of many courses. It's also offered on a flexible schedule, to avoid conflicts with work and other responsibilities.

The university awards 200 or so bachelor's-level science degrees each year, along with some 20 engineering degrees. That's only a tiny fraction of the 12,000 degrees awarded annually by the country's universities in all fields, although Open University officials also point to the several hundred certificates and nondegree diplomas that they award each year in fields such as computer programming and medical laboratory techniques that allow students to advance in their careers. The school also offers some master's degree programs, although the numbers are rather small.

Even such modest scientific offerings are enough to make officials at other Asian open universities jealous. But a lack of money and a large target population pose a formidable challenge to providing science to a mass audience.

–DENNIS NORMILE