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Online Learning in Singapore Primary Schools:
An Interview with Seng Chee Tan
by Elizabeth Hawthorne and Seng Chee Tan

The Southeast Asian country of Singapore comprises a main island and numerous islets between Malaysia and Indonesia. Inhabited by Chinese, Malays, Indians, Eurasians, and other ethnic populations, Singapore is a vibrant mix of different cultures and religions. It is also reputed to be the most wired island in the world. This characteristic—along with the nation's commitment to multiculturalism, its Western influences (including the widespread use of English in schools), and its determination to be economically competitive—makes Singapore a particularly interesting case study for information technology (IT) adoption and adaptation.

Seng Chee Tan is an assistant professor in the Learning Sciences and Technologies Academic Group at the National Institute of Education in Singapore. In this interview with Elizabeth Hawthorne, principal of Change Consultancy in Chicago, Tan describes his country's achievements in technology-enhanced education.

Elizabeth Hawthorne [EH]: Dr. Tan, Singapore is said to be the most wired island in the world. Please describe the hardware that is common throughout Singapore schools.

Seng Chee Tan [SCT]: With the launch of the Masterplan for Information Technology in Education in 1997, the Ministry of Education provided an IT-enriched environment for all schoolchildren, including those in primary schools. In terms of physical infrastructure and hardware, all schools were provided with wide-area-network and Internet access. It is now common to see two or more computer laboratories in a school, with a student-to-computer ratio of 6:1 (the goal is 2:1). There are also computers in some classrooms, libraries, audiovisual theatres, and even along the walkways or in canteens. Most classrooms are equipped with a single-beam projector. Teachers were given a special subsidy to purchase computers, and the current teacher-to-computer ratio is approaching 1:1.

EH: With all of this equipment readily available, what are the expectations for schoolchildren with respect to computer use? That is, are children in the primary grades expected to be able to use the Internet? Are special software packages used? To what extent are computers used independently or through structured oversight?

SCT: Some schools conduct computer enrichment courses, but the emphasis is more on the use of IT in teaching and learning. Schoolchildren are able to use the Internet under teacher guidance for some learning activities. Web sites or portals are being set up to help primary students learn languages (e.g., Happy Town for Chinese, Nadi for Malay, and Nam Naadi for Tamil). [Editor's note: These sites employ special language packs.]

The Ministry of Education provides funds for schools to purchase their own educational software, and it maintains a list of reviewed programs. The Ministry also develops some software in-house to cater to local curricula. The use of educational CD-ROMs was dominant at the beginning of the Masterplan, but in recent years, many schools have subscribed to outside service providers for e-learning platforms and IT-based software. Now there is an increasing use of learning objects; I think that this trend will reduce problems associated with running software on different platforms or different operating systems.

Under the Masterplan, most schools are using IT in teaching and learning for at least 10% of the curriculum time.

EH: Are there restrictions on children's use of the Internet? If so, how are they imposed?

SCT: Children use the Internet in school, mostly under the guidance of their teachers, and at home under the supervision of their parents. The main concerns of Singapore's Media Development Authority (MDA) are pornography, violence, and the incitement of racial or religious hatred. The MDA has developed an effective Internet policy and has worked with Internet service providers to filter out objectionable content; such content is therefore unlikely to be accessed by our children. Teachers are careful in using the Internet in their classes; some of them download the relevant pages for students. An organization called the Parents Advisory Group for the Internet (PAGi) is also actively involved with parents and the industry to enhance Internet safety for young children.

EH: Has computer use affected the pedagogy that teachers apply in Singapore schools? If so, please explain how things have changed.

SCT: I have visited some schools but not all, so my comments are observational. During the initial phase of the Masterplan, teachers used IT as efficient tools to enhance productivity (e.g., they created PowerPoint presentations, prepared worksheets in Microsoft Excel, etc.), and they used computer-based tutorial software to conduct lessons. Recently, we have seen an increase in the use of various pedagogies with IT, like problem-based learning, constructivist learning, and computer-based conferencing. Some instructors are even using the Web as a publication house for children to share their works. These changes reflect the efforts of various parties, including the schools, the Ministry of Education, the National Institute of Education, and some companies that sponsor awards for innovative practices.

EH: Has the government supported shifts in pedagogy?

SCT: Yes. Take, for example, an initiative called Quality and Excellence in Schools through Technology (edu.QUEST). This Ministry of Education program encourages teachers to learn about information and communication technology (ICT), provides them with project ideas, and connects them to other educators interested in sharing best practices. It also encourages teachers to be reflective practitioners by engaging them in action research. More ICT-related information is available to teachers through the edu.Mall portal.

EH: Has technology fostered more creativity from both students and teachers?

SCT: Technology is one of the driving forces of creativity. It is quite common for children to create their own PowerPoint presentations. New Web-editing software has made it easy for students to publish and share their works through the Internet, and advances in video technology allow students to produce their own i-movies. Schools are participating in a number of competitions related to computer programming, video production, and digital presentations. Projects like edu.QUEST encourage teachers to be innovative while engaging in their own classroom action research.

EH: What are teachers saying about the use of technology with their students? What is their comfort level? What are their concerns?

SCT: I have not conducted a survey or any interviews on this topic, so my answer is based on informal conversations with teachers. All teachers are trained in IT use by the Ministry of Education or the National Institute of Education; most of them have basic skills. The main concerns seem to be workload and time constraints. Teachers have to cover a national curriculum, and they must prepare students in particular for the national examination that they take after completing the sixth grade. (This examination determines the type of school that each child will attend and the academic track that he or she will take.) The time that remains is often not enough for teachers to create their own IT-based materials or to prepare IT-based lessons. I think the problem may be partly solved with time, when teachers have accumulated their resources.

EH: Have the national examinations changed in any way—in terms of content, design, or delivery—with the advent of technology and the increasing use of it in schools?

SCT: Examination scores are computerized, meaning that there is a standard program for reporting the scores. As for computer-based assessment, some schools do subscribe to application providers for e-learning services, which usually include components on online assessment. I would not say that it is a common phenomenon yet, although the Ministry is considering some projects involving IT-based assessment, like adaptive testing systems and automated essay-marking systems.

I have seen an increase in alternative forms of assessment. For example, assessment rubrics are being used in many schools to grade the students' project work. (Junior college students who want to gain admission to a university must now provide evidence of this work.) I cannot say that such changes are solely due to the advent of technology, but technology has fostered a more holistic education for our students.

EH: What is teacher training like? What is emphasized? How is it delivered?

SCT: The National Institute of Education conducts a module on IT use for all preservice teachers, who are required to attend. The Educational Technology Division of the Ministry of Education provides training for all in-service teachers in the form of workshops and guided lessons.

The emphasis is on the proper use of IT for teaching and learning. In the National Institute of Education, preservice teachers learn to be presenters, facilitators, and designers—that is, they learn to use IT to enhance their presentations, to facilitate their instruction, to encourage student thinking, and to design simple IT-based learning materials called microLESSONS. We relate practices to relevant learning theories. The training is administered in modules that are lecture-free and that blend face-to-face instruction and e-learning; the emphasis is on performance assessment. For in-service teachers, we also offer professional development courses that lead to an advanced diploma or an advanced postgraduate certificate; teachers can choose modules that are specific to the use of IT in education.

EH: What are the major challenges related to IT use in Singapore's primary schools?

SCT: Schools are well equipped with hardware and infrastructure, and teachers do possess basic IT skills. The major challenge is to encourage teachers to explore the various ways of using IT based on sound pedagogy. While it is relatively easy to learn a program, it is much harder to for a teacher to be convinced that alternative pedagogies will work. For instance, we require all preservice teachers to create microLESSONS using PowerPoint. Most of them do not have problems with the software, but it takes some effort for them to understand the constructivist approach behind the lessons.

EH: Why do you think this is the case?

SCT: Teachers are familiar with the instructional approaches that they experienced as students. We used a more didactic approach in the past; the constructivist approach requires quite different planning and preparation.

Teachers need to design activities that engage students in processing knowledge and that guide them toward constructing and representing their own understanding. Teachers also need to give students more power or autonomy. Some teachers are not comfortable with this approach for several reasons. First, they are not very familiar with it, and they do not want to fail (they do not have time to conduct the lessons again). Second, it requires a lot of guidance and scaffolding, which is very time-consuming and not easy to do well. Third and finally, it means giving students more autonomy, and the students themselves may not be comfortable in this situation.

I am not advocating one approach over the other. I am saying that we try to expose teachers-in-training to a

variety of instructional approaches.

EH: Have the goals of the Masterplan been reached? What is next?

SCT: The first Masterplan covered initiatives through the end of 2002. The second installment, the Masterplan II for IT in Education, covers 2003 to 2007 and will further enhance teaching and learning processes. Academic staff members at the National Institute of Education are researching the use of IT in education. The Institute also boasts a relatively new Centre for Research in Pedagogy and Practice that examines, among other things, the use of ICT in education.

EH: This is an exciting time for technology and learning in Singapore. What wisdom can you share with educators and administrators in other countries?

SCT: Building the infrastructure and providing the hardware are relatively easy; with sufficient commitment and funding, these goals can be achieved. However, to truly use technology effectively and meaningfully, we need to invest more time and effort in teacher training in terms of pedagogical knowledge. Teachers' beliefs about teaching and learning, as well as their understanding of how learning occurs, influence the final mode of instruction. These mindsets are hard to change and therefore pose the greatest challenge to innovation in education.