

## LEVERAGING TECHNOLOGY FOR EDUCATIONAL REFORM AND PEDAGOGICAL INNOVATION: POLICIES AND PRACTICES IN HONG KONG AND SINGAPORE

NANCY LAW

*Centre for Information Technology in Education  
Faculty of Education, The University of Hong Kong  
Pokfulam Road, Hong Kong  
nlaw@hkusua.hku.hk*

Schools as social institutions are resistant to change, and the introduction of ICT (information and communication technologies) into classrooms has not yet created fundamental changes in learning and teaching in public schooling in general. Findings from international comparative studies have shown that educational innovations leveraging the potentials of technology have taken place in schools around the world and that national educational policies have major influence on the sustainability and scalability of educational innovations. This commentary draws on the policies and strategies associated with the implementation of the IT in Education masterplan in Singapore and Hong Kong to argue that there is a distinct possibility that these systems will be able to leverage the potential of ICT to bring about significant changes in public schooling within the next two decades.

*Keywords:* Systemic change; education masterplan; public schooling.

### 1. Information Technology and Schooling: A Catalyst or a Lever for Change?

The escalating developments in information and communication technologies and their wide ranging impact on the basic fabric of our contemporary society has been widely recognized. The importance and possible contributions of integrating ICT into learning and teaching at all levels of education have also been widely acknowledged. Many countries, developed as well as developing ones, have variously established national ICT in education masterplans and/or national education masterplans that incorporated a prominent strategic ICT component since the mid 1990s (Plomp, Anderson, Law and Quale, 2003). These plans were often accompanied by significant government funding at the national and regional levels. On the other hand, Cuban's (2001) observation that computers in classrooms have been oversold and underused has been widely quoted around the world. How can such contradictions be reconciled? Will ICT really play an important role in the daily milieu of classrooms and bring about significant changes in educational practice?

Based on an assessment of the situation in America, Halverson and Collins (2006) argued that the catalytic power of information technologies is likely to leave the core practices of public schooling untouched, but will instead “converge into components of a parallel, alternative learning system” (this issue). This prediction was made on the basis that “as the structures and cultures of institutions evolve, their core practices become increasingly resistant to change” (ibid.). I certainly agree that schools as social institutions are resistant to change, but they will change under suitable circumstances, just as other social institutions have changed in history. However, schools, whether public or private, will not change simply because of the presence of information technology per se. They are influenced by much broader educational policies and priorities, including curricular goals, assessment strategies, appraisal criteria and community expectations. The status of public schooling in relation to parallel alternative learning systems no doubt has important equity and broader social implications. Changes there again often reflect national policies and priorities. Information technology per se will not be a catalyst for change (meaning that educational practices will not change simply because of the presence of technology), but could be used as a lever for the realization of educational visions involving curricular and pedagogical transformations (Law *et al.*, 2000; Venezky & Davis, 2002).

## **2. Intrinsic Incompatibility Between Schools and the New Technologies?**

Halverson & Collins’ response to the commentaries put forward the view that there are deep incompatibilities between schools and the new technologies. Essentially the argument is that teachers will not want to change from their role as experts, that they will not change their beliefs about learning, that schools will not change its goals from the factory model of teaching a prescribed content which is supposed to last for the rest of the students’ life, and that standardized assessment will stay indefinitely. They have a deep disbelief that schools or teachers will change in fundamental ways at all. Thus, the alternative learning systems that Halverson and Collins describe are in fact non-schooling, systems *outside* of the formal school system. While the other three commentaries agree with Halverson & Collins that it would be very difficult for schools to change and to adopt the new technologies in significant ways (and I also share the view that changing schools as social institutions is a difficult process), I see important differences between the views of the other three respondents and Halverson and Collins’s. First of all, it should be noted that the alternative approach to schooling that Alexander’s commentary describes was what happened *in* some schools, not outside. The commentaries of both Young and Miyake describe changes in teachers’ practice in some schools that share the alternative goals and approaches to learning and education that Halverson & Collin described. The main challenges they describe are not by nature intrinsic to teachers or schools but are rather obstacles arising from system level institutions such as high

stake public examinations, which cannot be changed by school-based or individual efforts alone.

I argue here that whether schooling will change to take advantage of the possibilities that the new technologies provide depends importantly on whether there are concerted national efforts toward systemic change at all levels, from the top system level down to individual teachers and parents. Further there is evidence that such efforts on systemic change are taking place in many countries around the world. At the education system level, Pelgrum and Law (2003) reported distinct changes observed in the national educational policy and implementation strategies in ICT in education since the 1980s, moving from a focus on *training IT professionals* and *delivering an IT-literate workforce for national development* to *supporting education reform* efforts to prepare for challenges of the twenty-first century in the more economically advanced countries. At the practice level, the findings from the Second Information Technology in Education Study Module 2 (SITES M2), an international comparative study of innovative pedagogical practices using technology, provided strong evidence for the emergence of more student-centered pedagogical practices involving changed roles of teachers and students, and the achievement of new educational goals suited to the 21st century when ICT was integrated across the curriculum in the various countries (Kozma & McGhee, 2003).

In this short commentary, I will examine the policies on ICT in education and their impact on schools in Singapore and Hong Kong to arrive at a view that ICT is playing an increasingly important role in classrooms, with the possibility of becoming an indispensable part of significantly changed classroom practices within the next two decades.

### **3. Thinking Schools, Learning Nation: A Singapore National Initiative Beyond ICT in Education**

This section reviews the national policies and implementation strategies that Singapore has put in place in the last several years to realize its national vision of *Thinking Schools, Learning Nation* (TSLN), which was established on the basis that the future wealth of a nation will depend on its capacity for learning:

A nation's wealth in the 21st Century will depend on the capacity of its people to learn. Their imagination, their ability to seek out new technologies and ideas, and to apply them in everything they do will be the key source of economic growth. Their collective capacity to learn will determine the well-being of a nation. (Goh, 1997)

The first Masterplan for IT in Education was also launched in Singapore in 1997 as "a key strategy for producing a workforce of excellence for the future" (Singapore Ministry of Education, 1997). It aimed to achieve four major goals: enhance linkages between the school and the world around it, generate innovative processes in education, enhance creative thinking, lifelong learning and social responsibility,

and promote administrative and management excellence in the education system. The comprehensive implementation strategy included a cascade model of teacher development that trained experienced teachers and heads of departments to go out as ICT coaches, who provided site-based training in schools to the 24,000 strong teacher force, both on pedagogical principles to harness ICT for teaching and learning as well as on how to implement the “Thinking Skills Program” (Yeo, Kan & Tham, 2003). Leadership workshops were also organized for school principals to acquaint them with the roles they need to play to lead the change processes involved. Most important of all, to facilitate a change in pedagogical culture, a reduction of 10–30% in the curriculum content was instituted in July 1998 to provide more flexibility for the development of a learner-centered environment, and assessment was to measure students’ skills in assessing and applying information, thinking and communicating.

Building on the success of the first plan, Singapore’s Masterplan II for IT in Education (Singapore Ministry of Education, 2002) was unveiled in July 2002. This new plan identified the strategic role for IT to be one of enhancing (a) teacher-pupil relations, (b) interaction, peer support and collaboration among learners (pupil-pupil, teacher-teacher), and (c) interaction between learners and the wider community, as core to a systemic and holistic approach to change at this stage of development without swerving from its focus on realizing the TSLN vision.

In parallel to the sustained systemic efforts on curriculum and pedagogical reform, the Singapore government made a landmark commitment to education research on schools and pedagogy through the establishment in 2002 of the Centre for Research in Pedagogy and Practice (CRPP) within the National Institute of Education, which is affiliated with the Nanyang Technological University and is the sole teacher-training institution in Singapore. The significance of this project can be gleaned from the level of government investment committed: S\$48 million over a five-year initial period which, according to Luke, Freebody, Shun, & Gopinathan (2005), is more than 10 times the per capita investment in educational research of the UK, Australia or Canada. The CRPP remit was to build a comprehensive program to provide descriptive, observational and intervention-based data for research-based policy development, intervention and innovation in all aspects of Singaporean schooling, including school organizational capacity, leadership and high-stakes assessment.

A further national initiative on educational research was the establishment of the Learning Sciences Laboratory (LSL), also in the National Institute of Education, in 2004. The driving motivation for the establishment of the LSL was the realization that “for effective transformation of learning to take place enabled by ICT, educators need to go back to the basics of understanding learning from scientific and interdisciplinary perspectives” (Looi, Hung, Bopry & Koh, 2004, p. 94). This Laboratory was proposed as an experimental site for ideas and concepts related to learning interactions and teaching pedagogies to be prototyped and implemented in classrooms and schools. The mission of the LSL was to contribute to transforming learning in

Singapore schools through transforming pedagogical mindsets, experimenting with potentially transformative learning technologies and contributing to transformative capacity building and empowerment.

The reader may query the significance of these developments. After all, most of the learning sciences laboratories are found in the US, and large research centers conducting national level evaluative education studies are found all over the world. Would this make a major difference to the impact of ICT on learning and teaching in Singapore, when it had not done so in the US even though many world-renowned research establishments have operated there for decades? It may be too early to conclude that ICT will bring about significant pedagogical changes to Singaporean classrooms at large. However, what sets the Singaporean approach apart is the coherent, holistic and systemic efforts from an apparently single-minded government that has put the transformation of education as its top national priority upon which the national future depends. The transformative use of ICT in learning and teaching outside of public schooling can and will happen. Whether the same transformative potentials of ICT will be realized in public schooling given such a national educational context is to be observed.

#### **4. ICT as Integral to a Broad-Brush Education Reform Initiative in Hong Kong**

Hong Kong's route map on ICT in education bears similarities and differences with that of Singapore. Hong Kong's first IT in Education plan (EMB, 1998) was launched one year after Singapore's. The main difference between the two masterplans was not in the specific policies or strategies, but in terms of the clarity of the educational goals they served. While *prima facie* the espoused goals of this plan bore strong similarity to those found in the Singaporean plan, many schools in Hong Kong viewed the effort to integrate IT in support of learning and teaching as primarily a technological transformation rather than an educational one (Law, 2003). An important contextual background that impinged on the implementation and impact of the first five-year IT in Education strategy in Hong Kong was the lack of an overall education reform initiative at the time the plan was launched. It was not until 2000 that the blueprint for education reform of the entire education system, *Learning for Life, Learning Through Life* (Education Commission, 2000), was launched. This reform was again motivated by the perceived economic imperative that Hong Kong needs a flexible and reflexive workforce that can serve emerging industries founded on knowledge, technology and innovation. To achieve this, learning and teaching in the various key learning areas must help students to develop the nine generic skills of collaboration, communication, creativity, critical thinking, information technology, numeracy, problem solving, self-management and learning, which in turn require the innovation and adoption of new pedagogical practices. Project-based learning and IT for interactive learning were the two pedagogical strategies that were recommended as amongst the key strategies to achieving the

goals of the reform. Assessment reform was part and parcel of the initiative with an aim to establishing a new culture of assessment for learning rather than learning for assessment.

The launch of the education reform gave the IT in Education initiative a much needed educational focus in the formulation of the second strategy, *Empowering Learning and Teaching with Information Technology* (EMB, 2004). In reviewing the implementation of the first IT in Education policy, this document recognized that an important barrier was the inadequacies in vision and leadership at the school level so that “the use of IT for the promotion of curriculum and pedagogical innovation are crucial yet have not been widespread” and that “appropriate professional development and support are lacking” (EMB, 2004, p. 5). Building leadership capacity, fostering the establishment of communities of practice for pedagogical innovation and supporting continuous research and development were distinctive strategic goals that were not found in the first IT in Education policy document. The identification of these omissions indicate a recognition of the challenges that needs to be overcome to achieve deep curricular and pedagogical reform.

## 5. Technology as a Lever for Systemic Educational Innovation

In both Singapore and Hong Kong, efforts to promote the integration of ICT into learning and teaching are part of and subservient to a national education reform agenda that demands deep changes in curriculum goals, assessment practices and pedagogical roles in order to educate their younger citizens to ensure national well-being for the 21st century. We see clear efforts in both systems to nurture, support and disseminate innovation through the exemplars of *success stories* from Singapore<sup>1</sup> and *good practices* from Hong Kong.<sup>2</sup> In the case of the latter, the aim of putting the exemplars online was not simply to disseminate good practice, but more importantly to “create a community database of pedagogical innovations using information technology, a sharing system for teachers to explore and reflect on their own practices with other interested education professionals and to build professional collaboration on action-oriented school development initiatives.”

An analysis of 94 case studies collected from 23 countries led Venezky and Davis (2002) to the conclusion that innovation or change will not occur from the mere presence of ICT in a school, but for the prepared organization, ICT can be used to leverage educational change. In any system, there are likely to be some schools that are prepared to leverage the educational potential of ICT while there are others that are ill prepared. However, the historical, socio-cultural contexts as well as national educational policies have major influence on the sustainability and scalability of educational innovations. It is widely recognized that the prevailing cultural influence in Singapore and Hong Kong is the Confucian Heritage Culture (Biggs, 1996),

<sup>1</sup>[http://www.moe.gov.sg/edumall/success\\_stories/success\\_stories.htm](http://www.moe.gov.sg/edumall/success_stories/success_stories.htm).

<sup>2</sup>[http://goodpractices.cite.hku.hk/modules/myhome/index.php?sel\\_lang=english](http://goodpractices.cite.hku.hk/modules/myhome/index.php?sel_lang=english).

with emphasis on rote memory and the authority of the teacher as the source of wisdom. There are still many obstacles to overcome at systemic, institutional and individual levels for the emerging innovations to take root and blossom. However, if the concerted systemic efforts described above are sustained in these two economies, it appears hopeful that they will be able to leverage the potential of ICT to bring about significant changes in public schooling.

The question of whether ICT will also play a significant role in American public schooling in general to bring about curriculum and pedagogical innovations is difficult to answer. It is apparent from (Cuban, 2001) that American schools face greater obstacles in the form of inconsistencies in the system level education policies:

In the mid-1980s, just at the time techno-enthusiasts turned their attention to schools, there were determined efforts to restructure both urban and rural public schools to prepare a foundation for more ambitious forms of instruction and curriculum. Initiatives in elementary and secondary schools across the country sought to re-align the age-graded school, bridge subject-matter boundaries, share decision making in schools, and increase teacher collaboration to achieve professional communities where learning was intellectually rigorous, active, and project-based. Within a few years, however, the surge of restructuring ebbed, and a new generation of school reformers promoting rigorous academic standards, accountability and higher test scores gained prominence. (p. 181)

Will ICT favor the prepared nation? What are the necessary conditions for a nation to be “prepared”?

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