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Technology leveraging change in Hong Kong schools

R.M.K. Fox
University of Hong Kong, SAR China

ABSTRACT

Technology *per se* has been seen as a catalyst for reform and change in many schools. This article reviews Hong Kong school practices and government policies and strategies and proposes that technology can act more as a lever than a catalyst for change if supported by broader changes in the education system. The article concludes that certain factors can facilitate this change

Keywords: *technology, reform, public schooling.*

INTRODUCTION

In a recent paper Fox and Henri (2005) proposed that the move from teacher-centred to more learner-centred teaching practices cannot be attributed solely to the introduction of information and communication technology (ICT). They argued that significant change in teaching practices in schools required a large scale, coordinated, holistic and a systematic reform process. This commentary draws on strategies, policies and practices in integrating ICT into educational institutions in Hong Kong to help identify key factors that effect change in schools.

BACKGROUND

In 1998 the new Hong Kong government made clear its perception of ICT as an agent of change in teaching practices seeing technology "as a powerful educational tool that can play a catalyst role in the transformation of school education" (EMB, 1998, p. 1). In support of this view the government made available "HK$B3.05 (about US$M391)" in the same year, to equip schools with hardware and software and to provide ICT infrastructure and technical support (Plomp et al. 2003, p. 25). The fund was also intended to cover five years of competency training for all teachers. By 2003, the government was able to report to the community that all teachers had taken and passed the basic ICT training programme; that 75% of the 50,600 teachers in Hong Kong (EMB, 2004) had passed the intermediate ICT training programme; and a further 25% and 6.7% respectively, had passed the upper intermediate and advanced ICT training programmes (EMB, 2003).

Table 1: IT Competency Levels

IT Competency	2000-01	2001-02	2002-03
Basic	100%	100%	100%
Intermediate	21.7%	50.6%	75.0%
Upper Immediate	6.0%	12.0%	25.0%
Advanced	3.9%	4.8%	6.7%

(EMB, 2003)

The overall initiative reflected the government's perception that the adoption of ICT into the education system would be the "catalyst" for a much needed paradigm shift "from a largely textbook-based teacher-centred approach to a more interactive and learner-centred approach" (EMB, 1998, p.1). The targets for the integration of ICT into education were further defined in the policy address given by the new Chief Executive of Hong Kong:

> *Within five years, we are aiming to have teaching in at least 25% of the curriculum supported through IT. Within ten years, we aim to see IT being applied comprehensively in school life, and all our teachers and Secondary 5 graduates being able to work competently with IT tools. (Tung, 1997, p. 47)*

The role of ICT was made clear. The introduction of ICT would be a central component leading to a transformation in schools. This belief that IT or ICT can play a key role in reforming education systems is reflected in similar agendas elsewhere in much of the industrialised world (e.g., DFEE, UK, 1997; MOE, Singapore, 2000; DE, Victoria, 1998; MOE, Research, and Church Affairs, Norway, 2000). These reform agendas are all concerned with the adoption and use of ICT in schools to increase learning opportunities and student motivation and achievement. These policies state that the introduction of ICT into educational environments will accelerate change and ultimately improve student learning. The rhetoric surrounding such policies and in the case of Hong Kong, EMB's policy document (1998) indicate that teaching practices will be reformed, from a teacher dominated mode of delivery to a more student-centred approach to educational practice. In other words, the government was looking for a planned 'technochange', a term which Marcus describes as "the use of ICT to drive improvements in organisational performance" (2004, p. 4). This view of IT/ICT as a catalyst for change assumes a key role for ICT in shifting teachers from teacher-centred ways of working to "a new role as learning facilitator" (EMB, 1998, p. 10). However, this vision does not take into account the many constraints imposed on teachers to reform and change their practices. These constraints include an inflexible and 'overstuffed curriculum' (Fox & Radloff, 1999), a rigid examination system, short lessons of typically 30 minutes to large classes of, on average of 40 plus students, conducted in classrooms with limited resources and space and social pressures to perpetuate traditional methods. Teachers' priorities in Hong Kong schools are to ensure that their students attain the academic level required to gain a good pass in the examination system. The examination system itself has created pressures for rote learning from Grades Three to Six in primary school, then intensive competition to get into the right secondary school, followed by two sets of exams at secondary level, one at the end of Form Five and another at the end of Form Seven for those wishing to enter university. The role that ICT can play in helping teachers attain their goals is therefore limited within these present

constraints. Pressures to adopt ICT in education since 1998 has primarily led to the ascendancy of PowerPoint slides in partial replacement of the blackboard and overhead projector. As Lam and Lee (2000) discovered, ICT in Hong Kong schools has predominantly been used simply to transmit information via PowerPoint as an alternative to the older technologies, to prepare lesson materials and for school administration purposes. Hardly the looked for technochange.

By 2000 the government acknowledged that more needed to be done in order to realize the vision outlined in the plan. The Education Commission produced a report entitled Learning for Life (Education Commission, 2000, p. 1), which presents a "blueprint for the development of education in the 21st Century" for all levels of Hong Kong education. The report allows for more school-based flexibility in delivering and interpreting the school curriculum, notably: "The overall direction of the education reform is to create more room for schools, teachers and students, to offer all-round and balanced learning opportunities, and to lay the foundation for lifelong learning." (p.1)

The report acknowledged restrictions in the present practices in schools, highlighting "the heavy workload endured by teachers", the "examination-driven" rote learning and the monotony typical of Hong Kong school life, offering students "little room to think, explore and create." The report went on to observe that: "to make up for these weaknesses, we need to uproot outdated ideology and develop a new education system that is student-focused" (Education Commission, 2000, p. 4). The report stressed the need for this curriculum reform as part of "an overall reform of the rationale behind teaching and learning", which positions students at the centre and the focus of the education system (p. 40). Much of what is said in this document needs to be implemented before significant change can occur in school, irrespective of the introduction of new technologies. As Cuban notes " … although promoters of new technologies often spout the rhetoric of fundamental change, few have pursued deep and comprehensive changes in the existing system of schooling" (2001, p.195). In his research in America, Cuban found that:

> *the introduction of information technologies into schools over the past two decades has achieved neither the transformation of teaching and learning nor the productivity gains that a reform coalition of corporation executives, public officials, parents, academics, and educators have sought. For such fundamental changes in teaching and learning to occur there would have to have been widespread and deep reform in schools' organizational, political, and technological contexts. (2001, p.195)*

He further points out that:

> *without attention to the workplace conditions in which teachers labor and without respect for the expertise they bring to the task, there is little hope that new technologies will have more than a minimal impact on teaching and learning. (Cuban, 2001, p.197)*

Cuban's research was further supported by Fullan when he said that "it has become imperative … to attempt to affect substantial system change because without the latter you cannot get large-scale, sustainable reform" (Fullan, 2003, p.xi). He goes on to state that "the solution [for dealing with change] lies in better ways of thinking about, and dealing with, inherently unpredictable processes" (Fullan, 1993, p.19). To this we need to add the notion of "sustainability because deeper, more lasting reform is not possible without paying attention to establishing the conditions for continuous reform." (Fullan, 2003, pp.xii). Clearly the introduction of technology alone is insufficient to effect sustainable and systematic change. Systematic change then should occur first or at least simultaneously with any deliberate technochange.

GOVERNMENT DISCUSSION DOCUMENT

In response to shortcomings and changing identified needs, the government produced a discussion document that proposes 'the way forward' in Hong Kong. The report identifies what achievements have been made to date. It lists the main changes are that schools are: "connected to the Internet; teachers have acquired at least basic skills and are embracing ICT as a teaching tool; students are using ICT and the Internet in project-based learning" (EMB, 2004, para 2). The document notes that on average each primary school has 91 computers (PCs) while secondary schools have 247, above the original targets of 40 and 82. "All schools have broadband connection to the Internet with over 60% … having fibre access and enjoying 10 to 100 Mbs bandwidth." And further that the household PC "… and Internet penetration rate is 68% and 60% respectively in 2003" (p. 1). The document also identifies a major limitation to the implementation of the first five-year policy on IT integration was a focus on technological solutions rather than on how the technology could support educational needs. The document highlights a key barrier to success was the inadequacies in vision and leadership at the school level "the use of IT for the promotion of curriculum and pedagogical innovation are crucial yet have not been widespread" and "appropriate professional development and support are lacking" (EMB, 2004, p. 5). The discussion document does highlight a change in emphasis in government policy from seeing the role of ICT as the 'catalyst' for change to a more modest 'lever' for change and points to the importance of building multi-level leadership within schools to support an overall school plan for effective ICT implementation. The document also emphasises the importance of empowering teachers with IT by providing them with the necessary professional development opportunities and support to take on the challenges 'of using IT for curriculum and pedagogical innovations' (p. 15). In conclusion, the government document argues that improved educational practices will not change simply because of the presence of technology but that broader issues need to be addressed including educational policies and priorities, curricular goals, assessment and examination strategies, appraisal criteria and community expectations.

A WAY FORWARD

As is true for any change that involves major impacts on educational practice, the change has to align with other individual institutional priorities for it to be successful. Case studies of ICT policies and practices in schools in over 30 countries has indicated that the vision and goal for the implementation can be very different for schools that have been actively engaged in an innovation and change process (Plomp et al., 2003). These case studies highlight the challenge that ICT integration poses to educational institutions, which depend on both the vision and values embodied in the change as well as the existing culture and values of the institution concerned.

Strategies for ICT integration into the curriculum will be affected by how individual schools and their teachers emphasise particular curriculum and pedagogical approaches. For example, technology adoption and use in a school which emphasises traditional content and processes through set sequences, will be very different from a school in which students are engaged in collaborative projects within or across curriculum subjects. ICT in the more traditional arrangements is likely to be restricted to structured activities under the direction of the teacher. ICT in more student-centred environments that support increased student responsibilities and project- or problem-based learning will encourage a different kind of ICT application. The way ICT is used is therefore influenced by individual school culture, school priorities, existing school practices, types of leadership and directions in which the school is proposing to move. (Pelgrum & Law, 2003)

The change process is complex as the change ultimately has to take place in the classroom. So attempts to manipulate change too simplistically will result in failure, as described by Lankshear et al.:

> *… classrooms are complex, self-organising, adaptive systems: they have to arrange themselves around the interactions between their various human and non-human components. Each time a new component – such as a new technology or a policy – is added, it does not feed one more 'thing' into the mix in a linear way: rather, its introduction produces a compound effect. The new component rearranges all other interactions, and may add many more in its own right. Classroom practices then have to reorganise themselves around this new complexity, which involves changes in roles, changes in relationships, changes in patterns of work and changes in allocations of space in the classroom … in complex and often unpredictable ways' (p. 112)*

The challenge for ICT integration in schools therefore depends on the vision and the values embodied in the change, as well as the existing culture and values of the institutions concerned. In a study of 18 schools in Hong Kong which introduced ICT across the curriculum, the way the technology was used, its impact on learning and teaching, "bore no relationship with the technology infrastructure or technical skills level of the teachers. Instead, it was very much determined by the vision and understanding of the school principal and the prevelant school culture." (Pelgrum & Law, 2003, p. 62). Leading change is therefore a key challenge for principals to face as the key agents of change.

Yuen (2000) categorised schools which enthusiastically adopted ICT into teaching and learning into three predominant models of technology adoption. The models differed according to particular critical characteristics shown in the integration process: he named them 'technological adoption'; 'catalytic integration' and 'cultural integration' models.

In the 'technological adoption' model school, the principal and the majority of staff viewed ICT as a tool to improve existing teaching practices, and increase efficiencies and student IT skills. The key obstacles to implementation in these schools are gaining the right hardware and software technology and developing the right infrastructure and curriculum resource materials. Yuen noted that in these schools, the impact of technology on teaching and student practices was minimal. The technology just confirmed existing presentations, predominantly through PowerPoint. (Lam & Lee, 2000)

Schools that were characterized as 'catalytic integration' tended to have 'visionary leadership' and a history of continuous educational reform through engaging teachers in a learning process. In these schools, teachers are seen as members of a 'learning organisation' (Senge, et al., 2000). Principals in these schools view ICT as an opportunity to affect change through educational reform. ICT use was deliberate and designed as an integral part of the curriculum, consistent with the school ethos. The key focus in these schools was teacher development with strong support for curriculum leadership and development. These schools showed more student-centred work, more innovative teacher practices, and were more likely to adopt innovative pedagogical practices such as collaborative problem-based learning tasks and projects. The school principal is the key agent of change, who has a clear vision and implementation strategy for ICT with the main elements being staff development focusing on curriculum tailoring and pedagogic innovation. In these schools, ICT helped advance curriculum reform initiatives already underway. The challenges for teacher in 'catalytic integration' schools is to rethink their attitudes, beliefs and understandings held about their roles as educators and to re-conceptualise their understanding of schooling and society.

The 'cultural integration' model schools (Law, 2000) had a strong and distinctive school culture and a long history of supporting student-led initiatives. These schools had long established support for student-initiated work that aligned with the school ethos of self-actualisation and lifelong learning. ICT in these schools was perceived mainly as an opportunity to provide a very powerful tool to support the empowerment of students and teachers. These schools, had a long history of supporting individual choices. The teachers and students were not required to learn technical skills to use ICT. Rather, ICT adoption was encouraged through existing channels across the schools. In these schools, a wide range of ICT adoption was found from expository teacher-centred teaching to more student-centred social constructivist and collaboration work as well as using ICT as a cognitive tool. In fact in these schools rather than the school staff leading technical training, it was the student organizations that ran courses for fellow students to improve their ICT literacy skills. Schools adopting the cultural integration model used ICT to help promote the school vision and mission, though in many different ways. The differences lie in the different educational values and emphasis that are deeply rooted in the rich tradition and history of the schools in the study. Schools without such established traditions and culture would find it extremely difficult to integrate ICT into the curriculum in the same way that these schools do.

These three models identify different types of schools' adoption of technology and can be used by schools in Hong Kong to compare and reflect on their own approaches to technology adoption. Depending on the model that individual schools most closely identify with can help the school locate where it currently is. This in turn can assist in the planning of where the school wants to go and how it might there.

Whatever the model adopted and adapted, I would argue that there are a number of common factors necessary in Hong Kong to effect sustainable and successful technology integration. These factors are included below under broad headings of: leadership, planning and professional development.

Leadership**:** a key to successful integration of ICT into schools is the provision of clear and focused leadership. This requires the establishment of a vision and a mission that can be shared amongst all stakeholders in the school: the principal, teachers, administration staff, students, parents and the community, as well as the articulation of a plan and strategies for implementation that can realize the vision. In addition, leadership should not be seen as solely the role of the principal, but that there should be levels of leadership within the school, where stakeholders are prepared to take on leadership roles. This multi-level leadership, however, is only possible when conscious efforts to devolve decision-making to the lower levels are made in the school.

Planning**:** the provision of resources and support by the government, should be staged and progressively conditional on the school's ability to demonstrate that it has clear plans and strategies for implementation that are consistent with broader curriculum priorities and visions. The use of ICT for learning and teaching, where possible, should focus on helping to solve key educational challenges identified in the school.

Professional development**:** initiatives to support school teachers and provide them with necessary professional development at the school level is the key unit for sustainable change. The focus therefore should be at the school level and include professional development initiatives tailored to specific needs rather than relying on generic government level training programmes. The school professional development should also be part of an overall school improvement plan, with teachers' involved in the design and implementation of their own professional development activities. These development programmes need to be ongoing. Single workshops with no follow-up tend to fail (Fox & Herrmann, 2000). It is much better if activities are spread over time and include a mix of theory and practice including exemplars of new ways of teaching with opportunities for teachers to practice and gain feedback and support from each other on their

work. Deep changes in teachers' beliefs can only happen through ongoing reflective practice. This can be encouraged through involvement in sharing ideas throughout the school, which promote curriculum and pedagogic innovation and reform. Schools therefore would benefit from creating 'communities of collaborative practices', encouraging teachers to routinely engage in discussions and observations and activities that identify and solve problems.

This paper has commented on the past and present factors for change in Hong Kong schools concerning the use of ICT to assist in school reform. It argues that technology by itself cannot effect change but that in combination with broader factors such as careful planning, vision building, multi-level leadership and focussed professional development, ICT can assist in leveraging longer term change in Hong Kong schools.

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