Technological Practice and Change in Education

Robert Fox

Centre for Information Technology in Education
The University of Hong Kong

Abstract. Today more than at any other time, the potential for technology to act as a major catalyst for educational change in what we do and how we do it has never been more apparent. This chapter explores one case within an institution in Hong Kong that rose to the challenge of doing things differently and providing students and teaching staff with new ways of working, taking into account new technological practices and changing educational needs.

1 Introduction

We live in exciting times with many opportunities and challenges for reform and advancement in education. Today more than at any other time, the potential for technology to provide a major catalyst for change in what we do and how we do it in education has never been more apparent. Few students today come to university without ownership of powerful mobile technologies, whether these are laptops, tablets or hand-held devices such as smart phones. All these devices have enormous computing capabilities and offer access to thousands, of often free, applications, readily downloadable over the Internet. Many students regularly and frequently access their networks, including but not limited to, Facebook or iTunes, YouTube, Skype, Blog, Twitter, many times each day.

Universities have observed this trend towards mobility and personal learning environments (PLEs) is made possible by the easy access to multiple software applications and have begun to recognize the potential to link into, and communicate with, students through these new applications. For example, universities such as Stanford have for several years run extended induction programs, sample lectures, special interest groups, course materials and assignments and many more activities via Facebook (http://www.facebook.com/stanford). These are open, not only to their own students, but to potential and future students and interested people across the world.

Increasingly, universities have installed free wifi access in their: classrooms, lecture theatres, libraries, on-campus cafes and corridors, to complement free wifi access or relatively cheap 3G access off-campus. This trend is no more apparent than in universities in Asia, notably in Korea, Japan, and Hong Kong. The rhetoric that stated we are at the crest of a technological wave that could soon transform our higher education environments is true today.

In Hong Kong, this potential for change is especially apparent. We are just one year away from a major once-in-a-lifetime reform of our education curriculum at both

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school and university levels. Our students will complete their school education one year younger and commence their university education one year earlier. The standard university programs will change from a predominantly three year to a four year degree. All undergraduate programs will provide outcomes-based courses where students will be required to show evidence of their capabilities benchmarked against a clear set of learning outcome statements. At the same time, the numbers of students in the major universities is expected to increase in 2012 by one-third, requiring universities to create many new physical learning spaces to accommodate this extended influx. At my university, this increase in numbers is expected to be around 3,500 students. Universities are asking what new kinds of teaching and learning places are needed? Do we need to duplicate existing classrooms, computing laboratories and lecture theatres, designed prior to the introduction of PLEs and ubiquitous mobile devices or should we re-think our physical environmental needs, taking into account changing student study habits, changing curriculum requirements and emerging technological and pedagogical practices.

This chapter is based on an ICT 2011 conference presentation that explores one case within an institution in Hong Kong that rose to the challenge of doing things differently and providing students and teaching staff with new ways of working, taking into account new technological practices and changing educational needs.

2 Trends and the Impact of Changing Technological Practices in Education

Since the early 2000s, the annual Horizons Report has identified emerging technologies and their likely impact on teaching and learning in education. The report this year (Johnson, Smith, Willis, Levine, & Haywood, 2011) continues this trend, highlighting the increasing importance of the following over the next few years: (learning) resources and easy access to multiple applications that lend themselves to education; an increasing expectation and ability for students to learn when and where they need, often through access to mobile devices; a continuing growth in importance of new collaborative ways of working, leading to emphasize on the need for higher education to re-think the ways we do things and the need for creating more opportunities to facilitate and stimulate meaningful learning tasks that engage students in collaborative projects; and a shift towards using cloud-based computing and decentralized information technology services. All of this emerging as we all move more towards taking advantage of powerful, ubiquitous and cheaper (and increasingly mobile) digital technologies and their applications. Along with these trends are many challenges, not least those related to helping teachers and their students understand and use technology to support student learning. Researchers and practitioners such as Koehler, Mishra and Henriksen (2011) through their applied work with the technological pedagogical content knowledge framework (TPCK www.tpck.org/) are helping us to understand the complexities of this challenge. Their framework identifies four additional types of teacher knowledge (technological knowledge (TK), technological-content knowledge (TCK), technological-pedagogical knowledge (TPK) and technological-pedagogical-content knowledge (TPCK) that are required by teachers to successfully integrate digital technology use in their teaching

These come on top of (pedagogical knowledge (PK), content knowledge (CK) and pedagogical-content knowledge (PCK)) proposed by Shulman (1986).

Increasingly, new technologies are changing our everyday practices. For example, where the printed word was once king, the new digital multi-media of text, audio, image, animation and video is taking over. No longer do we first 'read' the news in printed news*papers*. Now we watch Internet TV, access online news sites such as TIME.com or Newsy.com or WikiLeaks. We subscribe to news related groups via our preferred social network using our mobile devices, as we go about our everyday work and play. A recent example is the way the news first broke concerning the death of Bin Laden via Twitter (Harlow, 2011). These ongoing changes in our everyday practices need to be used to our advantage in leveraging changes in today's educational practices.

As earlier mentioned, the major opportunity we have in Hong Kong for effecting change in what we do is provided by the new 3+3+4 curriculum, which constitutes six years of secondary school followed by four years at university (Tang, 2010). Each of the main universities in Hong Kong is planning their own unique ways of adapting to the extra year of study, the outcomes-based curriculum and the criterion referenced grading system accompanying this move. What is important is that this is the major watershed event for Hong Kong education as well as a 'unique opportunity for universities to move from a specialized focus to a more holistic student-oriented approach to undergraduate education.' (University Design Consortium, Arizona State University, n.d.).

> The increased duration of undergraduate degrees is posing opportunities and challenges for Hong Kong institutions. The additional undergraduate year will provide the possibility to offer students a more flexible learning experience, giving them time and space to build a broader knowledge base and to develop a more solid foundation for their holistic development. It is hoped that this will help nurture capable people to drive the development of a knowledge-based economy and to meet society's rapidly changing needs. (University of Aberdeen, Curriculum Reform Initiative, n.d.).

Despite the focus for undergraduate education, the philosophy of curriculum change and restructuring is also being encouraged in taught post-graduate programs and courses.

3 Changing Educational Practices through Technology: A Case Study

The new outcomes-based curriculum requires the development of clear principle learning outcomes (PLOs) statements, identifying what our students should be able to do to successfully complete the degree they have taken. These degree PLOs must be broken down into Learning Outcomes (LOs) for every course, identifying how each course contributes to the program PLOs. The courses that make up a program or degree then require activity and assignment tasks for students to complete which will go towards evidencing student capabilities defined in the PLO/LOs. An example, described in a course is outlined below in Figure 1.

Module Learning Outcomes (LO)

LO No.	*LO Statement*	*Related PLO**	*Related Assessment Task(s)*
1	Identify challenges in implementing change in organizations	1, 2	1
2	Evaluate and apply models of change to a learning organization	5	1, 2
3	Develop strategies to support sustainable change in a learning organisation	1, 3, 5	2

*List of Program Learning Outcomes (PLO) and links to the University's Educational Aims is available in course student guides: MITE: http://mite.cite.hku.hk/course/view.php?id=10&topic=5 and MLIM: http://mlim.cite.hku.hk/course/view.php?id=5&topic=5

Fig. 1. Course or module learning outcomes and links to program outcomes

Each topic in the course is related to a face-to-face or an online session with clearly identified content and student activities to be covered. Students normally initiate work on the activities in class then complete the work out-of-class through their ePortfolios which may be in the form of a blog or a proprietary system such as Mahara. At regular intervals individual students and groups present their work to the class, either online or in the face-to-face class, evidencing their work within the online environment. The ePortfolios are linked to the course learner management system, illustrated in Figure 2.

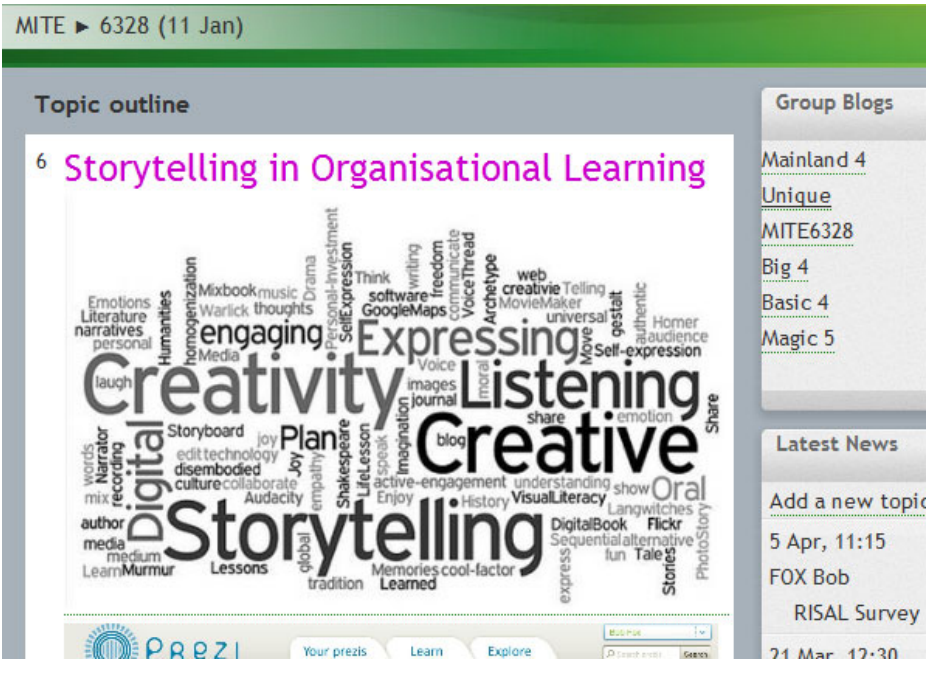

Fig. 2. Group ePortfolios linked to the course Learner Management System

The assignment tasks, both individual and group-based are explained in the course outline and discussed in class with samples of marked student work with grades provided online to enable students to understand better what is expected in terms of their potential grades. In the first class, the assessment marking framework is outlined, enabling students to understand what levels of work will constitute different grades. The framework used is based on the 'Structure of Observed Learning Outcomes' or SOLO (Biggs & Chan, 2007). In addition, each student task and assignment is accompanied with a list of key considerations taken into account in marking the work. The structure of the course and the continuous activities students are expected to complete during the semester, evidenced online as video, audio, image, photo, animation and text offer a way of working not possible before the use of new digital technologies.

4 Physical Collaborative Environment

The previous section focused on the eLearning environment in this case study. The physical environment used afforded collaborative work within a technologically advanced learning room. The layout of this innovative room is provided in Figure 3 and is supportive of the learner needs and learning theories (Oblinger, 2006) within the course.

The room is designed to support the seating of students in groups around separate tables positioned around the room. These tables are well equipped with technology

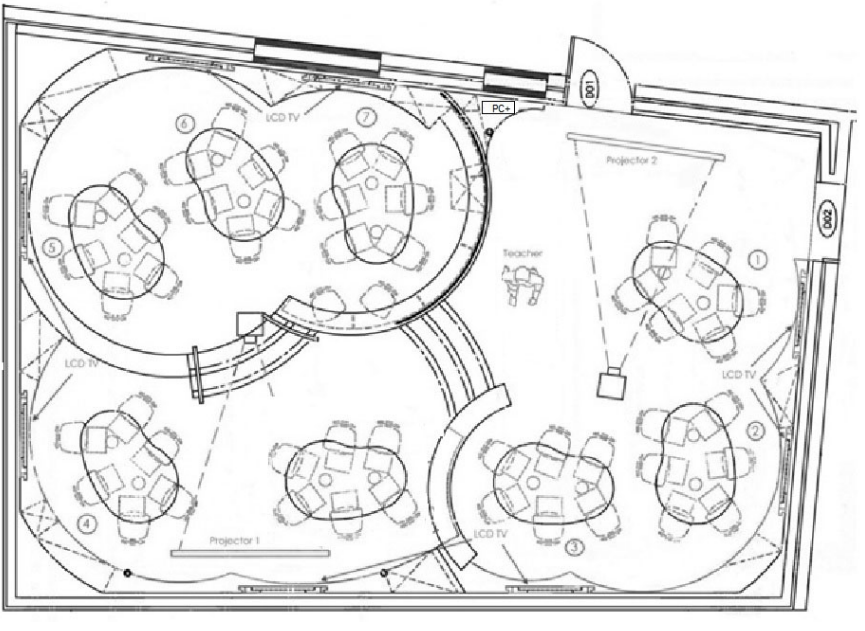

Fig. 3. Layout of the collaborative classroom

and the room has excellent wifi, allowing students who use their own mobile devices (mostly tablets, iPads and laptops) to connect to their PLEs, ePortfolios and the various eLearning sites. The grouping of seats in this room do not highlights a single focal point. The room provides multiple focal points, enabling students sitting in groups to remain seated and yet able to present their work to the entire class by remotely linking their table digital devices to display their work on all eight 42 inch LCD screens and the two projectors around the room, as needed. The lighting in the room is adjustable and remotely controlled, enabling teachers and students to change the lighting used for different types of activities creating different moods. There are potentially two teacher stations in the room. The teachers can either select one of eight tables or position their remotely controlled devices on a ledge at the side of the room. In classes given in this case study, the teacher preferred not to take over one of the eight tables. This enabled the teacher complete freedom to roam and when teacher-led periods of the class were required, the teachers were able to stand in the middle of the room. This may cause unease for the teachers as they face just half the class at any one time. Yet at the same time, it puts pressure on a teacher to keep the teacher-centred components of the class to a minimum and instead to stimulate student group work. Yes, the design of this special classroom could be improved, but it does afford a new way of working and interacting in class, privileging collaborative group work and student-centred activities.

5 Conclusion

The opportunities we have in Hong Kong to make major changes in education have never been greater than they are now. The technology at our disposal is ubiquitous and becoming cheaper and easier to use. Students are buying ever faster and smarter mobile technologies that complement potential changes to the curriculum and to our changing needs in society and education. Our institutions are re-thinking the use of physical spaces. Teachers and their students have already begun to show a lead in taking up new approaches to their academic work.

This paper has introduced one case study that highlights some of the changes possible, though there are many new opportunities, thanks to the ever increasing technology innovations and applications being created daily. This paper has explored some changing practices using new technologies to drive the changes and has outlined changing needs for university physical and virtual learning spaces and the resultant designs to maximize opportunities for student learning.

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