The Use of ICT to Support Ongoing Education Reform

Lau Chi Kan

Vice Principal
Ju Ching Chu Secondary School (Tuen Mun)
Email: cklau@jcctm.edu.hk

Threads

On promoting ICT in education in our school, we pull together four threads:

1. Chen\(^1\) says that we are in the shadow of the Third Industrial Revolution: the economy is wisdom-based, information travels very fast, globalization is the trend, digital divide is unavoidable, things become in and out-dated very fast, etc.

2. Hong Kong is undergoing a large-scale education reform. According to Cheng\(^2\), there is a great demand for paradigm shift towards the new paradigm of triplization process including globalization, localization and individualization in education. To respond to these new requirements, our school education needs to shift from a largely textbook-based teacher-centered approach to a more interactive and learner-centered approach. ICT plays a very important role in this paradigm shifting.

3. Ubiquitous computing becomes reality. When the ongoing revolution in information technologies continues, computers are becoming inexpensive and ubiquitous. According to CILT\(^3\), the desktop computer and its close cousin, the full-featured portable, will represent just one end of a spectrum of intelligent personal assistants. Eventually, simpler computers with fewer options and compact operating systems costing a fraction of desktop computers will be marketed to meet the needs of learners. Most people will own several computers to meet different purposes, and many will communicate through a ubiquitous network.

4. With the evolvement of the internet and other technology, various intelligent platforms are emerging and flourishing. They are having a bigger and bigger share on education and changing the role of the traditional teacher from a knowledge provider to a facilitator.

---

1 Prof CHEN Kwan-yiu, Edward, President of Ling Nam University, Hong Kong
2 Prof CHENG Yin-cheong, Director of Centre for Research and International Collaboration, Asia Pacific Centre for Education Leadership and School Quality, Hong Kong Institute of Education
3 The Center for Innovative Learning Technologies, supported by the National Science Foundation, U.S.A.
The School IT Profile


The Government gave us a budget of 1.6 million Hong Kong Dollars to promote IT in education in 1998. As the money was rather limited, we had a hot debate on how to spend the money effectively. At its end we decided on that we should spend the money on facilitating teachers to use IT to teach first. We were particularly keen on encouraging teachers to get used to IT and use IT in planning and conducting their lessons.

How the 1.6 million dollars was spent

- To equip the Geography Room with 21 computers so that we would have two computer rooms.
- To link up every classroom and special room in the school campus with a computer network of 150 nodes.
- To share a notebook computer between every two teachers to encourage them to use IT in teaching.
- To stock 4 portable digital projectors.


The budget given by the Government was used up by August, 2000. Fortunately, with the support of funding from the Quality Education Fund and our parents, we were able to launch the multi-media learning center project, the multi-media classroom project and the digital bridge project as well as some other projects. At the same time, the ability and willingness of the teachers and students in using IT in education also improved tremendously.

The school facilities as at 8.2002

- A server cluster composed of more than ten dedicated computers providing various kinds of services.
- Seven IT learning centers including an MMLC (with 41 computers) and two computer rooms (with 21 computers). The total number of computers was above 200.
- All the rooms and special rooms were connected to the computer network and could gain access to the Internet via broadband.
- All the classrooms and special rooms were "multi-media classrooms", each equipped with a computer system, digital projector, screen, overhead projector and sound system.
- Each teacher was given a computer and could gain access to the network with the node at his desk.
The status of teachers and students as at 8.2002

- All the teachers acquired the "Intermediate Information Technology" level or above and were quite at ease in using IT in their lessons;
- There was an IT group made up of more than ten teachers and technicians;
- From F.1 to F.5, all the students received training in computer literacy;
- Training up a team of IT prefects with more than 60 students from various classes. They helped teachers to use IT during lessons and promoted the use of IT among their fellow students.

As an aside, in March 2001 we started to use SMS (Short Message Service) to send short messages to parents, giving them timely information about the performance of their children or special arrangements in response to some unexpected events. We were the first secondary school in Hong Kong communicating with parents in this way.

As you can perceive, the IT development in our first and second stages was rather teacher-oriented in nature. We focused on helping teachers to use IT by providing the necessary facilities, training and support.

On the other hand, as there was only one computer in the classroom and this computer was mainly kept in the hand of the teacher, there was little chance for a student to use a computer in a normal classroom situation, and hence it was rather difficult for a teacher to shift from the practicing textbook-based teacher-centered approach to the more interactive and learner-centered approach.

Stage 3 (9.2002-now)

Thus we had the strong desire to extend computers to the hands of the students. By mid-2002, we started to plan for an across-school digital campus. We submitted a plan to the EMB and were given the positive response. We became one of the ten WLAN pilot schools, the experience of which will be discussed in the following sections.

The Idea of a digital campus

Our vision

We envisage that a whole-school computerized learning environment (with the student to computer ratio at or smaller than 1:1 level and ubiquitous access to the internet inside the school campus) is the ideal environment for learning in the ICT era. Within this environment, a student is encouraged to have a computer on his own, whether it is used as a tool to access the network, an e-book or an aid to the traditional lessons and textbooks. In order to facilitate learning, he can bring along the computer to everywhere and travel with it between school and home on a daily basis.
Whenever he wants to learn, he can search and find the required material from the internet or the school intranet easily. Besides the traditional channels, he can communicate with his teachers and fellow students electronically at ease.

**The wired and wireless networks**

To realize the environment, on top of the existing wired LAN in the school, we build a wireless network. The wired network serves as the backbone as well as the network providers at key areas like the computer labs, staff rooms and the computer at the teacher's desk in each classroom; the wireless network covers the whole school campus just like the canopy of a tree. The wireless network allows our students and teachers to access it with their own wireless devices and tap the resources on the wired network, for the purposes of conducting lesson planning, teaching and learning activities, data collection, school administration, etc.

---

**The Ideal Digital Campus**

---

We believe that ubiquitous computing is upon us: using a computer network to learn and solve problems is a part of life; using different computers at different time to meet different purposes is a part of life. A student may use a desktop computer at the computer lab to learn computing and a notebook at home to do homework; yet of all kinds of computers available, with its convenience, portability and inexpensiveness, the **handheld computer with wireless connectivity** best suits learning and teaching at classroom and outdoor environments.
Collaboration between the school and home

At this moment, the handheld computers are still very expensive for the government, the school or the parents to pay for them. But given time, when the culture develops, the technology improves, the prices drop and the value is well recognized, things will change. We believe that through collaboration between the school and the parents, we can share the cost and build a high-quality digital campus: the school provides key equipment like the networks and computers in computer labs, and the parents provide handheld computers for their children. We believe the time when children go schooling with handheld computers provided by their parents is about to come.

The WLAN Pilot Scheme

We submitted a plan to the EMB in January 2002 to ask for help. With their positive response of sponsoring a WLAN and lending us 60 sets of pocket pc with wireless lan cards, the WLAN Pilot Scheme was implemented from December 2002 to August 2003.

We built a Wi Fi network in the school campus. Each Form 6 student was given a pocket pc plus a wireless lan card (60 sets altogether) and was allowed to use it and keep it at his custody for six months. The project was aimed at exploring the feasibility of implementing a Wi Fi network in a school environment and adopting handheld computers to open up new opportunities for teaching and learning purposes.

Outcome

We found that the Pilot Scheme put a positive sign to all of the following issues:

- A handheld computer promotes self-study. With its convenience and portability, it can be used to exploit some educational resource and benefits where other computers cannot provide.
- With a handheld computer for each student, lessons in an ordinary classroom can become more interactive and collaborative.
- It supports the paradigm shift from a largely textbook-based teacher-centered approach to a more interactive and learner-centered approach.
- Handheld computers are useful aids to field trips and outdoor studies.
- Handheld computers open up new opportunities for computerizing school administrative work.
- It is feasible to implement a Wi Fi network at a school environment.
- It is rather safe to put a handheld into a student's custody.
Difficulties

We encountered the following difficulties during the experimental period:

- There were few educational applications available. When they existed, they were very expensive. We had to make a lot of effort to develop school-based software.

- The internet was abundant with learning resource. It was a pity that quite a lot of the materials did not have the suitable format for a handheld and some form of conversion work had to be done before they could be used comfortably.

- The technology level of the WLAN and handheld computers at the moment was not efficient enough to support those applications demanding huge volume of data transfer in the wireless way.

- The Form Six Curriculum was very tight and exam-oriented. It discouraged teachers and students from practicing "paradigm shift" during normal lessons.

- The school was closed for 3 weeks in April owing to SARS. The disease consumed a lot of our time and energy during its violence and in the aftermath and hindered our development projects.

Conclusion

About five years ago, in their "Information Technology for Learning in a New Era - Five Year Strategy 1998/99 to 2002/03" document, the EMB laid the following emphasis:

Our school education should be alive to the various opportunities and changing needs of the information age. We should help our students to develop an understanding of the pervasive impact of IT on the society and their daily lives, higher order thinking skills, as well as abilities to seek, evaluate, organise and present information. They also need to develop habits of life-long learning so as to ride on the tides of rapid changes. To respond to these new requirements, our school education needs to see a paradigm shift - from a largely textbook-based teacher-centered approach to a more interactive and learner-centered approach.

To bring about the so-much-discussed paradigm shift in education, we need to work for its sufficient condition first. To do so, besides working for changes in the mind
set and culture among teachers, parents and students, and changes in the way in which the curriculum is designed and delivered, which are all very important, we also need to take advantage of the advance in information technology. The WLAN and handheld computers are two very promising devices for this purpose indeed.

Reference

Chen, KY. *The Challenges in a Knowledge-Based Economics.* Invited keynote speech presented on 5 Jan 2002 at Vice-Principal Leadership Seminar Series organized by Department of Educational Policy and Administration of Hong Kong Institute of Education


Cheng, Y.C (2002a). *Fostering Local Knowledge and Wisdom in Globalized Education.* Invited keynote speech presented at the 8th International Conference held at Faculty of Education of Chulalongkorn University, 18-21 November 2002, Bangkok, Thailand. The theme of the conference is “Globalization and Localization Enmeshed: Searching for a Balance in Education”

http://cilt.concord.org/themes/ubiquitous.html. The Center for Innovative Learning Technologies is funded by the National Science Foundation, U.S.A. and designed as an inclusive national effort led by five institutions—SRI International, Stanford University, University of California at Berkeley, Vanderbilt University, and the Concord Consortium.

Education and Management Bureau, Hong Kong (1998). Information Technology for Learning in a New Era - Five Year Strategy 1998/99 to 2002/03. This paper briefs members on the progress of implementation of the Information Technology (IT) for Learning in a New Era.

http://www.techlearn.ac.uk/NewDocs/Wireless.doc.

Law N, Li S C, Lam W.M. & Mak M (2001) Scaffolding and Knowledge Management tools to Support Self-directed Collaborative Learning, University of Hong Kong.