COVER SHEET

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IT FOR LEARNING AND TEACHING –
WHERE DOES THE TEACHER FIT IN ALL OF THIS?

ABSTRACT

Presentation by Professor Ruth Hayhoe

Comparative Education has always taken social change as a core concern, and several decades ago Edmund King pointed out the different idioms of education that fitted pre-industrial society, industrial/commercial society and what he then defined as the emerging technological or communications society. He defined the communications society as one of "world-wide interdependence and instantaneous interaction of every kind," and the idiom of education as one in which "all teach and all learn together all the time." (King, Other Schools and Ours, 1979, p. 42)

The tendency has been to focus on the technical and technological demands put upon teachers, as they face the task of mastering the rapidly changing techniques and capacities offered by Information Technology. However, there are even greater demands in the areas of morality, the development of judgement, the flexibility to deal with multiple perspectives, and the capacity to communicate across languages and cultures.

In this presentation, I will take several examples to illustrate some of the challenges in these areas that come with the presence of an IT-rich environment. First, I will look at issues of moral understanding and multi-perspectivity in the teaching of sensitive historical topics, showing how the Institute's IT in Education Network project can provide teachers with supplementary material which open up many perspectives on a period or an event, and call for a sophisticated level of moral interpretation. Second, I will look at comparative curricular study, showing how a project entitled "Schools around the World," calls for excellent communication abilities in English and other languages, as well as ability at conceptual understanding and interpretation across cultures. Third, I will look at comparative pedagogy across primary school classrooms in Hong Kong and France, in a technologically supported project that opens up the possibility of oral dialogue from classroom to classroom. Finally, I will consider the challenges facing the arts and aesthetic areas of knowledge, as the music of different traditions and cultures goes onto the internet or into the form of computer discs for teaching and interpretation.

The presentation will illustrate, through selective projects now underway at the Hong Kong Institute of Education, how teachers are being called upon to develop a greater depth of philosophical thought and understanding, a greater breadth of academic knowledge, and higher level communication skills in several languages, as they take up the challenge of opening children's minds to the rich world of information and global interaction offered by Information Technology. This theme is then developed much more fully in the linked paper presented by Dr. Lee Kar Tin, which introduces recent policy on IT in education around the world, describes recent policy development in Hong Kong, and gives a detailed picture of how the Hong Kong Institute of Education is responding to both global and local demands and challenges in this area.

Presentation by Dr. Kar Tin Lee

For at least two decades, the information technology (IT)-school link has dominated as one of the top issues in education. Many government authorities around the world believe that IT, thoughtfully integrated into the curriculum, will provide students with skills necessary to compete and survive in the 21st century. As for Hong Kong it is currently in the midst of education reform and thus the entire education community is facing the question of how to transform or reengineer our schools to bring about a holistic reform of the entire system of which the integration of IT into classroom settings is one element.

In order to effect a paradigm shift it is important that our teachers appreciate the need for the shift and are receptive to the challenge of taking up their new role as a learning facilitator. It would mean a cultural change for teachers who are only familiar with the textbook-based approach of teaching and, for those who have had no exposure to computing so far, an IT literacy challenge altogether. Therefore active steps need to be taken to assist teachers to transit to the new mode of teaching to move them away from the traditional textbook-based approach to pedagogy so that diversified models of teaching which include elements of IT can be introduced into classrooms. Teachers need to be able to use IT as productivity tools, and act as facilitators of learning in order to facilitate the learning of their students. They need a keen awareness of the use of IT to support self-learning and co-operative and life-long learning.

To bring about this change the Hong Kong Institute of Education (HKIED) has recently adopted a policy for Information Technology Competency in Education (ITCE). The Institute recognises the urgent need for our preservice education programs to explicitly emphasise integration of IT use in the subject content areas and within individual curriculum units. The study programme is now structured in such a way so as to enable students to use IT to support their curriculum most effectively throughout all modules. Through this systematic approach we sincerely hope that our students will go out into Hong Kong schools to be change agents for our next generation of students. We hope that information technology has the potential to drive new models of teaching and learning so that in the 21st century our students can effectively integrate information technology into a context of standards-based curriculum, constructivist pedagogy, and authentic assessment.

INTRODUCTION

We all know that,

> "(I)t is impossible to provide a future teacher with all the competencies
> and knowledge he (she) needs, for an entire career. There is no
> "rucksack" for a good teacher! ... the ability to evolve and adapt is an
> essential component of the profession of a teacher. This ability must
> be developed in initial education".
>
> [Cornu, 1997:322]

This statement refers to the teacher of tomorrow as a new profession. From his French experience Cornu is convinced that teachers must be able to adapt and to evolve particularly when it concerns the integration of information communications technology (ICT) into the profession of the teacher. For at least two decades, the information technology (IT) -school link has dominated as one of the top issues in education. Many government authorities around the world believe that IT, thoughtfully integrated into the curriculum, will provide students with skills necessary to compete and survive in the 21st century. Despite this overwhelming support and the huge investments public education has made to date in acquiring technology for schools, concern still exists that computers remain underutilised. This in the main has been attributed to the failure of teacher preparation courses to adequately prepare teachers to take IT effectively into the classroom. Therefore, as teacher educators we need to focus specifically on how our teachers can be prepared to cope and to be active members of the global community of learners.

Many countries throughout the world have now launched initiatives in response to the challenges presented by the emerging global information society. The integration of information technology (IT) into school curricula is almost invariably a key element of such initiative. At the Hong Kong Institute of Education (HKIED) one of the guiding values of our mission statement is to enhance creativity and effectiveness in teaching, learning, research and administration through an IT-rich environment where the strategic thrust is to restructure the teacher education programmes and adopt use of information technology in all courses (Strategy, 2000). In line with international and local developments (President's Committee of Advisors on Science and Technology, 1997; Singapore Ministry of Education, 1997; BECTa, 1999; EMB, 1998) the Institute is now actively integrating use of IT across the curriculum of teacher education programmes to ensure that besides the social, vocational and economic reasons for promoting the use of IT in schools, the pedagogic reasons should be even more compelling. It is our philosophy that teachers and teachers-to-be need to recognize that use of IT can improve the quality of the educational experience by providing rich, exciting and motivating environments for learning. This notion is strongly supported by numerous studies which have illustrated the benefits of IT for pupils. High motivation is evident in pupils using IT to learn whilst other studies highlight the opportunities which IT presents to encourage the development of creativity, imagination and self-expression.

In the United States of America for instance, it is envisioned that all US students will be technologically literate in this century. Similarly in Japan, the Ministry of Education is preparing its students by connecting 900,000 network-equipped personal computers in schools within this year. As for the United Kingdom the Government has generated a new and pragmatic vision for the future use of information and communications technology (ICT) in education. This vision is clearly exemplified through the National Grid for Learning

(NGFL), which links the ICT infrastructure, content and practice into a coherent framework. Through the National Institute of Education (NIE) Singapore had already at the end of the 1997-98 academic year prepared all graduates who are equipped with basic skills to integrate IT into the teaching of school curricula subjects (Singapore MOE, 1997). Hand in hand with this achievement, the Singapore Institutions of Higher Learning (IHLs) have also been given an important role to foster deep collaboration between them and schools so as to breed a cross-fertilisation of ideas and strengthen the educational system as a whole.

It is noteworthy to look more closely at the UK's most recent developments as a certain trend can be seen to be the main push of current IT developments in the education field. Raising the standard of pupil's achievements by increasing the expertise of teachers in the use of ICT in subject teaching, to the level expected of all Newly Qualified Teachers who enter the profession has now become the main aim for IT in education policy. The Expected Outcomes (TTA, 1998:3) for teachers have been clearly spelt out to ensure that teachers know:

- when, when not and how to use ICT in teaching their subjects;
- how ICT can be used in teaching the whole class;
- how ICT can be used when planning, including the use of ICT for lesson preparation and the choice and organization of ICT resources;
- how to assess pupils' work when ICT is used; and
- how ICT can be used to keep up-to-date, share best practice and reduce bureaucracy.

The TTA goes on to indicate that "(T)eachers should develop the knowledge and skills necessary to access and exploit, electronically, the information and sources which will support their continuing professional development … Training should provide the foundations from which teachers can continue to keep up to date with ICT and its application to subject pedagogy, in order to enhance their teaching skills, stimulate pupils' intellectual curiosity and raise pupils' standards of achievement" (TTA, 1998:5).

In accordance with this forward looking trend it is our aim to provide our Institute's students with an opportunity for continued reflection on use of IT in the classroom and how to integrate its use into the wider curriculum. Through systematic integration of IT throughout the entire teacher education programme we aim to prepare teachers to effectively use IT and to become change agents in Hong Kong schools.

THE HONG KONG CONTEXT

We know from the myriad of research done overseas over the past twenty years that effective and appropriate use of IT can lead to more effective learning in the classroom – but how do we go about helping our local teachers-to-be to have this predisposition before they enter schools. It is perhaps fortunate that Hong Kong is currently in the midst of education reform and thus the entire education community is facing the question of how to transform or reengineer our schools to bring about a holistic reform of the entire system of which the integration of IT into classroom settings is one element.

It is a well established fact that all preservice teachers must now be prepared to play a major role in implementing use of IT in teaching and learning. We as teacher educators must continue to play a vanguard role in helping these new teachers find effective and meaningful ways to continue to introduce new technologies into the classroom setting. Exactly how this

is to be done continues to be a subject of intense debate in many countries. However, at the Institute we feel we have begun to make some inroads through consistent review of our programmes and systematic integration of IT within them.

In the EMB document, Information Technology for Learning in a New Era (1998) it emphasized the need 'to bring about a paradigm shift in the delivery of school education – from a largely textbook-based teacher-centred approach to a more interactive and learner-centred approach'. One of the missions is to 'integrate IT into school education meaningfully through necessary curriculum and resource support'. The central tenet of this policy is to encourage key players (teachers) to take up the challenges of their respective new roles.

The Education Department of the Hong Kong (ED) has since promulgated a series of IT in education skills levels which preservice and inservice teachers must attain by a certain time (Au, et al., 1999). These IT competency levels are underpinned by the strong notion of the teacher who is IT competent in education. Teacher preparation, continual professional development and self-learning are the major determinants of the extent to which these characteristics are evident in our teachers. A distinct departure from past developments in IT integration in the three main areas outlined below.

Firstly, with regard to the practice of teaching, teachers should be:
* able to use IT as productivity tools to enhance the efficiency and effectiveness of a teacher's work;
* able to use and integrate IT selectively and critically in learning and teaching contexts including addressing the individual needs of students; and,
* aware of the paradigm shift in learning and teaching including the changing roles of students and teachers, changing conceptions about learning and teaching, a range of instructional strategies that involves using IT which will facilitate and enhance the learning of the students.

Secondly, as facilitators of learning, teachers must be able to facilitate the learning of the students in areas such as communication, accessing information, development of thinking skills and problem-solving skills, fostering of creativity, self-directed, co-operative and life-long learning, positive attitudes towards IT, and awareness of related equity, legal, ethical and social issues.

Thirdly, with reference to the general professionalism of teachers, they are to be:
* aware of the use of IT to support self-learning, co-operative and life-long learning;
* aware of equity, legal, ethical and social issues in relation to the use of IT in education; and,
* aware of the current and future trends of IT and its applications in education.

All these concur with the findings of previous international studies. In 1990, Sheingold & Hadley's seminal study of 600 teachers had revealed that teachers would only adopt new media if they can use them in accordance with their existing beliefs and practices. Classroom teachers need to acquire a fundamental understanding of and commitment to not only familiarising, utilising, and integrating technology into their own teaching, but also to develop a willingness to provide students with a variety of opportunities to learn on their own using technology in both similar as well as new, unanticipated ways.

This in a nutshell is what the Five Year Strategy (EMB, 1998) was aiming at when it stated that in order '(T)o effect the paradigm shift … it is important that our teachers appreciate the need for the paradigm shift and are receptive to the challenge of taking up their new role as a

learning facilitator. … we realise that the paradigm shift would mean a cultural change for teachers who are only familiar with the textbook-based approach of teaching and, for those who have had no exposure to computing so far, an IT literacy challenge altogether'. The same report goes on to assert that active steps will be taken to assist teachers to transit to the new mode of teaching and would be careful not to place emphasis solely on technical skills, but also on how the traditional textbook-based approach to pedagogy can diversify to include elements of IT, be more interactive and less rigidly structured' (EMB, 1998:10).

Research has so far indicated many models of integration. However, in the meantime, government efforts to place high powered hardware and software in schools have done little to increase use of IT in the curriculum due to the absence of a concomitant effort at inservice and preservice IT in education courses. The issue of how to introduce the use of IT to teachers and to encourage them to use it in the classrooms has yet to be resolved one way or another in many countries. This issue continues to haunt many teacher education institutions worldwide. It is precisely in this area that the Institute aims to extend preservice IT integration in education into the classrooms. Our programmes are designed to simultaneously teach and mentor students to support their curriculum with IT. The teaching staff together with the student teacher will collaborate on revision of curriculum or develop new curriculum based upon the latest pedagogy, instructional design principles and teaching discipline content. With the programmes now planned for implementation teaching staff and student teachers together will have the opportunity to identify problem areas in the curriculum which might be resolved by integrating use of IT into that part of the curriculum.

The Institute is well aware that a lack of preservice education on the integration of IT in the curriculum is one of the most common obstacles new teachers face when beginning their careers. Our programmes now stress the need for our preservice education programs to explicitly emphasise integration of IT use in the subject content areas and within individual curriculum units. The key element is that curriculum is now structured in such a way so as to enable students to use IT to support their curriculum most effectively throughout all modules of their study programme.

Developments at HKIED so far

For many years it was the case that the majority of teacher education colleges worldwide followed the practice of using a single technology subject to prepare pre-service teachers to sue IT in their teaching. We recognise that this model has consistently failed to produce the IT competent teachers who can integration use of IT in the classroom. The single IT subject can only give a very surface level exposure to the students while at the same time faculty is of the view that IT is something for somebody else to do and so they do not attempt to model the use of IT in their own classes nor require students to use it.

For preservice students to become competent in using IT for instruction they need to be given experiences throughout their course duration which show them how computers and related technologies can be used within the classroom context and as a learning tool. Before this can happen faculty has to buy in to this concept of change. Academic staff members have to accept the philosophy of the programmes which aim to produce IT literate teachers and believe in the change themselves and be prepared to model use of IT in their own teaching (Bannon, et al., 1998; Makrakis, 1997). Teaching staff must commit to the fact that use of IT

can be beneficial to themselves and ultimately to their students. Both staff and students need to be lifelong learners to stay current.

From the students' perspective, Somekh and Davis (1997) had emphasized the use of approaches which enable teachers and student teachers to transfer their newly gained skills and confidence to other applications of IT. They go on to say that provided the teacher had adopted a transferable learning style, each further development should become an easier step.

To bring about this change the Hong Kong Institute of Education (HKIED) has recently adopted a policy for Information Technology Competency in Education (ITCE) for implementation. This is to ensure that new and existing programmes do prepare quality teachers who possess the key attributes of a teacher who is information technology competent in education by helping the students to develop an understanding of how IT can help them in their work as teachers. Besides developing a set of skills in the use of IT tools, students will demonstrate competence in creating and maintaining effective learning environments where use of IT is an integral part.

"(T)he use of IT *can* provide innovative learning experiences, but in all cases a great deal depends upon the teacher to provide the context which makes this possible. Teachers need to be competent and confident users of hardware and software, but this in itself is not enough. They need also, to understand how to organise the classroom to structure learning tasks so that IT resources become a necessary and integral part of learning rather than an add-on technical aid… unless teachers believe in an innovation it is very unlikely that they will introduce it effectively...(I)n the case of IT, it is particularly important to convince teachers of its value because many perceive themselves to be technologically incompetent and feel deskilled and demoralised when they first begin to use computers in the classroom". (Somekh, 1997).

In preparing teachers who will use and integrate IT to improve learning and teaching, the policy for IT Competency in Education (ITCE) promotes systematic integration of IT throughout the entire teacher education programme. It is a commitment to raise awareness of teachers to use of technology and to assist them to think seriously about their own commitments to use of technology in schools. Integral to this systematic integration of IT into programmes is the Institute's endorsement of the key attributes (mentioned earlier) put forth by the Education Department (Education Department, 1999).

Encompassing the key attributes, the infusion of IT into programmes at the Institute entails the following: (i) provision of a self-paced tutorial called Easy Learning Information Technology Empowering Program (ELITE) which comprises a suite of programmes for student access on the Institute's network; (ii) a core Foundations of IT in Education module that students must complete; and, (iii) integration of IT elements across major study or teaching subject modules and other modules as appropriate. Throughout the duration of the programme students will be given plenty of opportunity to begin to acquire the habit of questioning the value of the educational experiences they offer to their students (Somekh, 1997) and will be actively engaged in learning how to use technology in their content area and learning how to develop and implement lesson plans that include the use technology in their teaching (Levin & Buell, 1999).

All teaching departments of the teacher education program will be actively involved. The major task facing the HKIED at present is therefore the consideration of how IT elements

could be successfully integrated across the subjects in order to satisfy the complex levels of IT skills and concepts. In fact three years ago, in anticipation of the announcement of the Government's requirements various courses had already incorporated use of IT wherever and whenever it was considered appropriate. However, besides the IT specific subjects, there was no proper way to audit exactly what IT skills students would acquire upon completion of the training. Since the announcement of the IT Competency Levels in October 1999, steps have been taken to ensure that responsibility for acquisition of IT skills is distributed across the entire teacher education course. Modules within the course will be revisited to ensure that students had the opportunity to use IT within a context that was appropriate to that subject area. This form of permeation would mean that IT would be embedded within the major subject areas as well as other subject areas when deemed appropriate such that all IT elements can be clearly identified within their assessment tasks. This way the graduating students would be eligible for certification with the suitable level of IT competency skills to meet the Qualified Teacher Status criteria.

In parallel with this development, the readiness of faculty for this kind of integration has to be facilitated by immediate and timely professional development of staff. It would be a reasonable expectation for staff to at least possess generic skills in IT, rather than knowledge of software that was subject or equipment-specific. If teaching staff can possess a content free set of generic skills and understandings, then they will be more willing to accept the integration of IT across the entire teacher education programme and begin to be role models for their students.

It is the belief of the Institute that with the availability of more information resources for example, CD-ROM Encyclopedias, World Wide Web and multimedia software, students can now be involved in creating dynamic products, making decisions, selecting solutions from alternatives, and demonstrating learning by investigating facts and implementing solutions (Panel on Educational Technology, 1997; Viadero, 1997). Students should be able to go into, through and beyond the curriculum, increasing their knowledge and empowering themselves with modeling and guidance from innovative educators. (Cadiero-Kaplan, 1997).

Through implementation of the ITCE Standards, we hope to prepare our students to work in the types of classrooms where knowledge is actively used and students are given more responsibility since this is precisely the environment needed to effectively integrate the tools of technology into the curriculum (Perkins, 1992). Integrating technology into the curriculum must be accompanied by interest in expanded paradigms as they relate to the roles of teachers and students. Learners must be encouraged to construct, evaluate, manipulate, and present their ideas while demonstrating understanding of curriculum concepts and innovate constructs.

New teachers need to inculcate the willingness to learn enough about IT to make effective use of it in the classroom. In order to reengineer pedagogy – they must learn enough about the relevant technologies to apply them in their professional live, and to translate them to their students as part of the integrated learning of the subject matter. Whereas in the past, the role of school was thought to be the dispenser of information, within our programmes this role can no longer hold. It is being challenged for two reasons. First the amount of information is increasing at an unbelievable rate. Second, there is a serious lack of agreement on what 'information' should be taught in school. The information explosion has changed the nature of knowing from the ability to recall information to the ability to define problems, to retrieve information selectively and to solve problems flexibly, which therefore changes

the nature of learning from the need to master topics in class to the need to learn autonomously. Learners need to learn how to revise their ideas and select information, and to synthesize it form the vast pools of resources.

For all this to happen, it is essential that our teachers be at the forefront of those in our society who have access to, and proficiency with use of IT. One of the basic skills of the future will be the use of powerful information technologies to engage in effective thinking and problem solving. The traditional textbook can no longer keep abreast of the rapidly changing world and the knowledge explosion that is part of our daily experiences. Our student must realise that the traditional teacher-directed classroom is no longer an effective delivery system to prepare our students for the realities which they face. Preservice teachers must be prepared to do things differently than most of them encountered in their schooling experiences. As teacher educators, we have a responsibility to provide the tools and experiences that will prepare them for using IT effectively in their own classroom environments. It is only when we the teacher educators provide the opportunity for preservice students to practice meaningful integration of technology while gaining the insights necessary for effective thinking and problem solving that we will have made a giant leap toward constructing better schools for the future.

WHAT OF THE FUTURE?

Teachers of the 21st century will be required to reflect more often on how they are transmitting knowledge and creating their classroom environments. Effective teaching with technology requires more than knowledge of curriculum and classroom management. It requires reflection on our roles as educators. In order to be successful in providing learners with technology integration, faculty must assist our student teachers to acquire a willing attitude to continually develop their technological skills, reflect on their own teaching processes and strategies, and empower students to become independent, cooperative, collaborative learners (Hannafin, 1999; Hooper & Rieber, 1995). Teachers along with their students need to become lifelong learners who continually develop critical thinking and technological skills.

We as an Institute have a contribution to make to our society in the 21st century, by ensuring that all young people leave education with the skills needed to meet the challenges of the Information Age. The primary rationale for use of IT should be seen to complement the achievement of broader educational aims which affirm the professional skills of teachers and the personal growth of students.

Inevitably there will continue to be a large range of stumbling blocks ahead for us. We can overcome these through the effective and inclusive use of IT in all curricula areas. This emphasis should be loudly resounding in all teacher education institutions because unless teacher education programs focus on this approach to use of IT in the educational context, students will be unprepared for the reality of the kind of classrooms they will enter in the future.

We are optimistic that our efforts in integrating IT across the curriculum will be effective, and, that the new teachers who graduate in two years' time could be expected to have more competence and confidence to use IT in the classroom. We also hold the view that more research needs to be carried out to follow up on the outcomes of these students when they do

join the teacher workforce. In 1997, Salpeter declared that "interactive technology plays little more than an incidental role in classrooms." He further stated that this role is often the "result of teaching approaches and curricula that place relatively little value on technology as a tool". We sincerely hope that our students will not perpetuate this practice and will go out into Hong Kong schools to be change agents for our next generation of students. We hope that technology has the potential to drive new models of teaching and learning so that in the 21st century our students can see computers taken into classrooms where teachers integrate technology into a context of standards-based curriculum, constructivist pedagogy, and authentic assessment. Our new programmes will expose students to the use of IT to the extent that they will see use of IT tools as second nature. If we are successful in providing new models of classroom practice for our students then we are well on our way to helping them plan changes in their own strategies or curriculum.

Only then can our students be enthusiastic about the present and be excited about the future to realise our mission to truly experience the shared joy of learning. We aim to take our students further beyond the traditional classroom. We believe our approach holds great promise to help meet the challenge of the Hong Kong Government's goals for IT in schools.

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