

LEGCO PANEL ON EDUCATION

Use of IT in Education in Hong Kong and Other Economies

Purpose

This paper informs Members of the use of information technology in education (ITEd) in Hong Kong and other economies.

Background

2. In 1998, the Government pledged to make Hong Kong a leader, not a follower, in the information world of tomorrow. To tie in with this pledge, the Government issued the “Information Technology for Learning in a New Era: Five-year Strategy – 1998/99 to 2002/03” (the Five-year Strategy) document in the same year. Five years down the road, the strategy has brought about tremendous changes to the education scene in Hong Kong. Towards the end of the Five-year Strategy, the Government commissioned a tertiary institution to review the progress made on the development of ITEd in Hong Kong, and to recommend future directions on such development. The review, which has now been completed, also sheds light on how Hong Kong is fairing in ITEd compared to other parts of the world.

Comparison with Other Economies

3. It should be stressed, at the outset, that consistent and direct comparisons on the use of ITEd between Hong Kong and other economies are constrained by a number of factors. These factors include the lack of uniformity in the information garnered from various sources, the differences with regard to government policies and objectives, states of social, economic and educational development and school systems across countries / regions, as

well as limited research studies conducted on matching dimensions of ITEd, etc. Against these constraints, this paper attempts to summarize the more significant findings relating to several areas on ITEd, namely, school IT infrastructure in terms of students' access to computer and connectivity, teachers' pedagogical IT practices as well as students' usage of IT, etc. The Annex contains a series of tables summarizing the state of ITEd in Hong Kong compared to other economies.

Infrastructure

4. Based on the review we recently completed, the average computer to student ratio in Hong Kong is 1 to 7.4, 4.6 and 2.0 in the primary, secondary and special school sectors respectively. Almost all schools in Hong Kong have broadband connection to the Internet. Over 95% of the surveyed schools (amounting to 1,039) have developed school websites and over 72%, intranet or learning management system.

5. As seen in Table 1, the computer to student ratio in schools in Hong Kong and the community are comparable to or even better than other developed countries / regions.

6. In addition, a survey by the Census and Statistics Department conducted in mid-2003 reflected that 91.3% of Hong Kong students aged 10 or over had computers at home and 92.6% of these students had their computers connected to the Internet.

Teachers

Professional Development

7. The Five-year Strategy recognized the important role of teachers as the enablers of ITEd. As shown in Table 2, our review indicated that all surveyed teachers (10,173 in number) have completed IT training at the Basic Level, with more than 89% of them at Intermediate Level or above. This makes Hong Kong one of the places with the largest proportion of teachers trained in IT skills. The Education and Manpower Bureau (EMB) also provides refresher training courses, seminars and workshops on an on-going

basis to keep teachers abreast of IT development, in particular on the pedagogical application of IT.

8. With reference to overseas literature findings, it is noted that high level of teachers' IT attainments is only a gateway and teachers who make effective use of computers in the classroom are those who can combine their technical skills with experience in using computers professionally (Becker et al., 1999)¹. More importantly, they need more exposure and training on the effective pedagogical use of IT, especially in relation to specific key learning areas. This echoes the findings of the Second Information Technology in Education Study Module 1 [SITES-M1]² conducted by the University of Hong Kong in 1999 that the majority of teachers across countries / regions were adequately prepared with respect to general applications (word-processing, database and spreadsheet software use), but fewer were prepared adequately with respect to the instructional aspects of IT. In this connection, under the second ITed strategy announced in July 2004, we have given teachers more professional development opportunities and support to use IT for curriculum and effective pedagogical practices.

Pedagogy & Curriculum

9. Our review also showed that IT was commonly used amongst teachers for teaching, administration and searching information. It was reported that a high percentage (nearly 90%) of schools occasionally or always use IT in learning and teaching across all Key Learning Areas except Physical Education. More than half of the surveyed primary, secondary and special school teachers considered themselves proficient in applying / integrating IT into subject curriculum. Nonetheless, it was reflected that the pedagogical usage of IT in classroom remained largely teacher-centred.

10. In 2000–2003 when Hong Kong participated with 27 countries / regions in SITES M2, an aim of which was to “provide a better understanding

¹ Becker, H., Ravitz, J. & Wong, Y. (1999). *Teacher and Teacher-Directed Student use of Computers and Software*. University of California, Irvine: Center for Research on Information Technology and Organizations.

² Second Information Technology in Education Study Module 1 [SITES-M1] was a survey of principals and technology coordinators at a sample of schools in 26 countries / regions. The focus of Module 1 (M1) was on the extent to which schools have adopted and implemented pedagogical practices that are considered important to education in the information society. Details of SITES-M1 can be located at http://sites.cite.hku.hk/index_eng.htm

of what kinds of pedagogical innovations have developed around the world where technology plays a substantial role, and what school factors contribute to the emergence and sustainability of these innovations”, of the 174 case studies reported by the research teams around the world, 9 were contributed by Hong Kong (3 from primary schools and 6 from secondary schools). Amongst these 174 cases, a total of 83 cases from 25 countries / regions³ had been selected for examination along the six dimensions of innovation, namely, intended curriculum goals of the innovative practices, pedagogical role(s) of teachers, roles of students, nature and sophistication of the IT used, multiple types of learning outcomes exhibited (manifestation of learning outcomes) and connectedness of the classroom. As shown in Table 3, the mean innovation scores and related descriptive statistics along each of the six dimensions of innovation for the 9 Hong Kong cases are comparable to those of the 83 cases.

11. In addition to the above, it is also encouraging to note that in 6 out of the 9 cases submitted by Hong Kong, “the teachers played emergent roles of facilitating exploration or guiding collaborative enquiry and not merely providing learning resources or giving instructions”. Nonetheless, it should be noted that these practices, as in other countries / regions, “are still the minority in terms of Hong Kong classrooms in general”⁴.

Student Learning

12. To ensure that students can acquire the requisite IT skills for their life-long and life-wide learning, schools have offered computer awareness/IT courses to all levels of primary school students whilst secondary 1 to 3 students can acquire the requisite skills through computer literacy/other IT courses. In addition, students are given the opportunity to apply the acquired IT skills in project-based learning in school. Our review showed that the majority of students have developed confidence in using IT, demonstrated a basic understanding of computer knowledge and skills relevant to the stage-specific IT Learning Targets, and rated themselves as at least basically competent in common hardware and software skills. As seen from the findings of OECD

³ These countries / regions included Hong Kong, Australia, Canada, Chile, Czech Republic, Denmark, Finland, France, Germany, Israel, Italy, Korea, Latvia, Netherlands, Norway, Philippines, Portugal, Singapore, Slovakia, South Africa, Spain Catalonia, Taiwan, Thailand, United Kingdom and USA.

⁴ The Centre for Information Technology in Education (CITE), “A comparative case study of Innovative Pedagogical Practices Using Technology”, Key Findings presented by the Hong Kong SITES Research Team (para 30). Retrieved on 14 Oct 2004 from URL: http://sitesdatabase.cite.hku.hk/keyfinding/i_classroom.htm.

2001 in Tables 4 and 5, the mean percentage of 15-year-olds who reported using computers “almost every day” and “a few times each week” at home and at school was above the “country / region mean”.

13. Apart from the above, our review reflects that the majority of the surveyed students have used IT for Internet search, entertainment, communication with others, collaborating with others and doing creative work at home.

E-Learning

14. As shown in Table 6, Hong Kong was placed 19th amongst 60 countries / regions / economies / cities with regard to e-learning by the Economist Intelligence Unit⁵ in 2003. It is worth noting that e-learning was put under the limelight during the outbreak of SARS in early 2003. During that period, most schools made use of the schools’ homepages or the Intranet for the delivery of learning materials as well as interaction with students on the Internet. The Hong Kong Education City (HKEdCity), together with other education and social services organisations contributed tremendously by offering online courses, webcasting tutorials, etc. to support home-based learning.

15. The e-learning project during SARS period had brought HKEdCity the “Computerworld Honours Medal of Achievement⁶” in April 2004 in San Francisco. It is also encouraging to note that the e-learning project during SARS period has also been selected from a pool of about 900 projects from 107 countries / regions around the world as finalists in the Stockholm Challenge 2003/2004⁷ – a unique awards programme for human betterment through the application of pioneering Information Technology projects worldwide.

⁵ Economist Intelligence Unit, The 2003 e-learning readiness rankings. Retrieved on 14 Oct 2004 from URL: http://www-306.ibm.com/services/learning/solutions/pdfs/eiu_e-learning_readiness_rankings.pdf

⁶ Computerworld Honours, “2004 Award Recipients for the 21st Century Achievement Awards”. Retrieved on 14 Oct 2004 from URL: http://www.cwhereoes.org/caa_4_a.asp

⁷ The Stockholm Challenge Finalist book (2004). Retrieved on 12 Oct 2004 from URL: <http://www.stockholmchallenge.se/index.html>

Way Forward

16. With a view to preparing our students for the information age, turning schools into dynamic and interactive learning institutions and fostering collaboration amongst schools, parents and the community, the vision of the second ITEd strategy is to empower students, teachers, schools and other stakeholders to use IT effectively as a tool for enhancing the effectiveness of learning and teaching. We will continue to work towards this vision and take stock of where we stand internationally from time to time.

Education and Manpower Bureau
March 2005

Table 1 Student to computer ratio and connectivity in schools in Hong Kong and some overseas countries / regions

Country / Region	Year of achievement (target)	Student to Computer Ratio			Connectivity		
		primary school sector	secondary school sector	special school sector	primary school sector	secondary school sector	special school sector
<i>Hong Kong</i>	2003	7.4:1	4.6:1	2.0:1	<i>All schools connected to the Internet by Broadband</i>		
Australia (Victoria)	2002	4:1 ⁸					
Canada	2003				78% of students had access to a computer at home ⁹		
Japan	2001				100% schools with high speed constant access ¹⁰		
	2004	11.2:1 ¹¹	lower secondary: 7.7:1 ¹⁰ ; upper secondary: 6.7:1 ¹⁰				
	(2005 target)	5.4:1 ⁹			100% classrooms ⁹		
Korea	2001	10:1 ¹²	middle school: 7:1 ¹¹ ; high school: 5:1 ¹¹		100% (LANs or Leased lines) ¹¹		
	(2005 target)	5:1 ⁹					
Singapore	(2002 target)	2:1 ⁹					
	2004	6.6:1 ¹³	5:1 ¹²		100% ⁹		
Taiwan	1999				100% ⁹		
	2004	17.5 : 1 (Taiwan) 6 : 1 (Taipei City)					
Thailand	(2001 target)	80:1 ⁹	40:1 ⁹				
	2002	84:1 ⁹	53:1 ⁹		1.19% ⁹	22.50% ⁹	
	(2004 target)	40:1 ⁹					
United Kingdom	2003	7.9:1 ⁹	5.4:1 ⁹	3.0:1 ¹³			
	(2004 target)	8:1 ¹⁴	5:1 ¹³		75% of students have access at home ¹⁵		
	(2006 target)				All schools connected to the Internet by Broadband ¹³		
USA	2000	8:1 ⁹	5:1 ⁹				

- ⁸ Victoria (1998), Key Initiatives. See. Retrieved on 10 Nov 2004 from URL: http://www.budget.vic.gov.au/domino/web_notes/budgets/budget98.nsf/0/75a82b7911469b704a2565ee003b58db?OpenDocument
- ⁹ Looker, D and Thiessen, V 2003, The Digital Divide in Canadian Schools: factors affecting student access to and use of information technology, Statistics Canada, June 2003
- ¹⁰ The Hong Kong Polytechnic University (2004), "Overall Study on Reviewing the Progress and Evaluating the Information Technology in Education (ITEd) Projects 1998/2003"
- ¹¹ Annual national survey conducted by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) and the target was set by the e-Japan Strategy II announced on 2 July 2003
- ¹² UNESCO, "Overview of ICT use in education in Asia and the Pacific". Retrieved on 14 Oct 2004 from URL: <http://www.unescobkk.org/education/ict/v2/info.asp?id=10999>
- ¹³ Bala, A (2001), "Use of the IT Medium in Education for Human Resource Development: The Singapore Experience". Retrieved on 10 Nov 2004 from URL: <http://courses.nus.edu.sg/course/phibalas/dialogue2001/Burma%20IT%20Paper.htm>
- ¹⁴ The Department for Education and Skills, UK, "Survey of Information and Communications Technology in Schools 2003"
- ¹⁵ DfES (2004) Standards Fund Circular 2004-2005 – ICT extract. Retrieved on 10 Nov 2004 from URL: <http://www.dfes.gov.uk/ictinschools/funding/composite.cfm?partid=70>

Table 2 Percentage of Hong Kong and some overseas teachers with IT training

Country / Region	Year	Teacher who completed IT Training		
		primary school sector	secondary school sector	special school sector
Hong Kong	2003	<i>100% attained Basic Level; 89% Intermediate Level or above Since the 1999-2000 school years, there are on-going refresher training courses aiming to keep teachers abreast of IT developments and in particular pedagogical application of IT</i>		
Japan	2002	Elementary Schools: 105.9% ¹⁶	Junior High School: 67.5%; High School: 44.6% ¹⁵	55.7% ¹⁵
Korea	2001 onwards	from 2001 onwards, 33% every year from 2004 onwards, 100% will get retraining once every three years ¹⁷		
Singapore	1999	100% ¹⁶		
Taiwan	2004	100% ¹⁶		
Thailand	2003	around 20% ¹⁶		-
UK	2003	95% ¹⁸	87% ¹⁷	93% ¹⁷

¹⁶ Centre for Educational Computing, The Current Status of Information Technology in Education. Retrieved on 14 Oct 2004 from URL:http://www.cec.or.jp/e-cec/CEC_ITgenjyou.html

¹⁷ The Hong Kong Polytechnic University (2004), "Overall Study on Reviewing the Progress and Evaluating the Information Technology in Education (ITEd) Projects 1998/2003"

¹⁸ The Department for Education and Skills, UK, "Survey of Information and Communications Technology in Schools 2003"

Table 3 Mean innovation score and related descriptive statistics along each of the six dimensions of innovation for the 9 Hong Kong cases under SITES M2¹⁹

	Mean innovation score		Minimum innovation score		Maximum innovation score	
	Hong Kong	Other 25 Countries / regions	Hong Kong	Other 25 Countries / regions	Hong Kong	Other 25 Countries / regions
Curriculum goals	4.44	4.18	2	1	6	6
Teacher's roles	4.67	4.34	2	2	7	7
Students' roles	5.11	4.31	2	2	7	7
ICT sophistication	5.78	5.71	5	5	7	7
Manifestation of learning outcomes	4.89	4.13	1	1	7	7
Connectedness of the classroom	3.89	4.16	1	1	7	7

¹⁹ The Second Information Technology in Education Study; Module 2 (SITES: M2)

Table 4 Frequency of use of computers at home by 15-year-olds (2000)²⁰
Mean percentage of 15-year-olds who reported using computers at home

Country / Region	Almost every day	A few times each week	Between once a week and once a month	Less than once a month
<i>Hong Kong</i>	<i>31</i>	<i>33</i>	<i>5</i>	<i>1</i>
Australia	44	30	12	5
Belgium	38	26	13	7
Brazil	18	7	7	5
Canada	51	21	10	4
Czech Republic	31	15	8	4
Denmark	44	25	14	7
Finland	45	22	10	5
Germany	43	23	14	7
Hungary	29	14	7	4
Ireland	32	23	10	5
Latvia	16	9	5	4
Liechtenstein	39	24	17	5
Luxembourg	44	22	14	7
Mexico	14	10	4	4
New Zealand	36	27	13	6
Norway	53	22	11	6
Russian Federation	12	6	4	4
Scotland	38	26	10	4
Sweden	60	21	9	3
Switzerland	39	25	17	7
United States	49	18	12	6
<i>Country/ Region mean</i>	<i>39</i>	<i>21</i>	<i>11</i>	<i>5</i>

²⁰ OECD 2001

Table 5 Frequency of use of computers at school by 15-year-olds (2000)²¹
Mean percentage of 15-year-olds who reported using computers at school

Country / Region	Almost every day	A few times each week	Between once a week and once a month	Less than once a month
<i>Hong Kong</i>	<i>2</i>	<i>51</i>	<i>10</i>	<i>5</i>
Australia	15	35	24	17
Belgium	5	26	32	12
Brazil	5	7	14	15
Canada	18	21	23	22
Czech Republic	4	24	34	11
Denmark	23	36	26	11
Finland	6	41	30	16
Germany	4	14	25	20
Hungary	7	58	19	5
Ireland	4	22	25	14
Latvia	6	35	26	12
Liechtenstein	5	24	50	11
Luxembourg	10	26	34	12
Mexico	8	26	8	8
New Zealand	18	16	21	27
Norway	6	22	33	28
Russian Federation	4	22	24	11
Scotland	18	39	18	14
Sweden	16	29	27	17
Switzerland	5	17	37	20
United States	18	19	23	23
<i>Country / Region mean</i>	<i>10</i>	<i>28</i>	<i>26</i>	<i>16</i>

²¹ OECD 2001

Table 6 Hong Kong's position in e-learning in 2003 by Economist Intelligent Unit

Index	Rank and Year	Total number of countries / regions / cities / economies	Organisation
E-Learning	19 th , 2003	60	Economist Intelligence Unit
Criteria: (a) Connectivity (the quality and extent of Internet infrastructure); (b) Capability (ability to deliver and consume e-learning); (c) Content (the quality and pervasiveness of online learning materials); and (d) Culture (behavior, beliefs and institutions that support e-learning development)			