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Current development of Information Technology in Education in Hong Kong - Key findings of a territory-wide review survey

Kai-Ming LI* & Siu-Cheung KONG
Department of Mathematics and Information Technology
Hong Kong Institute of Education, Hong Kong, China
*kmli@ied.edu.hk

Abstract: This paper reports the key findings of a territory-wide review survey on the current development of Information Technology in Education (ITEd) in Hong Kong. 711 schools in different sectors had taken part in this study. Five areas regarding ITEd were reviewed: (1) IT facilities and accessibility; (2) Resources; (3) IT deployment in schools; (4) IT deployment for learning/teaching; and (5) Students' awareness/competency in use of IT. All schools had basic infrastructure to support the development of ITEd while teachers and students were competent to adopt IT in teaching and learning. The present progress of ITEd has posted a solid foundation for further development which aims at developing 21st century skills.

Keywords: Information Technology, education, technology and education, evaluation study

1. Background

The Hong Kong Special Administrative Region Government (HK Government) has been promoting the use of IT in education (ITEd) actively in the past decade. Through the use of IT, HK Government aims to enhance the effectiveness of learning and teaching and to equip students with 21st century skills, information management competency as well as capability for life-long learning so that they can cope with the changing needs and competitions in the information age [1].

To achieve the above goals, the HK Government has implemented three ITEd strategies since 1998. In response to the First [3] and the Second Strategy [4] published by the Government, three major territory-wide evaluation studies were conducted to review the progress of ITEd in Hong Kong: the Overall Study [5]; Phase (I) Study [6] and Phase (II) Study [7]. These studies showed favourable findings in the infrastructure and competencies in using IT among teachers and students but revealed needs in improving the pedagogy and the fostering of Information Literacy[1] (IL). As a result, the Third Strategy (EDB, 2008) and the corresponding review studies (the current paper describes one of them) aim to assess the ITEd development progress, especially focusing on the integration of IT for empowering learning and teaching as well as promoting the development of IL.

Seven review areas were identified for the current Review Survey by comparing and re-mapping (see [2] and [6]) the various areas of concern of Phase (I) Study [6], the standards for the educational use of technology suggested by International Society for

[1] Information Literacy – CILIP's definition: "Information Literacy is knowing when and why you need information, where to find it, and how to evaluate, use and communicate it in an ethical manner." [13]

Technology in Education (ISTE) [8, 9, 10] and UNESCO [11, 12] study: (1) IT facilities & accessibility, (2) resources, (3) IT deployment in schools, (4) IT deployment for learning/teaching, (5) students' awareness/competency in use of IT (6) parental support, and (7) school expectations on ITEd.

2. Method

2.1. Participants

Full enumeration was conducted in March 2010 for all schools from four sectors: primary and secondary schools, special schools [2] adopting mainstream curriculum [special (mainstream) schools] and those with special curriculum [special (special) schools]. 343 (70%), 324 (70.13%), 14 (77.78%) and 30 (71.43%) of them had responded respectively.

2.2. Design

A web-based questionnaire survey was used in this study by using an evaluation platform which is developed by the Education Bureau. A server was set up for preparing the online questionnaires, as well as for collecting and analyzing online data. Descriptive statistics for the first five review areas was used for discussion at this stage. Other inferential testing for examining differences among school sectors and some independent variables will be conducted later and the results will be reported in the subsequent paper.

3. Major Findings

3.1. IT facilities and accessibility

Respondent schools in the primary and secondary school sectors had similar net student computer ratios of 8.57:1 (SD: 4.70) and 8.09 (SD: 6.76) respectively. The ratios of special schools sectors were lower, which were 2:1 (SD: 1.01) and 3.46:1 (SD: 1.39) for special (mainstream) and special (special) schools respectively (Table 1).

TABLE 1 AVERAGE NUMBER OF COMPUTERS AND STUDENT TO COMPUTER RATIOS IN DIFFERENT SCHOOL SECTORS[#]

Accessibility of computers	**School Sector**			
	Primary	***Secondary***	***Special (Mainstream)***	***Special (Special)***
Average number. of computers	138(59.33)	257(77.11)	129(55.11)	94(36.61)
Average net student to computer ratio[a]	8.87:1(4.70)	8.09:1(6.76)	2:1(1.01)	3.46:1(1.39)

Standard deviations in brackets

a. calculated by dividing the average number of computers for students' use only in the respondent schools by the total number of students

Table 2 shows some key figures of the accessibility of computers and digital projectors in classrooms and special rooms[3]. The computer and projector to room ratios suggest that majority of the respondent primary and secondary schools had around one computer and projector in each classroom and special room. For special schools (mainstream and special), they had at least one computer in classrooms and special rooms, while more than half of the special rooms were equipped with projectors in average.

[2] Special schools were classified into six categories: School for Children with Hearing Impairment, with Intellectual Disability, with Physical Disability, with Visual Impairment, for Social Developmentm and Hospital School

[3] Special rooms refer to： Multi-media Learning Centre, IT Learning Centre and Computer Laboratory

For internet availability, all the schools had internet connection, while most of them had Wi-Fi connectivity within campuses (primary 94.46%, secondary 97.84%, special (mainstream) 100%, and special (special) 100%).

TABLE 2 AVERAGE COMPUTERS AND PROJECTORS RATIO IN CLASSROOMS AND SPECIAL ROOMS [#]

Accessibility of computers and projectors	**School sector**			
	Primary	***Secondary***	***Special (Mainstream)***	***Special (Special)***
Average computer to classrooms ratio[b]	1.06:1(0.53)	0.91:1(0.46)	1.24:1(0.85)	1.20:1(0.68)
Average projector to classrooms ratio	0.95:1(0.24)	0.98:1(0.20)	0.71:1(0.39)	0.87:1(0.35)
Average computer to special rooms ratio	4.75:1(6.31)	4.14:1(5.07)	4.71: 1(7.70)	2.03:1(1.73)
Average projector to special rooms ratio	0.85:1(0.52)	0.97:1(0.42)	0.82:1(0.86)	0.59:1(0.27)

Standard deviations in brackets

b. ratio calculated by dividing the average number of computers/projectors by the number of computers/projectors of classrooms/special rooms

3.2. Resources

In terms of financial resources, schools spent around 12% of their annual school expenditure on ITEd development (Table 3).

TABLE 3 FINANCIAL RESOURCES FOR ITED DEVELOPMENT IN DIFFERENT SCHOOL SECTORS[#]

Resources	**School Sector**			
	Primary	***Secondary***	***Special (Mainstream)***	***Special (Special)***
Average annual ITEd expenditure	328,496 (187,467)	481,256 (270,327)	239,929 (93,070)	254,700 (107,812)
Average % of school annual expenditure	12.23 (8.37)	11.26 (7.95)	13.54 (8.78)	12.10 (7.91)

Standard deviations in brackets

For the availability of digital resources, all respondent schools had set up school homepage. Also, all special schools and most primary and secondary schools (93% and 99.38% respectively) had intranet. Apart from that, majority of the respondent schools, 85.42%, 94.44%, 100%, 66.67% (primary, secondary special (mainstream) and special (special) respectively) have been using e-learning platform/learning management system.

3.3. IT deployment in schools

89%, 85%, 86% and 97% of the primary, secondary, special (mainstream) and special (special) schools had formulated development plans on ITEd respectively, where "to improve students' learning outcomes" was rated as the most important goal for ITEd development across the four school sectors.

Over 85% the respondent schools required teachers to include IT elements in teachings and learning activities (primary 93.88%, secondary 86.73%, special (mainstream) 85.71%, and special (special) 90%). Moreover, majority of primary (79.88%) and secondary (84.26%) had provided online exercise/test database bank. However, only 50% of special (mainstream) and 33.33% of special (special) schools had such system.

For the development of student's IL, a majority of the respondent schools had integrated IL into the computer/IT curriculum (primary 97.38%, secondary 97.21%, special (mainstream) 100% and special (special (86.67%). IL is also taught as independent subject in 31.49% primary schools, 27.02% secondary schools, 28.57% special (mainstream) schools and 10.00% special (special) schools.

3.4. IT deployment for teaching

80%, 77%, 70% and 83% respondent teachers at primary, secondary, special (mainstream) and special (special) schools respectively were confident or very confident in using IT for teaching/learning. On the other hand, majority of the respondent teachers had used IT for learning/teaching within one month of the survey date (primary 88%, secondary 84%, special (mainstream) 66%, and special (special) 88%). Assigning learning tasks to student with the use of IT beyond school hours was uncommon, only 48% (primary), 51% (secondary), 25% (special (mainstream)) and 11% (special (special)) respondent teachers did that within one month of the survey date.

3.5. Students' awareness/competency in using IT

In the questionnaire, students' level of IL and computer/IT skills was evaluated by school representatives using a Likert scale ranging from "totally not competent" (1) to "very competent" (5). In general, students were fairly competent in IL and computer/IT skills, where most of the mean ratings were over 3. Moreover, they were rated best in the "computer operation skills" and "information search" areas, with a mean rating over 4 (Table 4). Results also show that students' competency in "information collation and analysis" was comparatively low amongst these seven areas.

TABLE 4 STUDENTS' LEVEL OF COMPETENCY IN IL AND COMPUTER/IT SKILLS[#]

IL and computer/IT skills	**School Sector**			
	Primary	***Secondary***	***Special (Mainstream)***	***Special (Special)***
Information search	4.31(0.58)	4.41(0.62)	4.00(0.55)	3.24(0.97)
Information selection	3.58(0.58)	3.67(0.64)	3.43(0.51)	2.76(0.88)
Information collation and analysis	3.46(0.59)	3.46(0.64)	3.36(0.50)	2.60(0.71)
Reporting and presentation	3.74(0.64)	3.67(0.71)	3.71(0.47)	2.80(0.82)
Proper use of IT	3.81(0.64)	3.49(0.67)	3.71(0.83)	2.88(0.95)
Computer operation skills	4.32(0.58)	4.35(0.58)	4.00(0.68)	3.50(1.00)
Chinese characters input	3.34(0.60)	4.04(0.63)	3.71(0.61)	2.64(0.99)

Standard deviations in brackets

4. Summary and Conclusion

Results from the survey indicate that schools in all four sectors were fairly well equipped with ITEd systems and facilities. All of the respondent schools had school homepage and a majority of schools had set up intranet and e-learning platform. However, a much smaller proportion of special schools (mainstream and special) provided online exercise or test database bank when comparing with primary and secondary schools. Special schools' students might be less competent in self learning thus the demand of such system was low. Moreover, existing online exercises or tests might be designed for mainstream schools' students and were not suitable for the students of special schools. In terms of hardware, most schools had set up IT facilities and equipped with computers and digital projector for learning and teaching. For IT deployment at school, majority of respondent schools required teachers to include IT elements in teaching and learning activities. Most teachers reported that they were confident in using IT and had used IT for teaching and learning recently. However, assigning learning task using IT to students beyond school hour was uncommon. Students of the respondent schools were fairly competent in different IL or IT skills and they performed best in information search and computer operation. It is worth to note that "information collation and analysis" was the weakest area. Future teaching activities and

curriculum should address this issue and strengthen students' development in this aspect. In terms of resources, schools spent similar proportion of budgets on ITEd development across all school sectors.

A major limitation of the study is that it was based on a self-reported questionnaire, where responses were subjective opinions only. If possible, further studies should be carried out to investigate different skills levels and perceptions of a sample of students and teachers individually.

The above results show that the current situation of ITEd development in Hong Kong is satisfactory. Schools are equipped with IT facilities and resources. Students are competent in IT skills and teachers show good acceptance of IT and use IT in their teaching. All these lay a solid background for further development in enhancing student's cognition and 21st century skills.

Despite the generally successful implementation, there are still a few areas that need further effort. First, more attention should be put to address special schools' needs in designing digital resources specifically for their students and teachers. More resources should be spent in purchasing computer for students use as well as in technical support and maintenance. Furthermore, schools and teachers should be more active in exploring the possibility of the use of IT in doing and submitting assignments. Last but not least, teachers should strengthen students' information collation and analysis skills by practicing student-centred pedagogy in their teaching.

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