

**Report on the Review Surveys of  
the **THIRD** Strategy on  
Information Technology in Education**

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## **Executive Summary**

### **Purposes of the Review Surveys**

This Review Surveys were commissioned by the Education Bureau (EDB) of the Government of the Hong Kong Special Administrative Region (HKSAR) to collect data for better understanding of schools' implementation of Information Technology in Education (ITEd) and to review the progress of the ITEd initiatives in Hong Kong as put forth in the Third ITEd Strategy documented in the "Right Technology at the Right Time for the Right Task".

### **Methodology**

A cross-sectional research design with two intervals of data collection, Review Survey 1 (RS1) conducted in January 2010 and Review Survey 2 (RS2) in February 2012, was adopted in this study. The data collected in RS1 became the baseline data of this study, which were used for systematic review of the progress of various ITEd initiatives at the first stage of the Third ITEd Strategy. The cross-sectional data collected in RS2 were subsequently compared with the data gathered in RS1 for tracking this progress of the implementation of ITEd from the 2009/10 to 2011/12 school years respectively.

There were seven Review Areas in this study, namely, IT facilities and accessibility, Resources, IT deployment in schools, IT deployment for learning and teaching, Students' awareness/competency in use of IT, Parental support and School expectations on ITEd. Based on these seven Review Areas, web-based questionnaires were designed and uploaded to the *Self-evaluation Platform on ITEd for Schools* (SEP) developed by EDB. Full enumeration was adopted in this study for all school sectors that over 70% of schools from primary, secondary and special school including both mainstream and special curriculum sectors had submitted their responses online. Apart from revealing the local progress of ITEd development, the findings from this study were also compared with latest survey results of neighbouring countries as well as other developed economies to help position Hong Kong's progress and steer the future direction of ITEd development.

## **Summary of findings**

In the following, findings are presented in the first six review areas. For the last review area, “School expectations on ITEd”, the feedback from schools are summarised and incorporated into the preceding six areas for easy reference.

### ***IT facilities and accessibility***

Schools had well set up their IT infrastructure. Almost every classroom and special room was equipped with at least one computer and projector, which enabled IT use in general curriculum. Internet connection was further enhanced by higher bandwidth adopted which was among the highest standard of the leading Asian countries. Schools also reported to acquire more emerging mobile devices, such as eBook reader and tablet computers. This revealed that schools realized the pedagogical potential of the emerging technologies, particularly the digitalization of general classrooms with more efficient network and mobile learning devices.

### ***Resources***

Human resources of schools generally did not have significant changes but the increasing complexity of IT network in schools had demands for technical support services (TSS) staff. Schools also reported to spend more on ITEd which accounted for slightly over 10% of their schools’ annual expenditure, comparable to figures obtained in New Zealand and South Korea. Hong Kong schools also had well-built digital infrastructure among other countries. All schools had their own websites and most schools had learning management system. E-system or mechanism was also extensively deployed in facilitating communication amongst relevant stakeholders and managing ITEd-related resources.

### ***IT deployment in schools***

Over 80% of schools had ITEd development plans, mostly for one-year plan focusing on improving students’ learning outcomes. Almost all of the schools offered Computer/IT as a discrete subject. Besides, the incorporation of IT in teaching and learning with proper guidelines was addressed more in Hong Kong. Most schools provided free-of-charge learning resources and over half of the schools provided on-line or off-line fee-charging resources. Nearly 40 to 50% schools have collaborated with other organisations to develop or have deployed IT tools to facilitate learning and teaching.

### ***IT deployment for learning and teaching***

Nearly 80% of the teachers feel confident or very confident in using IT for learning and teaching, which was prominent when compared with other countries. About 80% teachers had used IT for learning and teaching within the month prior to the survey, which was a high ratio comparable to European teachers. There was also high extent of IT use in different subjects. A substantial increase in the use of emerging technology (e.g. Web 2.0 technology such as Blog, Wiki and Podcast) for learning/teaching was also observed and was considered to account for the lower usage of traditional digital resources. Hong Kong teachers also had more opportunities for professional development with inter-school sharing sessions getting more popular.

### ***Students' awareness/competency in use of IT***

Students' awareness/competency in use of IT was rated by their teachers according to their observation. Students' competencies in using emerging technical devices showed a significant growth. In other areas, students remained competent and comparable to European students. Students had the highest scores in "information search" and "computer operation skills". In "computer operation skills", the score even exceeded that of European students. Generally, Hong Kong students scored higher in IT skills than in information literacy which was more prominent in secondary students than primary.

### ***Parental support***

The percentages of students who have computer and Internet access at home further increased. It was reported that 91% of primary students, 94% of secondary students and over 70% of special school students had computer access at home and 90% primary, 93% secondary and over 70% special school students had also home Internet access. These percentages were comparable to the leading countries in the world. In addition, most schools continued their support to needy students by encouraging students to join the past "Computer Recycling Programme" or apply for computers from other non-government organisations (NGOs) or from IT industries. Besides, it was most common for schools to encourage parents to visit the school website or Intranet so as to understand the development of ITed in school.

## **Major Recommendations**

### ***IT facilities and accessibility***

To fully capture the pedagogical potential provided by the advancement of IT, schools should focus more on longer-term ITed investment, such as wireless network, server and cloud computing technology. For more innovative and extensive e-Learning projects to be implemented, schools

should also start to establish a reserve of mobile learning devices which enable the transformation of an ordinary classroom into an e-classroom where student-centred and inquiry-based learning activities can be initiated and accomplished.

### ***Resources***

To assist long-term ITed development, regular support from TSS staff would be essential. Apart from the consideration of taking TSS staff into the regular establishment, professional development program should also be provided to equip TSS staff to assist teaching and implement ITed development. The development of ubiquitous learning also prompted for new modes of funding. To allow for more flexible ITed development, in addition to Government funding, schools and parents can also discuss about the specific mode of financial support unique to their own ITed development.

### ***IT deployment in schools***

To formulate effective school-based IT development plans, schools should consider longer-term (three to five years) and more comprehensive planning to integrate IT in every part of the entire school development plan. This would need discussions among the school principal, IT coordinator and curriculum leader etc. throughout. Relevant professional development programmes should also be provided for these 3 parties. Furthermore, more extensive and multi-functional resource-sharing mechanisms should be established. For instance, the cloud computing technology available can achieve the above mentioned from individual schools by Private Clouds to larger educational groups by Public Clouds at reasonable costs.

### ***IT deployment for learning and teaching***

To assist teachers in gaining knowledge of new e-Learning resources as well as tailoring their own resources, professional development courses offered by tertiary institutions, other NGOs or IT trade industries should be continually provided. Pedagogical practices utilizing cloud technologies should be encouraged and promoted by inviting teachers to participate in interschool-collaborative projects, for example, those funded by the Quality Education Fund (QEF), relevant Government projects and organize experience-sharing activities to anchor the achievements and benefit the school community.

### ***Students' awareness/competency in use of IT***

To develop students' 21<sup>st</sup> century skills, first, the comprehensive review of the IT curriculum is necessary to align with the rapid development of IT and to integrate generic uses of IT into other disciplines for improving learning outcomes. Besides, it would also require a paradigm shift from



teacher-centred education mode to a more student-centred one, which is made possible by more extensive e-Learning experiences utilizing, for example mobile devices with compatible electronic platform for learning to be ubiquitous and seamless.

### *Parental support*

To completely eliminate digital divide, plans such as the current Internet Learning Support Programme should be continually promoted and implemented so that all students can perform e-Learning at home. Besides, close and continuous communication between schools and parents should be maintained to help parents understand the schools' ITed planning, especially when schools launched broader ITed development projects which require more home-school cooperation. Electronic communication between homes and schools should also be maintained.

### **Conclusion**

The study showed that the Third ITed Strategy has carriage of significant progress in terms of the seven review areas which indicated **schools are ready for a paradigm shift towards the mode of student-centred e-Learning.**

# Chapter 1

## Background of Review Survey(s)

### 1.1 Introduction

To help students cope with the changing needs of the information age, the Government of the Hong Kong Special Administrative Region (Government) has documented a clear vision of empowering learning through Information Technology (IT) in relevant policy documents for the implementation of Information Technology in Education (ITEd) (EMB, 1998, 2004). Impressed resources have already been allotted to different ITEd-related project initiatives and support measures.

From 1998 to 2007, three major territory-wide evaluation studies were conducted to gauge the effectiveness and to review the progress of ITEd in Hong Kong (EMB, 2005; EDB, 2007a and 2007b). Reports from these studies have provided a community-wide profile of the current situation, as well as of the problems associated with the implementation of ITEd in Hong Kong. According to the findings of the Second Information Technology in Education Study (SITES) (IEA, 2006), Hong Kong's student-to-computer ratio ranked first in Asia and fourth in the world, and the pedagogical use of computers could be more innovative. The above studies have also provided valuable recommendations, paving the way for the development of measures and actions to advance ITEd in Hong Kong. Hence, the Third Strategy on ITEd (Third Strategy), "Right Technology at the Right Time for the Right Task", has been launched in 2008 for the enhancement of learning and teaching (EDB, 2008).

To review the Third Strategy on using IT to enhance learning and teaching, the Education Bureau (EDB) commissioned the Department of Mathematics and Information Technology (MIT) of the Hong Kong Institute of Education (HKIEd) to undertake the project, *Review Survey(s) on the Third Strategy on Information Technology (IT) in Education* (Review Surveys). The project was commenced in late September 2009, and completed by end of August 2012.

### 1.2 Objectives

The objectives of the project were as follows:

- (a) to conduct surveys for better understanding of schools' implementation of ITEd; and
- (b) to review the progress of the Third Strategy based on some common indicators of ITEd.

### 1.3 Scope of Review Survey(s)

The scope of the project included the following to:

- (a) identify a set of ITed-related *indicators*, including but not limited to the following aspects, to assess the development of ITed and the use of IT in schools under the Third Strategy:
  - (i) IT facilities and accessibility;
  - (ii) Resources;
  - (iii) IT deployment in schools;
  - (iv) IT deployment for learning and teaching;
  - (v) Students' awareness/competency in use of IT;
  - (vi) Parental support; and
  - (vii) School expectations on ITed;
- (b) develop *instruments*, i.e., questionnaire survey(s) (both Chinese and English versions were administered online and also offline, if needed) with appropriate item modifications for each school sector [including primary (Government, aided, and direct subsidy scheme (DSS) schools), secondary (Government, aided, caput, and DSS schools), and special schools] and based on the set of indicators identified in Section 1.3(a) to address the objectives listed in Section 1.2;
- (c) propose *sampling* details for **Pilot Survey (PS)** with due regard to the need to cover all public school sectors and DSS schools;
- (d) propose means of instrument *administration* and, when necessary, specific *measure(s)* to facilitate, encourage, and monitor schools' returns, as well as to enhance data quality;
- (e) conduct the following:
  - (i) **Pilot Survey (PS)** in November 2009 to sample schools in accordance with 1.3(c), to validate the designed instrument(s) (both English and Chinese versions), as well as to refine 1.3(a), 1.3(b), and 1.3(d); and
  - (ii) **Review Survey 1 (RS1)** in January 2010 and **Review Survey 2 (RS2)** in February/March 2012 to all schools in accordance with 1.3(b) and any necessary refinements on the instrument(s)/logistics based on the results of the PS, to capture the whole picture in ITed at schools for progress evaluation of the Third Strategy;
- (f) perform *data cleaning* and conduct *data analysis* in accordance with the proposed method(s), which involved further analyses, including but not limited to cross-sector and cross-sectional data comparison, apart from descriptive statistics; address the objectives set by taking into account the distribution of schools in terms of school sizes, categories, and types.

## Chapter 2

### Literature review

The literature review, consisted of three major parts, was conducted to illustrate the development of ITed in Hong Kong, reveal some areas of concern about ITed, and establish certain common indicators of ITed for accomplishing the project's objectives.

#### 2.1 ITed in Hong Kong

The first part of the literature review focuses on an overview of the development of ITed in Hong Kong, including relevant policy documents and local studies.

##### (a) *ITed Strategies in Hong Kong*

To align with the rapid advancement of technologies in the late 20<sup>th</sup> and advancing 21<sup>st</sup> Century, the Government has published three ITed strategies in response to the drastic changes in the alternative forms of knowledge acquisition and teaching pedagogy. The global aims of these strategies are to prepare and equip students in Hong Kong with the skills and abilities to cope with the changing needs of the information age, and to enhance the effectiveness of learning and teaching with innovative technologies and related applications. The three ITed strategies published by the Government are listed below.

- (i) First Strategy: Information Technology for Learning in a New Era: Five-Year Strategy (1998/99 – 2002/03)

This strategy focused on the basic infrastructure and training of teaching professionals. A large amount of Government resources were invested in hardware resources and other IT-related facilities in schools. Next step came strategies focusing more on the use of IT to facilitate learning and teaching and enhance the effectiveness. To this end, the Hong Kong Education City (HKEdcity) has been launched (an on-line platform) to provide quality and comprehensive digital learning resources for schools, parents and students in Hong Kong.

- (ii) Second Strategy: Empowering Learning and Teaching with Information Technology (2003/04 – 2006/07)

With sufficient infrastructure and well-trained teachers, the Second Strategy document drew seven strategic goals focusing on the use of IT for learning and teaching. They were:

- Empowering learners with IT;
- Empowering teachers with IT;
- Enhancing school leadership for the knowledge age;
- Enriching digital resources for learning;
- Improving IT infrastructure and pioneering pedagogy using IT;
- Providing continuous research and development; and
- Promoting community-wide support and community building.

(iii) Third Strategy: Right Technology at the Right Time for the Right Task (2007/08 – 2012/13)

This strategy focused on the integration of IT into learning and teaching to improve learning outcomes. As this strategy was grounded on the belief that the success of ITed depends greatly on how effectively teachers and students will be using technologies for learning and teaching, there will not be a sole reliance on any IT hardware or software provisions without critical assessment of their positive impacts on learning outcomes. Therefore, this strategy **focused** more **on the human context** than the technical environment.

To promote the use of IT in learning and teaching as well as to support teachers in using the right technology at the right time for the right task, the EDB, among others, has developed the Depository of Curriculum-based Learning and Teaching Resources (the Depository) for teachers' use. The Depository is structured and curriculum-based with an aim to providing appropriate digital resources and pedagogical advice to the local teachers so that their burden from teaching materials preparation could be reduced.

The e-Learning resources are prepared at Primary and Junior Secondary levels. For the former, it includes Chinese Language, English Language, Mathematics and General Studies Key Learning Areas (KLAs). For the latter, it embraces Chinese Language, English Language, Mathematics, Science, Technology as well as Personal, Social and Humanities Education. (<http://www.hkedcity.net/edb/teachingresources/>)  
(<http://www.hkedcity.net/edbosp/>)

Besides, professional development programmes for teachers on the Depository are disseminated by the subject specialists through district-based sharing and school on-site support, etc. from 2010 to 2013.

**(b) Studies on ITed in Hong Kong**

To review the progress of the First Strategy and the Second Strategy published by the Government, three major territory-wide evaluation studies were conducted as follows.

(i) Overall Study on Reviewing the Progress and Evaluating the Information Technology in Education (ITEd) Projects 1998/2003 (Overall Study)—Final Report

In response to the First Strategy, the Overall Study was conducted to review the progress of the ITEd projects, to evaluate the application and effectiveness of ITEd, and to recommend strategies and plans for ITEd development in Hong Kong. In the study, six sets of research questions were formulated to seek an understanding of the following six areas: Access, Connectivity and usage, Teacher enablement, Curriculum, Pedagogy and resources, School and wider community culture, and Student learning.

The study revealed significant **progress on the enhancement of IT infrastructure, teacher professional training, and curriculum and resource support for ITEd during the five-year period from 1998 to 2003** (EMB, 2005). In brief, the average number of computers per school had remarkably increased. All schools reported having Internet connections, over 90% of which were broadband networked. Most of the teachers had received basic training in ITEd, although a minority of them considered themselves novices in adopting IT in teaching. There was also an increase in the use of IT by teachers, especially in information search and course material preparation.

(ii) Phase (I) Study on Evaluating the Effectiveness of the “Empowering Learning and Teaching with Information Technology” Strategy (2004/2007) [Phase (I) Study]—Final Report

The Phase (I) Study was conducted relevant to the launch of the Second Strategy. The primary purposes were to review the application of ITEd in relation to different stakeholders, the involvement of the community sector in ITEd, and the progress of ITEd projects, as well as to recommend necessary adjustments in the implementation of ITEd. In this study, eleven evaluative areas (EVs) were identified, and a list of indicators for assessing these EVs was defined to reflect the progress of each EV.

Some key findings of the Phase (I) Study suggested that measures, which were adopted to improve **IT infrastructure** in schools, were **effective** at that time and that most stakeholders were **satisfied** with the IT infrastructure in their schools accordingly. Moreover, student and teacher competencies in using IT in learning and teaching seemed to have improved. Generally speaking, positive progress was noted in all eleven EVs. **However, the use of IT as a tool for developing students’ higher-order thinking skills was not emphatically noted.**

- (iii) Phase (II) Study on Evaluating the Effectiveness of the “Empowering Learning and Teaching with Information Technology” Strategy (2004/2007) [Phase (II) Study]—Final Report.

To evaluate the Second Strategy, the Phase (II) Study was conducted to assess the impact of IT on empowering students’ learning in certain KLAs in both primary and secondary school levels, as well as in special schools, and to conclude the overall effectiveness of the Second Strategy. In assessing the information literacy (IL) competency of students, seven dimensions (i.e. define, access, manage, integrate, create, communicate and evaluate) were identified in the study. The definition of each dimension is listed in Table 2.1. Apart from the assessment of students’ level of IL proficiency, four sets of questionnaires were employed to determine students’ background knowledge on the use of Information and Communications Technology (ICT)<sup>1</sup> and to assess other factors that affect ICT-aided student learning.

As noted, students from all surveyed levels performed better in the dimensions of “define” and “access”, but might have improvement in the *dimension of “evaluate”*. Some exceptions were found in P5 (Primary 5) student performance in Chinese Language Performance Assessment (PA) that they could perform better in the *dimension of “access”*. Moreover, the overall performance of secondary school students was better than that of primary school students. Finally, **correlations were found between students’ level of IL proficiency and factors, such as gender, years of experience in using computer, access to computers at home, and the duration of daily computer use at home.**

Table 2.1 Dimensions of IL in Phase (II) Study

<b>Dimension</b>	<b>Definition</b>
Define	Using ICT tools to identify and appropriately represent information needs
Access	Collecting and/or retrieving information in digital environment
Manage	Using ICT tools to apply an existing organisational or classification scheme for information
Integrate	Interpreting and representing information, such as by using ICT tools to synthesise, summarise, compare and contrast information from multiple sources
Create	Adapting, applying, designing or inventing information in ICT environment
Communicate	Communicating information properly in its context (audience and media) in ICT environment
Evaluate	Judging the degree to which information satisfies the needs of the task in ICT environment, including determining authority, bias and timeliness of materials

Other than the foregoing studies commissioned by the Government, **SITES 2006, an international study was conducted by the International Association for the Evaluation of Educational**

<sup>1</sup> ICT and IT are interchangeable throughout the main text/report.

**Achievement (IEA)**, to investigate the use of ICT in learning and teaching, as well as related pedagogies in Hong Kong and 21 other educational systems. The main purpose of SITES 2006 was to “seek and identify what pedagogical practices teachers and schools of different educational systems were applying and how they were using ICT in these practices” (IEA, 2006).

To seek an in-depth understanding of the issue, four sets of questionnaires were developed to collect relevant information from system, school (principal questionnaire and technical questionnaire), and teacher levels. In the school-level questionnaire, six major domains were addressed, namely, (1) Infrastructure, (2) Pedagogical practice, (3) Vision, (4) Staff development, (5) Support, and (6) Organisation and management. Also, some **related indicators** were identified and operationalised in over 100 questionnaire items. Table 2.2 highlights some of the key findings of SITES 2006 for Hong Kong (Law, Pelgrum, & Plomp, 2008).

Table 2.2 Key findings of SITES 2006 for Hong Kong

Indicators	Percentage/Ratio
Mean student to computer ratio	6:1
Schools that had provided computer access to students outside class hours	98
Schools that possessed more than five projectors for presentation of digital materials	94
Schools in which Learning Management System (LMS) was available	91
Schools reported that computers were located in most of their classrooms	69
Schools in which smart boards were available	26
Schools in which mobile devices were available	20
Schools where introductory course for Internet use and general applications were available for teachers	90
Schools where course on pedagogical issues related to integrating ICT into teaching and learning were available for teachers	77
Schools that had organised ICT-related activities for parents	87
Science teachers reporting having used ICT in the teaching and learning activities of their target classes	82
Mathematics teachers reporting having used ICT in the teaching and learning activities of their target classes	70

Apart from studies focusing on the IT infrastructure and digital resources, there were also studies focusing on students’ IL and teachers’ skills to integrate IL into subject teaching. Centre for Information Technology in Education (CITE) of the University of Hong Kong conducted a one-year project called “**Development of Evaluation Tools for Assessing Students’ Information Literacy and Promoting Information Literacy among Students**” (CITE, 2010), which focused on students’ IL in General Studies / Science. Throughout the project, self-evaluation tools were developed for teachers to evaluate their students’ performance on IL with relevant workshops being provided for



teachers. In gist, five primary and secondary schools each participated in the study. As shown, students' IL skills were improved significantly by comparing their pre-test and post-test performances. Besides, from the teachers' interviews, it was revealed that pedagogical practices and enrichment of curriculum design had been enhanced.

## 2.2 Areas of concern about ITEd

The second part of the literature review focuses on exploring key areas of concern about ITEd, using both local and international studies, namely, the **Phase (I) Study and the UNESCO (United Nations Educational, Scientific, and Cultural Organisation) Study**, respectively.

In the Phase (I) Study, a comprehensive review of major frameworks, such as those developed by Lemke and Coughlin (1998), Newhouse (2002), and DEPICTS (cited in EDB, 2007a), was conducted. The seven interdependent dimensions of the Lemke and Coughlin (1998) framework were (1) Learners, (2) Learning environments, (3) Professional competency, (4) System capacity, (5) Community connections, (6) Technology capacity, and (7) Accountability.

Newhouse's study adopted a five-dimension framework, which included (1) Students, (2) Learning environments attributes, (3) Teacher professional ICT attributes, (4) School ICT capacity, and (5) School environment. In DEPICTS's framework, seven evaluation strands were designated to measure the impact of whole-school ICT. They were: (1) Leadership and vision, (2) Curriculum, (3) Teaching and learning, (4) Assessment, (5) Continuing professional development, (6) Resources, and (7) Pupil outcomes.

Other than these three frameworks, the standards for the educational use of technology (ISTE, 2007, 2008, and 2009), which were developed in the **United States**, were also reviewed.

The following were the five areas of the educational technology standards for teachers:

- Facilitate and Inspire Student Learning and Creativity;
- Design and Develop Digital Age Learning Experiences and Assessments;
- Model Digital Age Work and Learning;
- Promote and Model Digital Citizenship and Responsibility; and
- Engage in Professional Growth and Leadership.

The following were the six categories of the technological foundation standards for students:

- Creativity and Innovation;
- Communication and Collaboration;
- Research and Information Fluency;
- Critical Thinking, Problem Solving, and Decision Making;

- Digital Citizenship; and
- Technology Operations and Concepts.

The following were the five areas of the technological standards for school administrators:

- Visionary Leadership;
- Digital Age Learning Culture;
- Excellence in Professional Practice;
- Systemic Improvement; and
- Digital Citizenship.

From the above standards, some common areas of concern in the evaluation of ITEd implementation were observed. An attempt was made to distil evaluative areas from the areas of concern in the Phase (I) Study. Table 2.3 summarises and compares the areas of concern in the Phase (I) Study, the three frameworks, and the three technological standards stated above.

Apart from the areas of concern identified in Phase (I) Study, indicators in the UNESCO Study were also reviewed. **“Performance Indicators for ICT Use in the Asia-Pacific Region” was developed by UNESCO Bangkok in response to “challenges raised with regard to the role, value, and impact of ICT in Education”** (UNESCO, n.d.). The indicators were developed through a comprehensive review of ICT indicators and their corresponding questionnaires used in different countries, such as Australia, the Baltic States (Estonia, Latvia, and Lithuania), the Commonwealth of Independent States (CIS) countries, Canada, India, Indonesia, Japan, South Korea, Malaysia, New Zealand, Philippines, Slovenia, South Africa, Thailand, the United Kingdom, the United States, Uzbekistan, Vietnam, and some Western European countries.

The **UNESCO indicators were specially referred** to monitor the (1) Types of ICT resources available and their accessibility, (2) Extent and nature of professional development efforts, (3) Changes in teaching/learning practices, (4) Improvement in what is learned by students, and (5) Relationship between technology use and educational reforms, empowerment of teachers, changes in teaching and learning processes, and student learning (UNESCO, n.d.). These indicators were placed under the following five indicator components: (1) ICT-Based Policy and Strategy, (2) ICT Infrastructure and Access (including Enabling Environment, Internet Connectivity, Systems and Hardware), (3) Curriculum/Textbooks, (4) Teaching Professionals Use and Teaching, and (5) Student Use and Learning.

The review of the above studies paved the way for developing the conceptual framework of the Review Survey(s) and the following data analysis.

Table 2.3 Comparisons of areas of concern for evaluation of ITED in Phase (I) Study with other literatures

Areas of concern for the evaluation of ITED in Phase(I) Study		Framework for the United States (US) (Lemke & Coughlin, 1998)	Framework for Australia (Newhouse, 2002b)	Framework for the United Kingdom (UK) (DEPICTS, 2004)	Standards for US (ISTE, 2007, 2008 and 2009)	
Input dimension	1	Students' Perception of Learning with IT	Learners' Dimension	Students' Dimension (Students' ICT Competencies, Technology Literacy subsumed in Learning Environment Dimension)	Strand: Teaching and Learning	Technology operations and concepts for students
	2	Teachers' IT Competency as well as Teachers' & School Heads' Perception of ITED	Professional Competency Dimension	Teachers' ICT Attributes Dimension	Strand: Teaching and Learning	Engage in professional growth and leadership for teachers
	3	Community-wide Support & Parents' Involvement	Community Connections Dimension	School Environment Dimension	Strand: Resources	Systemic improvement for school administrators
Context dimension	4	School ITED Curriculum	School Curriculum Dimension	School Environment Dimension	Strand: Curriculum	Design and develop digital age learning experiences and assessments for teachers

<b>Areas of concern for the evaluation of ITeD in Phase(I) Study</b>		<b>Framework for US</b> (Lemke & Coughlin, 1998)	<b>Framework for Australia</b> (Newhouse, 2002b)	<b>Framework for UK</b> (DEPICTS, 2004)	<b>Standards for US</b> (ISTE, 2007, 2008 and 2009)	
<b>Context dimension</b>	5	School Professional Development in ITeD	System Capacity Dimension	Teachers' ICT Attributes Dimension	Strand: Professional Development	Excellence in professional practice for school administrators Engage in professional growth and leadership for teachers
	6	School Leadership	System Capacity Dimension	School Environment Dimension	Strand: Leadership and Vision	Visionary leadership for school administrators
	7	Digital Resources & Infrastructure	Technology Capacity Dimension	School ICT Capacity Dimension	Strand: Resources	Systemic improvement for school administrators
	8	School Technology-using Culture and ITeD Development	Technology Capacity Dimension	School ICT Capacity Dimension	Strand: Resources	Visionary leadership for school administrators Digital age learning culture for school administrators
<b>Process dimension</b>	9	Students' Learning Activities with IT	Learners' Dimension	School Environment Dimension	Strand: Teaching and Learning & Assessment	Communication and collaboration for students Research and information fluency for students Critical thinking, problem solving and decision making for students
	10	Teachers' Pedagogical Practices with IT	Learners' Dimension	School Environment Dimension	Strand: Teaching and Learning	Design and develop digital age learning experiences and assessments for teachers
<b>Outcome dimension</b>	11	Students' Learning Outcomes in Different Key Learning Areas (KLAs) and the Development of Information Literacy and Generic Skills	Accountability Dimension	Students' Learning, the Impact of ICT in Schools	Strand: Standards	Digital citizenship for teachers/students/school administrators

After the questionnaire was set and RS1 has been implemented, some national organisations, such as **European Commission, Joint Research Centre (JRC) and Inter-American Development Bank (IDB)**, have carried out studies on ICT use in education. Although different indicators were involved, they had some common themes.

To understand the current situation of ICT use in education, JRC conducted a research with the following aims: (1) improve the quality and effectiveness of education, (2) allow broader access to education, and (3) bring education to an international level (Scheuermann, 2009). Based on the aims to be obtained, the conceptual framework of the research included **six Domains** to be surveyed, which were (1) Policies, (2) Resources, (3) Curriculum, (4) Organisation, (5) Teaching, and (6) Learning. And the six Domains were further studied in three different levels – Macro, Meso and Micro as shown below in Table 2.4.

Table 2.4 Indicators used by JRC for Monitoring ICT Effects in Education for Policy-making

Domains	Indicators		
	Macro	Meso	Micro
Policies	National policies for ICT-implementation	eLearning strategies in school	Intentions of ICT uses in courses
Resources	ICT-penetration in education	Availability of LANs in school/class	Private access to ICT
Curriculum	Extent of curricula adaptation	ICT-related courses offered	Level of required for teaching/learning
Organisation	ICT in schools for organ. purposes	Use of CMS for class management	Internet-delivered Assignments
Teaching	ICT-implementation in school education	Pedagogical use of ICT in classroom	Teacher's use of ICT for teaching
Learning	Students' ICT-use	ICT-enhanced learning in class	ICT-related learning activities at home

To provide a standardized set of indicators to evaluate ICT use in education, IDB (Severin, 2010) has reviewed different measurements and has derived a set of indicators. They considered **ICT inputs in five aspects**: (1) Infrastructure: equipment, (2) Contents: curriculum content and supportive tools, (3) Human resources: teachers' training and community involvement, (4) Management: administration and review, and (5) Policy: budget, framework and overall planning, which well describe different dimensions that schools should consider when promoting ICT use in lessons.

## 2.3 Overseas studies on ITed

To better position the progress and achievement of ITed in Hong Kong, studies on student performance and ITed implementation in other countries were also reviewed. The following section is consisted of two parts, including the student performance in the Programme for International Student Assessment (PISA) in 2009-2010 and the next on the most recent ITed studies from selected countries. The common indicators and findings would be presented while their comparisons will be detailed in Chapter 5.

### 2.3.1 Student performance in the Programme for International Student Assessment (PISA) 2009-2010

**PISA has been** launched in 1997 by the **the Organisation for Economic Co-operation and Development (OECD)** to evaluate education systems worldwide by testing the skills and knowledge of 15-year-old students. It is an international study involving some 70 countries and economies to date, representing nine-tenth of world economy that the results denoted significance. The study is run with a randomly selected group of 15-year-olds taking tests in the key subjects: reading, mathematics and science every three years with different focus in each event. To provide more background information, the participant students and their school principals have to fill in additional relevant questionnaires on the students' family background and school operation.

With reference to **PISA 2009**, it was focused on students' reading skills with particular reference to a new option of digital reading skills. This was reported in the 6<sup>th</sup> volume of **PISA 2009: Students on Line: Digital Technologies and Performance** (OECD, 2011). The objective was to explore students' use and ability of learning with the use of information technologies, their relationships with students' family and school background, for example students' use, access and attitude to ICT both at home and school.

This report showed that secondary students of Hong Kong ranked fifth (515 score points) in the average digital reading score followed South Korea (568), New Zealand (537), Australia (537) and Japan (519) among the 19 countries and economies<sup>2</sup> participated in the digital reading assessment. As shown, the score of Hong Kong students was comparable to that of Japan as well as other European countries like Iceland, Sweden and Ireland.

Besides, the background survey of the 45 countries in the report revealed that Hong Kong students, comparatively, had the highest access to computer at home among Asian countries with 99.0% of students reported to possess at least one computer. Among all the 45 countries, Hong Kong ranked

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<sup>2</sup> In the descending order of the average score: South Korea, New Zealand, Australia, Japan, Hong Kong-China, Iceland, Sweden, Ireland, Belgium, Norway, France, Macao-China, Denmark, Spain, Hungary, Poland, Austria, Chile, Columbia.

10th while the OECD countries<sup>3</sup> averaged at 93.8%. Similar pattern was also observed in students' access to Internet at home. It was reported that 98.0% of students in Hong Kong had access to Internet at home, which topped in Asian countries and ranked ninth after some European countries. The OECD average for this was 88.7%. Regarding the student-to-computer ratio, Hong Kong ranked third in Asian countries (8.33 students to 1 computer) followed Japan (5.56:1) and South Korea (7.14:1) and ranked 14th in the whole survey with the OECD average ratio being 7.69 students to 1 computer. For the use of laptops in school, 7.4% of Hong Kong students reported having used laptops in school, ranked fifth in Asian countries following South Korea (20.1%), Singapore (17%), Thailand (13.1%) and Japan (12.1%). The OECD average was 18.5%. More information was shown in Table 2.5.

The data above suggested that Hong Kong was positioned in both the leading Asian countries and internationally in ICT as well as ITed. In the following, recent survey results from the European Union (EU), Australia, New Zealand, Japan and South Korea were collected and deployed to compare and reveal the current progress of ITed in Hong Kong.

Table 2.5 Common indicators and related findings of PISA 2009

Indicators	OECD average	Hong Kong	Top country
Digital reading assessment scores	499	515	568 (South Korea)
Home access to computer	93.8%	99.0%	99.9% (Netherlands)
Home access to Internet	88.7%	98.0%	99.1% (Netherlands)
Student-to-computer ratio	7.69:1	8.33:1	4.35:1 (Austria)
Reported use of laptops in school	18.5%	7.4%	73.5% (Norway)
Index of computer use at school <sup>4</sup>	0	0.13	0.74 (Norway)
Index of attitudes toward computers <sup>4</sup>	0	-0.07	0.43 (Portugal)
Index of self-confidence in ICT high-level tasks <sup>4,5</sup>	0	0.16	0.56 (Portugal)

In RS1, i.e. the interim report of this survey (EDB, 2010), the UK data in ITed were also shown and compared to the data collected in Hong Kong in 2010 to provide a more comprehensive comparison between these two educational systems to reveal the Hong Kong ITed position. The relevant studies are presented below.

**Harnessing Technology Review 2008** was a UK national survey conducted by the National Foundation of Educational Research (NFER) on behalf of the British Educational Communications and Technology Agency (Becta) in England. The survey was conducted in response to the British

<sup>3</sup> This average represented 34 OECD countries, mostly of European countries and also included Canada, Chile, Israel, Japan, South Korea, Mexico, New Zealand, Turkey, and the United States.

<sup>4</sup> The higher the index, the more positive the indexed item relative to the OECD average (which is set to 0).

<sup>5</sup> It is also noted that Hong Kong students ranked second in reporting "being able to create a multi-media presentation" and sixth in "being able to use a spreadsheet to plot a graph".

Government's publication of the strategy, *Harnessing Technology: Next Generation Learning 2009–14*. As stated in the report, the major aim of the survey was to “collect information that will assist Becta in assessing progress towards the aims and outcomes of the revised *Harnessing Technology* strategy and the *Children's Plan*, and to make future strategic decisions based on the latest developments in ICT related to schools” (Becta, 2008, p. 11).

With reference to the strategy, **five system outcomes were identified**: (1) Improved personalised learning experiences, (2) Confident system leadership and innovation, (3) Technology-confident and effective providers, (4) Engaged and empowered learners, and (5) Enabling infrastructure and processes. With respect to the five system outcomes, some **indicators** were used **to measure the impact of the strategy**, such as the availability of learning platforms, human and financial resources for ICT implementation, teachers' professional development, and ICT resources for teaching and learning.

To keep track on the progress, another review survey, ***Harnessing Technology Review 2009***, was done. As revealed, schools were better equipped with more efficient IT infrastructure, and teachers had used technology in their lessons more frequently.

A comparison of these results with RS1 (2010) showed that digital resources, such as school website, learning management platform and Intranet, were more commonly used in schools in Hong Kong. All schools in Hong Kong had school website and over 90% of schools in Hong Kong had their own Intranet. In terms of IT infrastructure, schools in Britain possessed more interactive whiteboards and computers than that in Hong Kong and Britain also had more schools with network speed higher than 1 Gbps. Hong Kong schools spent a larger proportion of school annual expenditure on IT (i.e., more than 10% for all sectors) than their Britain counterparts (i.e., less than 10% for all sectors). Information about IT plan of schools was covered in both Becta's Survey and RS1, and the situations were similar. More schools reported having an IT plan embedded within the whole-school improvement plan than those reported having a separate IT plan. The indicators also showed that the confidence and extent of using IT for these two educational systems were similar. (Table 2.6)



Table 2.6 Common indicators and related findings of Becta's Surveys (2008 & 2009) versus relevant findings selected from RS1 (2010)

Indicators	Primary School		Secondary School		Special School		
	Becta (2008)	RS1 (2010)	Becta (2008)	RS1 (2010)	Becta (2008)	RS1 (2010) (SpM)	RS1 (2010) (SpSp)
Number of interactive whiteboards in school for teachers and teaching support staff	9	2.68	28	1.44	9	2.36	3.13
Student to computer ratio	6.3	8.57:1	3.6	8.09:1	2.6	2.23:1	3.46:1
Schools having a network speed higher than 1Gbps	29%	N/A	8%	0.31%	11%	0.00%	0.00%
Schools having its own website	78%	100.00%	90%	100.00%	75%	100.00%	100.00%
Schools having its own Intranet	14%	93.00%	65%	99.38%	39%	100.00%	100.00%
Schools having learning platform	22% 40% <sup>6</sup>	85.42%	63% 79% <sup>6</sup>	94.44%	N/A	100.00%	66.67%
Annual expenditure on ICT (as percentage of school annual expenditure)	6%	12.23%	8%	11.26%	5%	13.54%	12.10%
School heads reporting 'High' priority for technology use to improve communication with parents	33% 21% <sup>6</sup>	72.55% <sup>7</sup>	48% 43% <sup>6</sup>	65.45% <sup>7</sup>	26%	75.00% <sup>7</sup>	66.67% <sup>7</sup>
Schools having an ICT strategy or plan embedded within the whole-school improvement plan	70%	60.64%	62%	52.78%	71%	57.14%	60.00%
Schools having a separated ICT strategy or plan	22%	28.57%	23%	32.10%	22%	28.57%	36.67%
Collaboration with other schools on curriculum and resource development	16% 26% <sup>6</sup>	48.40%	33% 48% <sup>6</sup>	50.00%	N/A	35.71%	63.33%
Teachers feel "quite" or "very" confident that they make best use of technology in lessons	88% <sup>6</sup>	82%	78% <sup>6</sup>	77%	N/A	70%	83%
Teachers use ICT resources in their lessons	86% <sup>6</sup>	88%	73% <sup>6</sup>	84%	N/A	66%	88%
Students using computers to write homework at least once a week	46% <sup>6</sup>	48%	83% <sup>6</sup>	51%	N/A	25%	11%
Students received e-safety advice from teachers	73%	86.88%	64%	89.78%	N/A	85.71%	53.33%

<sup>6</sup> Becta 2009

<sup>7</sup> This number indicates schools choosing "important" and "very important".

### 2.3.2 Recent ITed studies from selected countries

This section includes studies that would be referred and compared for the data collected in this study. Detailed comparisons would be the main subject in Chapter 5.

Different states in Australia have also implemented their own research on ICT use in schools. Some focus on the hard data while some focus on how teachers use ICT in teaching and learning. The **Digital Education Revolution in New South Wales (DER-NSW)** focuses on year 9 to 12 students (Howard & Carceller, 2010). This program aims at equipping all students with a specialized wireless laptop. To measure the effects brought about by using laptops, a 3-year project, from 2010 to 2012, has been carried out. This project measures teachers' use and attitude towards using ICT in learning and teaching, as well as students' perception on using ICT in different subjects by distributing self-response questionnaires to teachers and students. **The State of Victoria** conducts a **School Census** (Department of Education and Early Childhood Development, 2012) every year by providing the government schools with a platform to register all computers in school. The census shows that student to computer ratio is kept around 2:1 in recent years. To align with the global movement towards a 1:1 ratio of students to wireless-enabled computers, the Victorian Government also implemented "The Netbook Project" to lease a wireless-enabled computer equipped with more than 28 educational software programs for the participant family for AUS\$52 a year, the equivalent of AUS\$1 a week.

Table 2.7 Common indicators and related findings of survey in NSW, Australia

Common indicators identified	Data of NSW			
	Strongly Disagree	Disagree	Agree	Strongly Agree
Teachers feel confident that he/she can effectively use the laptop in his/her classes	7.6%	22.7%	48.1%	21.6%
Teachers have the necessary skills to use the laptops to his/her everyday teaching	6.0%	23.3%	44.3%	26.4%
Teachers have had the opportunity to participate in training where his/her learned to use the software on laptops	11.4%	22.1%	49.2%	17.2%
	<b>No</b>	<b>Yes</b>	<b>Don't know</b>	
Students have access to a computer at home	4.6%	95.4%	0.0%	
The home computer is connected to the Internet	5.5%	91.9%	2.6%	

Table 2.8 Common indicators and related findings of School Census 2012 (Victoria, Australia)

Common indicators identified	Data of Victoria	
	Primary	Secondary
Student to computer ratio	2.16:1	1.09:1

The **New Zealand ICT in Schools Report 2011** (2020 Communications Trust, 2011) was undertaken by the 2020 Communication Trust in co-operation with the Ministry of Education, and with the support of other government agencies and business partners. It was a comprehensive survey which included results of developments on school ICT infrastructure, use of networks, software, teaching applications, Internet access and usage, ICT planning and funding, e-Learning developments, professional development, and use of social software. A special focus of this report was on schools' readiness for ultra-fast broadband (UFB), given that the Government has prioritized school connections as part of its urban UFB and rural RBI (rural broadband initiative) rollouts. It was reported that by the end of 2012, 31% primary schools and 36% secondary schools would have UFB or RBI which provide them with at least 100 Mbps bandwidth. Some of the comparable data were extracted in the following table.

Table 2.9 Common indicators and related findings in 2020 Communications Trust (2011)

<b>Common indicators identified</b>	<b>Primary Schools</b>			<b>Secondary Schools</b>		
Gross student-to-computer ratio <sup>8</sup>	3			3		
Net student-to-computer ratio <sup>9</sup>	5			4		
Over half of the classrooms equipped with a data projector	56%			68%		
Over half of the classrooms equipped with an interactive whiteboard	34%			8%		
Over half of the students with computer access at home	74%			75%		
Over half of the students with Internet access at home	69%			72%		
Purchased or leased room-based video conferencing equipment	1%			45%		
Schools with learning management system	50%			78%		
Schools with 100Mb or higher bandwidth <sup>10</sup>	<b>Aug 2011</b>	<b>By Dec 2011</b>	<b>By Dec 2012</b>	<b>Aug 2011</b>	<b>By Dec 2011</b>	<b>By Dec 2012</b>
	9%	21%	31%	10%	23%	36%
Schools with wireless network	66%			39%		
Schools reported that staff use e-mail at least once a day	99%			99%		
Schools reported that staff use social software <sup>11</sup> at least once a month or more frequently for educational purposes	82%			90%		
Schools with ICT Strategic Plans	76%			80%		
Duration of ICT Strategic Plans	<b>1 year</b>	<b>2 years</b>	<b>3-5 years</b>	<b>1 years</b>	<b>2 years</b>	<b>3-5 years</b>
	52%	14%	32%	42%	31%	25%
Budget for ICT in Education (NZD) <sup>12</sup>	35,122.5			125,280		
Percentage of total operation grant spent on ICT	10.5%			11.6%		
Staff sharing good ICT practices at local/national level	<b>Local</b>		<b>National</b>	<b>Local</b>		<b>National</b>
	58%		14%	72%		37%

<sup>8</sup> Including all computers in the schools

<sup>9</sup> Excluding computers mainly used by teaching or administrative staff

<sup>10</sup> These figures counted ultra-fast broadband (UFB) and rural broadband initiative (RBI).

<sup>11</sup> Social software included blogs, wikis, RSS feeds, etc.

<sup>12</sup> These were calculated value from the range data from P.80 of the report.

Schools which allow students to bring their own mobile phones/laptops/netbooks/tablets	<b>Mobile</b>	<b>Laptop</b>	<b>Netbook</b>	<b>Tablet</b>	<b>Mobile</b>	<b>Laptop</b>	<b>Netbook</b>	<b>Tablet</b>
	47%	64%	36%	38%	77%	87%	68%	62%
Mobile phones/laptops/netbooks/tablets brought by students were subsequently used for educational purposes	<b>Mobile</b>	<b>Laptop</b>	<b>Netbook</b>	<b>Tablet</b>	<b>Mobile</b>	<b>Laptop</b>	<b>Netbook</b>	<b>Tablet</b>
	6%	85%	32%	23%	47%	97%	71%	56%
Frequency of computer or Internet use in curriculum areas for all school types				<b>“Often”</b>	<b>“Sometimes”</b>		<b>“Never”</b>	
	<b>English</b>			60%	37%		2%	
	<b>Mathematics</b>			59%	37%		2%	
	<b>Social Science</b>			29%	58%		10%	
	<b>Science</b>			25%	66%		6%	

To keep track of the development in ICT use in education, the **Korea Education and Research Information Service (KERIS)** publishes a white paper every year to summarise the situation of ICT in education as well as achievements of that year (KERIS, 2011). Table 2.10 shows the number of student per computer of different school sectors in South Korea. In addition, the South Korean Government has invested 45 billion won of the national budget in 2009 to implement the Internet network advancement project for all schools. As of March 2011, 70% of all schools were achieving Internet speeds of 100 Mbps or higher.

Table 2.10 Common indicators and related findings of KERIS’s white paper 2011

<b>Common Indicators identified</b>	<b>Elementary School</b>	<b>Secondary School</b>	<b>High School</b>	<b>Special School</b>
Student to computer ratio	4.5	5.0	3.7	1.5
Budget for ICT in Education (Million Won)	31	33	46	N/A
Percentage of school annual expenditure spent on ITed	5.33%	5.02%	4.05%	N/A
Budget for ICT in Education per Student	168,481	128,625	86,545	N/A

**Ministry of Education, Culture, Sports, Science and Technology Japan (MEXT)** has been conducting surveys annually on ICT use in education in order to assess ICT use environment at schools and implement policies on ICT in education. ICT use at schools has been widely carried forward with the supplementary budget since 2009 and new curriculum guidelines set in 2011. The following table presented the common indicators and findings from **Survey on digitization of education at school 2011 (MEXT, 2012)** comparable to findings in this study.

Table 2.11 Common indicators and related findings of Survey on Digitization of Education at School 2011

Common indicators identified		Primary School	Lower Secondary School	Upper Secondary School <sup>13</sup>	Special School	
Student-to-computer ratio		7.5	6.5	5.1	3.5	
Computer installment rates for teachers' daily managerial work		100.1%	97.8%	118.6%	94.4%	
Classroom with	Computer	36.1%	23.5%	23.6%	27.7%	
	Wifi	26.8%	26.2%	13.2%	15.8%	
No. of projectors and visualisers in	Classroom	0.28	0.11	0.11	0.07	
	Special room	0.11	0.11	0.12	0.10	
No. of portable computers <sup>14</sup> available for students use in classroom for each school		7.55	7.50	16.35	12	
No. of computers in	computer room	29.93	36.47	37.36	11.40	
	special room	0.22	0.21	0.91	0.23	
No. of tablets in school		0.77	0.43	1.36	1.26	
No. of electronic whiteboards in school		2.1	1.9	2.2	1.6	
Schools with homepage		86.4%	85.5%	99.0%	98.6%	
Schools with digital textbook		29.4%	17.3%	3.0%	6.9%	
Schools with e-systems		65.1%	65.8%	88.8%	82.2%	
Functions enabled by the above e-system	Administrative	84.7%	85.7%	79.8%	77.8%	
	Communication between staffs	88.4%	88.5%	84.9%	94.8%	
	Communication between schools and guardians	47.7%	44.9%	45.2%	46.7%	
	Facilities booking	37.4%	37.0%	34.0%	39.4%	
	Cloud computing	Public	3.0%	3.4%	1.3%	0.6%
		Private	24.0%	21.8%	28.0%	33.6%
Total		27.0%	25.3%	29.3%	34.2%	
Internet Bandwidth	< 1Mb	1.7%	1.5%	1.5%	1.4%	
	1 – 30Mb	26.9%	25.4%	32.1%	29.5%	
	≥ 30Mb	71.4%	73.1%	66.5%	69.1%	
Percentage of teachers confident in using IT for teaching		67.4%	60.8%	66.1%	60.8%	
Percentage of teachers participated in ICT training		26.5%	18.1%	16.9%	24.4%	

<sup>13</sup> Including both academic and vocational high schools

<sup>14</sup> Including tablets

The **European Survey of Schools: ICT and Education (ESSIE)** is one of a series within EU's cross-sector benchmarking activities comparing the national progress to the goals set by EU. It is the first Europe-wide survey (EU27 excluding UK and Netherlands but including Norway, Croatia and Turkey) of schools' ICT for six years, following Europe 2002 and EU2005 surveys. The focus of the study is on developing indicators, gathering and analysing data on students' use, competence, and attitudes to ICT. Teacher and school level factors will be investigated regarding their impact on students. The main areas of investigation are:

- Students' digital competence and attitudes towards ICT
- Students' ICT use in/out of classroom
- Teachers' professional ICT use in/out of classroom
- Teachers' attitudes towards pedagogical ICT use
- School infrastructure, connectivity and ICT access
- School leadership in ICT and ICT for pedagogy

Some related findings and possible common indicators for further comparisons are listed in Table 2.12. (European Commission Information Society and Media, 2011 quoted in Digital Agenda Scoreboard, 2012)<sup>15</sup>.

Table 2.12 Related findings and common indicators of European Survey of Schools: ICT and Education (ESSIE)

Common indicators identified	Average of ESSIE 2011			
	Primary	Lower Secondary	Upper Secondary Academic	Upper Secondary Vocational
Student to computer ratio <sup>16</sup>	7.14	5.26	4.76	3.23
Broadband coverage	90%	95%	96%	93%
Have a virtual learning environment (VLE) or learning platform	~33%	56%	61%	63%
School leaders and teaching staff regularly discuss the use of ICT for teaching and learning	~60%			
Have a written statement about the use of ICT specifically for teaching and learning exists	34-38%			
Have a policy which it enacts to use ICT for teaching and learning in specific subjects	45-56%			
Have a policy for responsible Internet behaviour	61-69%			
Have a policy to encourage teachers to cooperate and/or have time scheduled for such cooperation	47-57%			

<sup>15</sup> The final report of ESSIE was not published by the issue of this report but highlights were captured in the Digital Agenda Scoreboard 2012.

<sup>16</sup> Including both desktop and laptop/tablet for educational use

Teachers reported using computers and/or the Internet for class teaching in the last 12 months	86%	81%	84%	87%
Teachers reported using online material from established educational sources	75-89%			
Teachers reported using computers and/or the Internet in more than half of their lessons	13%	N/A	15%	31%
Teachers' confidence in their operational skills <sup>17</sup>	~3	~3	~3	3-3.5
Teachers' confidence in their social media skills <sup>17</sup>	2-2.5	2-2.5	2-2.5	~2.5
Students' confidence in operational skills <sup>17</sup>	N/A	2.63	2.88	2.78
Students' confidence in social media skills <sup>17</sup>	N/A	2.41	2.78	~2.5
Students' confidence in responsible Internet use <sup>17</sup>	N/A	2.58	2.93	2.75
Students' confidence in safe Internet use <sup>17</sup>	N/A	2.98	3.16	~3
Students reported using their mobile on a daily basis during lessons for learning	N/A	21%	27%	36%
Households with access to a computer	77%			
Households with access to the Internet	73%			

Based on the review of the above studies, certain common indicators of ITed, as listed in the tables in this section, were identified for future comparisons. The **common indicators**, such as ITed plan, IT facilities, student to computer ratio, Internet connectivity, and resources available for learning and teaching would be compared among Hong Kong and other countries, such as EU countries, states of Australia, Japan, New Zealand and South Korea. In addition, previous research results obtained, for example in the Phase (I) Study of Hong Kong will also be used for comparisons in the subsequent sections of this report.

## 2.4 Update of ITed in Asia and Pacific region countries

UNESCO has gathered relevant links about ITed for different Asia and Pacific region countries in its website: <http://www.unescobkk.org/fr/education/ict/countries/country-information/>. In this section, discussion will be focused on Asian/ Pacific countries, such as Japan, Korea, Singapore, and New Zealand.

To equip the citizens with IT knowledge in the era of the 21<sup>st</sup> Century with on-going technological development in IT dynamics, the **Japanese** Government has enlisted three aims to be achieved by IT education, which are **improving people's information literacy, reinforcing IT-driven education systems, and increasing number of people admitted to high education in IT-related fields** (IT

<sup>17</sup> These mean scores are on a scale from 1 to 4 with 1 being "not at all" and 4 being "a lot".

Strategy Council, 2000). To achieve the above listed goals, the Government proposed that Internet access should be provided in schools, and also in places outside schools such as libraries and community centres. Collaborations between schools both inside and outside Japan are encouraged. Besides, they also focus on the professional training for teachers, as well as training more IT technical experts.

**Korea** has adopted the concept of U-Learning, which allows students to learn based on his/her interest and at his/her convenience (KERIS, 2011). Therefore, they are also seeking ways to change schools to customize future students' needs. To achieve these, the Government focuses on 6 aspects to promote ICT in education, such as providing schools with a teaching-learning support system to enable teachers and students to gain access to more e-Learning materials, providing teachers with ICT training including an online training system and provision of computers/mobile learning devices, high speed Internet access, and recurrent maintenance of ICT infrastructure.

The **Singapore** Ministry of Education launched her first Masterplan for ICT in Education in 1997, and is now under the third Masterplan (2009-2014) (MOE, 2008). The current Masterplan emphasized four aspects: 1) strengthening integration of ICT into curriculum, assessment and pedagogy, 2) differentiated professional development, 3) improve the sharing of best practices and successful innovations, and 4) enhanced ICT provisions, with an aim to helping students meet society's needs in the future by enriching the learning environment.

As the demand for ICT skills is increasing in this era, to help students become capable of using ICT, the **New Zealand** Ministry of Education has launched different support programmes for schools (Ministry of Education New Zealand, 2008). The Ministry of Education proposed that expenditure for the costs on IT infrastructure, such as computers and software, as well as Internet access should be provided for schools. Besides, ICT professional development, for example, provision of technical assistance, including remote and onsite support, are provided to better integrate ICT into education for enhancing the effectiveness of ICT use in schools.

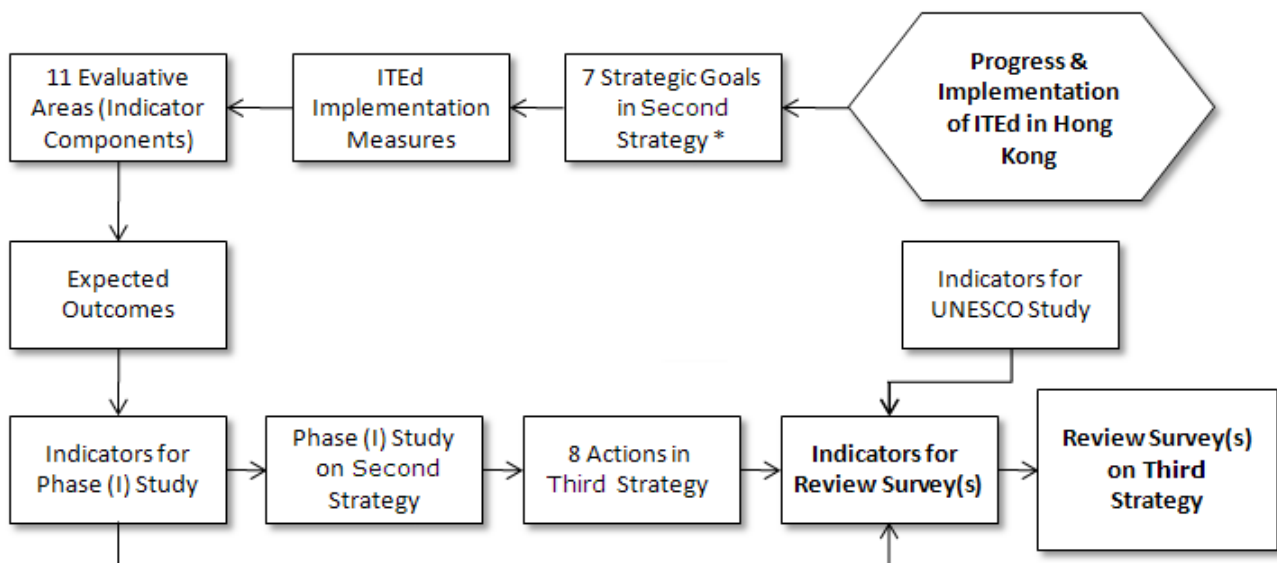
The above studies and reports disclosed world-wide ICT development in education and would thus help better position the progress of Hong Kong in ITed as well as determine the optimal future direction of our ITed development.



## 2.5 Conceptual frameworks of the Review Surveys

To advance ITed in Hong Kong, the Third Strategy (EDB, 2007b), along with its eight actions, was formulated. Figure 2 is a flow diagram showing the evolution of the Third Strategy, as described in Section 2.1. To track the progress of the Third Strategy, the framework developed for Phase (I) Study was used to guide the Review Survey(s) because the framework evolved from the Second Strategy. Indicators in the UNESCO study, a relevant international study described in Section 2.2, were also considered.

Figure 2 Development of Indicators for the Review Survey(s)



\* The Second Strategy on IT in Education: Empowering Learning and Teaching with IT (July 2004)

### 2.5.1 Development of the framework

Both the Second Strategy and the Third Strategy aimed at enhancing the effectiveness of learning and teaching with the use of IT; hence, the conceptual framework of Phase (I) Study, which was developed after reviewing conceptual frameworks across different studies (Table 2.3) to evaluate the Second Strategy, was adopted to track the progress of the Third Strategy. Given the well-developed framework of Phase (I) Study and the high reliability of its questionnaires [with Cronbach's Alpha reliability larger than 0.8 for most questionnaires (EMB, 2005, p. 36)], the eleven EVs of Phase (I) Study were used as bases for identifying major review areas and possible indicators for Review Survey(s). **Five indicator components from the UNESCO Study were also incorporated, as shown in Figure 2. The components were mapped and compared with the EVs to enrich the information to be obtained. By doing so, results from the current project can be compared, with higher reliability, with previous comparative surveys conducted within and outside Hong Kong, such as US and UK.**

Mappings and comparisons were conducted based on the similarities of the scope of the major areas reviewed and the indicators of both Phase (I) Study and UNESCO Study, including the contents of their respective questionnaire items. By comparing and re-mapping the various aspects/areas of concern of these two studies in light of the Third Strategy, the following seven review areas were identified for Review Survey(s): (1) IT facilities & accessibility, (2) resources, (3) IT deployment in schools, (4) IT deployment for learning and teaching, (5) students' awareness/competency in use of IT, (6) parental support, and (7) school expectations on ITed (Table 2.13).

Table 2.13 Comparisons of review areas with different studies

Phase (I) Study EVs			UNESCO Study (indicator components)	Review Survey(s) (review areas)
1.	Input dimension	i.	EV1 students' perception of learning with IT	
		ii.	EV2 teachers' IT competency as well as teachers' & school heads' perception of ITed	Teaching professionals use and teaching Resources IT deployment for learning and teaching
		iii.	EV3 community-wide support & parents' involvement	Student use and learning IT deployment in schools Parental support
2.	Context dimension	i.	EV4 school ITed curriculum	Curriculum/textbooks IT facilities & accessibility IT deployment in schools IT deployment for learning and teaching
				ii.
		iii.	EV6 school leadership	ICT-based policy and strategy Resources IT deployment in schools School expectations on ITed (technical support)
		iv.	EV7 digital resources & infrastructure	Curriculum/textbooks Resources IT facilities & accessibility IT deployment in schools IT deployment for learning and teaching School expectations on ITed (resources support)
				v.

3.	Process dimension	i.	EV9 students' learning activities with IT	Student use and learning ICT infrastructure and access: I. Enabling environment II. Internet connectivity III. Systems and hardware	IT facilities & accessibility IT deployment for learning and teaching Students' awareness/ competency in use of IT
		ii.	EV10 teachers' pedagogical practices with IT	Teaching professionals use and teaching ICT infrastructure and access: I. Enabling environment II. Internet connectivity III. Systems and hardware	IT deployment for learning and teaching
4.	Outcome dimension	i.	EV11 students' learning outcomes in different key learning areas and the development of information literacy and generic skills		Students' awareness/ competency in use of IT

### 2.5.2 Development of the indicators for the Review Survey(s)

With respect to the eleven EVs of Phase (I) Study, relevant indicators adopted from the Phase (I) Study and UNESCO Study were mapped, re-grouped, and modified as the construct map of the Review Survey(s) (Appendix 1). To match the construct map with the objectives of the current project, some indicators from the two studies above were excluded in view of some related actions of the Third Strategy and the seven identified review areas.

Thereafter, screening and further mapping of the possible/modified indicators derived from Phase (I) Study and UNESCO Study, along with the **eight actions of the Third Strategy**, against the seven review areas were conducted to draw the development of indicators for Review Survey(s) (Appendix 2) and to track the progress of the Third Strategy. For example, by combining 'Teachers'/therapists' perceived roles in ITed development' modified from Phase (I) Study and 'Organisational structure responsible for implementing the master plan' from the UNESCO Study, 'Human resources' (i.e., Identified indicator 2.1 in Appendix 2) was developed and grouped under the review area 'Resources'. **The final set of identified indicators for Review Survey(s) is shown in Table 2.14.**

Table 2.14 Identified indicators for Review Survey(s)

Review Survey(s)		Questionnaire Item No.	
Review areas	Identified indicators		
1. IT facilities & accessibility	<b>1.1 Student to computer ratio</b>	1.1.1 No. of computers in school a. total b. by no. of students	2a 2a /1b
		1.1.2 No. of computers in school for student use (excluding computers in staff rooms and general office) a. total b. by no. of students	2b 2b/1b
	<b>1.2 Availability of computers in school library for student use</b>	1.2.1 No. of computers in library for student use	2f
	<b>1.3 Availability of computers and digital projectors</b>	1.3.1 In all classrooms (excluding special rooms and laboratories)	2c
		1.3.2 In all special rooms <sup>18</sup> (including laboratories)	2d
	<b>1.4 Availability and type(s) of digital devices for learning purposes</b>	1.4.1 No. of digital projectors (mobile & non-mobile use)	2c+2d+2k
		1.4.2 No. of electronic whiteboards	2j
		1.4.3 No. of other digital devices	2l
	<b>1.5 Availability of Internet connection</b>	1.5.1 Wi-Fi connection	3h
		1.5.2 Bandwidth of Internet connectivity	4
	<b>1.6 Availability of computer room(s) for student use beyond school hours</b>	1.6.1 No. of opening hours of computer room(s) per week for student use beyond school hours	2g
		1.6.2 No. of computers in computer room(s) <sup>19</sup> for student use after school	2e
	<b>1.7 Students' utilisation of computer room(s) after school</b>	1.7.1 Average no. of students using computers in computer room(s) beyond school hours per day	2h
		1.7.2 Average no. of hours that each student uses computer in computer room(s)	2i

<sup>18</sup> Special rooms refer to those rooms mainly used for educational purposes. Each "Remedial Teaching Room" should be counted as one special room.

<sup>19</sup> E.g. MMLC (Multi-media Learning Centre), ITLC (IT Learning Centre), CL(Computer Laboratory)

Review Survey(s)			Questionnaire Item No.
Review areas	Identified indicators		
		beyond school hours per day	
2. Resources	<b>2.1 Human resources</b>	2.1.1 No. of staff members responsible for coordinating ITed development	2m
		2.1.2 No. of IT technical support services (TSS) staff members <sup>20</sup>	2n
		2.1.3 No. of ITed team members	2o
	<b>2.2 Financial resources</b>	2.2.1 Average <sup>21</sup> annual ITed expenditure <sup>22</sup>	
		a. total	2p
		b. as percentage of school annual expenditure <sup>23</sup>	2q
	<b>2.3 Availability of digital resources [including e-system(s)/mechanism(s)]</b>	2.3.1 Personalised spaces	
		a. School homepage	3a
b. Teacher homepage		3d	
c. Student homepage		3e	
	2.3.2 Interactive platforms		
a. Intranet	3b		
b. e-learning platform <sup>24</sup> /Learning management system (LMS)	3c		
c. Campus TV	3f		
d. Others	3g		
3. IT deployment in schools	<b>3.1 School-based ITed development plan</b>	3.1.1 Basic information	
		a. type	5a
		b. average duration	5b
		c. availability of evaluation mechanism(s)	5c

<sup>20</sup> Non-teaching staff employed for providing IT technical support

<sup>21</sup> With reference to the last 2 years' school records

<sup>22</sup> Including expenses on i) Employment of TSS personnel; ii) Internet connectivity & security services; iii) Digital resources for learning & teaching; iv) Replacement / upgrading of school's IT; v) Arrangement of maintenance services for school's IT facilities procured by Government funds; vi) Extension of opening hours for school's IT facilities; vii) Purchase of IT-related consumables; and viii) Other ITed-related items.

<sup>23</sup> Excluding teaching staff salaries

<sup>24</sup> E-Learning platform is a learning system developed on the environment of the Internet / Intranet which provides various learning tools such as learning materials available for download, assignment submission, on-line tests and learning records, etc.

Review Survey(s)		Questionnaire Item No.	
Review areas	Identified indicators		
	3.1.2 Consideration(s)/criterion(ia) for developing School-based ITed development plan	6	
3. IT deployment in schools (cont'd)	3.2 Availability & type(s) of mechanism(s)/measure(s) deployed	3.2.1 e-system(s)/mechanism(s) deployed to facilitate a. work flow b. communication c. other aspects	7a,b,d,e & f 7c 7g
		3.2.2 Measure(s)/scheme(s) deployed to a. enhance students' learning effectiveness b. promote students' information literacy c. bridge digital divide d. encourage parents' participation in ITed	8 9 2f to i & 10 17
	3.3 Information about school's ITed curriculum <sup>25</sup>	3.3.1 Mode of offer a. as a discrete subject b. integrated across different disciplines c. integrated into extra-curricular activities d. other modes	13a 9,13b & 15,8 <sup>th</sup> column 13c 13d
	3.4 Teachers' professional development on ITed	3.4.1 Type(s) of measure(s)/scheme(s) deployed	11
	3.5 Collaborative project(s)/activity(ies) organised by school	3.5.1 Type(s)	12

<sup>25</sup> "ITed curriculum" refers to the application of IT in learning and teaching of each Key Learning Area (KLA) (including Computer Studies / IT curriculum)

- a) to develop IT skills; and
- b) to foster the development of information literacy (information processing skills and attitude) and generic skills (collaboration skills, communication skills, creativity, critical thinking skills, problem solving skills, self-management skills, study skills, IT skills and numeracy skills).

Review Survey(s)			Questionnaire Item No.
Review areas	Identified indicators		
4. IT deployment for learning and teaching	<b>4.1 Teachers' confidence in using IT</b>	4.1.1 Percentage of confident/very confident teachers (per subject/KLA)	15, 2 <sup>nd</sup> column
	<b>4.2 Way(s) of using IT</b>	4.2.1 Use of emerging technology	15, 3 <sup>rd</sup> to 7 <sup>th</sup> columns
		4.2.2 Use of free-of-charge resources	
		4.2.3 Use of fee-charging resources a. on-line b. off-line	
		4.2.4 Assigning students to use IT to perform tasks beyond school hours	
<b>4.3 Extent of IT use</b>	4.3.1 Frequency in terms of descriptors	14	
5. Students' awareness/ competency in use of IT	<b>5.1 School heads' perception of students' level of competency</b>	5.1.1 In information literacy	16a to d
		5.1.2 In technical skills	16f to i
	<b>5.2 Proper use of IT</b>	5.2.1 Guideline(s)	9c, d & 16e
6. Parental support	<b>6.1 Provision of computers &amp; Internet access at home<sup>26</sup></b>	6.1.1 Computer access	10c,d,e,g & 18a
		6.1.2 Internet access	10e & 18b
	<b>6.2 Parents' participation</b>	6.2.1 Type(s) of activity(ies)	9b & 17
7. School expectations on ITEd	<b>7.1 Satisfaction with school current ITEd development</b>	7.1.1 Level of satisfaction	21
	<b>7.2 Professional support<sup>27</sup></b>	7.2.1 Theme(s) of ITEd professional development for teachers	22
		7.2.2 Type(s) of ITEd professional development for teachers	20 & 22
	<b>7.3 Technical support</b>	7.3.1 Type(s) of technical support needed	22
	<b>7.4 Resources support</b>	7.4.1 Type(s) of resources needed	19 & 22

<sup>26</sup> The figures refer to students (P1 to S6 / S7) studying full-time in public sector schools (i.e. primary, secondary and special), including DSS schools.

<sup>27</sup> E.g. sharpening teachers' IT pedagogical skills, facilitating school's implementation of ITEd, etc.

Unlike the previous studies on the first two ITed strategies, **it should be reiterated that the focus of this project** shifted from reviewing the practices of schools, teachers, and students, and the involvement of the community sector in ITed to **investigating the overall implementation of ITed in different school settings and collecting information on IT usage within schools.**

### 2.5.3 Development of the survey instruments for the Review Survey(s)

With Identified indicators, questionnaire survey instruments were also established to simplify the data collection process and to minimise school workload. Most of the Identified indicators were developed by combining or modifying relevant indicators adopted from Phase (I) Study and the UNESCO Study; hence, in the development of the survey instruments, references were made to the questionnaire items of these two studies. However, because the questionnaires adopted for Phase (I) Study were developed several years ago and the UNESCO Study was conducted outside Hong Kong, **modifications and updates had to be made** to ensure that the developed questionnaire items were applicable to schools and to Hong Kong's educational setting.

To strike a balance between data in-depth to be obtained and the length of the questionnaires, only essential question items were set for each indicator. Table 2.14 illustrates that information of interest could be obtained through corresponding questionnaire items under each Identified indicators. At the early stage of this study, the Discrepancy Evaluation Model (Provus, 1969) was planned for adoption in Review Survey(s). However, this model was not used because the self-evaluation items regarding different indicators and involving relevant stakeholders would lengthen the instrument. It would also result in an extra workload to school representatives, which could possibly lead to lower response rates. **The final version of the questionnaire contained 22 questions, including one open-ended question at the end to gather respondents' opinions on the questionnaire as a whole.**

To address differences in curriculum and IT facility needs across different school categories [i.e., primary, secondary, special (mainstream curriculum), and special (special curriculum) schools], the final version of the questionnaire was further refined. All four questionnaires (Appendices 11-14) were designed with the same core and some tailor-made items. Details of these modifications will be elaborated in the next chapter.

### 2.5.4 Modifications made on the survey instruments for Review Survey 2

To keep track of the changes of ITed in Hong Kong, necessary updates were required to better capture teachers' use of IT, for example, the use of the **Depository of Curriculum-based Learning and Teaching Resources** (<http://www.hkedcity.net/edb/teachingresources>) recently developed by



EDB for teachers' use. As denoted in the Literature Review, various professional development programmes, school on-site support, etc. have also been organised and provided for teachers to promote the use of the Depository. In view of this latest development, a column "have used the Depository of Curriculum-based Learning and Teaching Resources for learning / teaching *in the past month*" was added to Q15 of the questionnaire.

Besides, due to the difficulties experienced in RS1, the Research Team suggested that to capture more accurate responses, Q2p should be adjusted from an open-ended question to a multiple-choice one with ranges for options. The researchers also anticipated that if equal intervals were set for the ranges, this would tend to limit school's options as their expenditure on ITEd were somewhat quite similar. To better differentiate the figures, smaller ranges at unequal intervals were placed at: 0-200,000, 201,000-250,000, 251,000-300,000, 301,000-400,000, 401,000-600,000, 601,000-800,000 and >800,000.

## Chapter 3

### Methodology and survey designs

The project was conducted in three phases: the pilot study (PS), Review Survey 1 (RS1) and Review Survey 2 (RS2). In November 2009, PS was conducted to validate the survey instruments and logistic arrangements and to test the web-based questionnaire system. Comments from different school representatives and advisors were solicited to refine the survey instruments. The refined survey instruments were then used to collect data from all public sector schools in RS1 in January 2010. After RS1 was completed, the questionnaire was further amended for RS2 as described in Section 2.5.4, and data collection for RS2 started in February 2012.

#### 3.1 Sampling

Full enumeration was adopted in the study for all school sectors; hence, no sampling procedure was conducted. Invitations for the survey participation were distributed to all primary, secondary, and special public sector schools based on the school lists provided by the EDB. There were 490 primary, 462 secondary, and 60 special schools for RS1, and 482 primary, 463 secondary and 60 special schools for RS2.

The overall response rates, along with other descriptive statistics, for all of the four school sectors are reported in Appendices 3, 4, 5, and 6, respectively.

#### 3.2 Instrumentation - questionnaire surveys

##### (a) System deployed

The quantitative method by web-based questionnaire surveys was used for data collection in RS1 and RS2. A web-based approach was chosen because it enables the simultaneous processing of numerous questionnaires. In addition, there are no significant differences in the reliability of online surveys and traditional paper-based surveys, as shown in research reports (e.g., Kaplowitz, Hadlock, & Levine, 2004; Perkins, 2004). The web-based questionnaires were uploaded to the *Self-evaluation Platform on ITed for Schools* (SEP) developed by the EDB. The server was specially set up by the Project Team designated for processing the online questionnaires and data collection.

The SEP was chosen for this project because the design of the system incorporated various measures that facilitate the preparation and implementation of surveys, the monitoring of survey returns, and

the maintenance of data quality with minimum school disturbance. Technically, the SEP adopted a closed surveying strategy to prevent interference from unknown users and double entries from the same respondents. In this project, the SEP User Accounts and Survey Operation Guides for the respondents were prepared by the project team. The system allowed respondents to respond to the survey anywhere and anytime at their convenience. It also allowed respondents to save an incomplete survey questionnaire temporarily in case they had to collect further information to answer specific survey items or to engage in other urgent businesses.

Furthermore, respondents could immediately access the online help function of the SEP interface for any technical issues while they are answering online questionnaires. In this study, a hotline was also established during the survey period to help resolve problems encountered by respondents. To encourage respondents to give “true” responses to the questionnaire items, the survey data, as well as the identities of the respondents, were kept strictly confidential. Respondent identifications, such as school codes, were only used for tracking response rates and for follow-ups. With such measures, accurate response rates were easily calculated, and follow-up contacts to boost the response rates became feasible.

#### (b) Questionnaire design

As mentioned in Section 2.5.3, the length of the questionnaire was considered and only crucial questions were included with respect to the identified indicators (Table 2.14). The 22 questionnaire items were mainly in the forms of “single selection” (11), “multiple selection” (2), “closed-ended” (4), and “Likert scale” (4) questions. There was one open-ended question in the end (Question 22). Question 22 asked about respondents’ expectations of ITed development in their schools. The open-ended question was designed to allow respondents to express their opinions fully without limitations. It also helped shorten the length of the questionnaire by eliminating a list of possible options for such question.

To address the different needs and the curricular differences of the four different school categories, namely, primary schools (P), secondary schools (S), special schools adopting the mainstream curriculum (SpMain), and special schools with special curriculum (SpSp), the questionnaire was modified and turned into a set of four questionnaires with different subjects/KLAs listed under Questions 14 and 15. Details of the subjects/KLAs listed under Questions 14 and 15 for each school category are shown in Table 3. Other than the 22 questions that required the responses of either school heads or school representatives, subject/KLA panel members were also required to respond to Questions 14 and 15 (regarding their use of IT in learning and teaching). School representatives were required to answer Questions 14 and 15 after collating data from other KLA panel members.

Table 3 Subjects/KLAs of Questions 14 and 15

Question No.	Primary school	Secondary school	Special school (mainstream curriculum)	Special school (special curriculum)
14 & 15	<b>Table Heading: Subject/KLA</b>	<b>Table Heading: Subject/KLA</b>	<b>Table Heading: Subject/KLA</b>	<b>Table Heading: Subject/KLA/Area of Learning</b>
	• Chinese Language Education (including Putonghua)	• Chinese Language Education (including Putonghua)	• Chinese Language Education (including Putonghua)	• Language
	• English Language Education	• English Language Education	• English Language Education	
	• Mathematics Education	• Mathematics Education	• Mathematics Education	• Mathematics
	• General Studies [excluding Computer-related subject(s)]	• Science Education • Technology Education [excluding Computer-related subject(s)]	• General Studies/Science Education • Technology Education [excluding Computer-related subject(s)]	• General Studies
	• Computer-related Subject(s)	• Computer-related Subject(s)	• Computer-related Subject(s)	• Computer-related Subject(s)
		• Personal, Social & Humanities Education	• Personal, Social & Humanities Education	
	• Arts Education (including Visual Arts and Music)	• Arts Education (including Visual Arts and Music)	• Arts Education (including Visual Arts and Music)	• Arts Education (including Visual Arts and Music)
	• Physical Education	• Physical Education	• Physical Education	• Physical Education
		• Liberal Studies for Senior Secondary Levels	• Liberal Studies for Senior Secondary Levels (including Independent Living Skills)	• Liberal Studies for Senior Secondary Levels (including Independent Living Skills)
		• Practical Skills (including Life Skills Training)	• Practical Skills (including Life Skills Training)	
• Others (e.g. Library Period, Religious Studies, etc)	• Others (e.g. Library Period, Religious Studies, etc)_____]	• Others (e.g. Library Period, Religious Studies, etc)_____]	• Others (e.g. Library Period, Religious Studies, etc)	

### **3.3 Data collection**

RS1 was initially scheduled for implementation in early 2010. Invitation documents, including Invitation Letters from both the EDB and HKIEd, Reply Slips for collecting contact information of school representatives, and the following three appendices, were sent to all 1 012 schools.

- Appendix 1: Questionnaire (to facilitate collection of specific data prior to the on-line completion of the questionnaire);
- Appendix 2: Response Forms for Q14 and 15 in the questionnaire (separate form for each subject/KLA to facilitate collation of data by different subject/KLA panels or representatives); and
- Appendix 3: SEP Operation Guide (separate guide for each school with login account and password to provide step-by-step instructions for using the system).

RS2 was implemented on in early 2012 with similar implementation schedule for RS1.

### **3.4 Data cleaning**

System data cleaning and manual data cleaning were performed to detect and correct any corrupted and incorrect data input.

### **3.5 Data analysis**

This section introduces the methods of quantitative and qualitative data analyses used in this study.

#### **3.5.1 Analysis of quantitative data**

Quantitative data refer to the data collected from the questionnaire surveys. The statistical methods used are described in this section. The data collected from the questionnaire surveys were analysed by school sector [i.e., primary, secondary, and special (mainstream curriculum) and special (special curriculum)]. To address the research questions, questionnaire items were categorised into the following seven review areas according to the conceptual framework defined in this study:

1. IT facilities & accessibility
2. Resources
3. IT deployment in schools
4. IT deployment for learning and teaching
5. Students' awareness/competency in use of IT

6. Parental support
7. School expectations on ITEd

Different descriptive statistics were computed according to different question types. For closed-ended questions, the number of responses (n), means, standard deviations (SD), 25<sup>th</sup> percentiles, 75<sup>th</sup> percentiles, minimums, and maximums were computed; frequencies, number of responses (n), and percentages were computed for single-selection questions. Frequencies and percentages were computed for Question 15.

### **3.5.2 Analysis of qualitative data**

Textual responses (for Question 22) from the questionnaire surveys were collected. They were clustered into five main categories (i.e., Provision/subsidy of IT facilities and accessories, Financial support, Training/workshops, Provision of electronic resources, and Others). Data from each school sector were coded by two raters. A table showing the frequency of occurrence of each category was used to summarise the information gathered. Detailed results will be shown in Chapter 4.

### **3.6 Comparisons of findings with other studies**

To illustrate the progress and achievement of ITEd implementation in Hong Kong, data collected in the Review Surveys would be compared with the Phase (I) study and the latest overseas studies in Australia, New Zealand, South Korea, Japan and European countries listed in Section 2.3. Details are included in Chapter 5.

## Chapter 4

### Findings and analysis

#### Introduction

This chapter presents the results obtained from the Review Surveys to reveal some major developments and trends of ITed in Hong Kong between the school years from 2009/10 to 2011/12. The presentation will follow the seven Review Areas as mentioned in Chapter 2.5 for analysis and discussions. To streamline the presentation of the data sets, the more updated figures collected in the Review Survey in 2011/12 (RS2) will be reported while more significant results between the Review Survey conducted in 2009/10 (RS1) and RS2 will also be compared and analysed to show the changes and trends in these years. For easy reference, the figures for different school sectors are presented in the order of “primary school, secondary school, special (mainstream curriculum) school and special (special curriculum) school”. More significant statistical values and results will be indicated in brackets and bolded.

A total of 490 primary schools, 462 secondary schools, 18 special (mainstream curriculum) schools and 42 special (special curriculum) schools were invited to participate in RS1. Among the total numbers as mentioned, 343, 324, 14 and 30 submitted their responses respectively, yielding a response rate of 70.00%, 70.13%, 77.78% and 71.43% respectively.

Of the 482 primary schools, 463 secondary schools, 18 special (mainstream curriculum) schools and 42 special (special curriculum) schools invited to participate in RS2, 348, 337, 14 and 37 responded respectively, yielding a response rate of 72.20%, 72.79%, 77.78% and 88.10% respectively. The response rate for each sector was slightly higher than that of RS1 (+2.2%, +2.66%, ±0%, +16.67%). With the results obtained from the Review Surveys, the current situation of ITed in Hong Kong and also the changes took place between the three school years will be shown in the following.

#### 4.1 IT facilities and accessibility

Schools in Hong Kong always strive to provide students with a learning environment that is well-equipped with adequate and usable IT infrastructure. In response to the advancement of IT networking, **there was a significant increase in the average bandwidth of Internet connectivity for all school sectors.** The improvement in the Internet connectivity allowed students to utilize a wide-range of multi-media information and resources available on the Internet without barrier. **Also, schools reported having purchased more electronic devices, including some popular and emerging electronic devices (e.g. tablet computers).** **Apart from the purchase of some emerging electronic devices, a higher net student to computer ratio was found in most of the**

**school sectors; and the utilisation rate of the computer rooms has also increased.** This phenomenon could be explained by the shift on the type of IT infrastructure adopted by schools (i.e. more schools adopted tablet computers instead of traditional desktop computers).

#### **4.1.1 Student to computer ratio**

In RS2, the average numbers of all computers in each school (including desktop and notebook computers) were: primary 138, secondary 248, special (mainstream) 125 and special (special) 98. And the average numbers of computer for students' use were: primary 80, secondary 137, special (mainstream) 60 and special (special) 45. Comparisons between RS1 and RS2 showed **there was no significant change in the average number of computers in primary school while there was an increase in the special (special) school sector. However, there was a drop in the average number of computers in secondary and special (mainstream) school sectors. The decrease in the average number of computers for students' use in both sectors was slightly higher than the decrease in the average number of all computers. A greater drop in the average number of computers for students' use in the special (mainstream) school sector was observed (from 82 to 60). Due to the advancement of mobile technology and the wide-ranged interactive functions available on mobile digital devices (e.g. tablet, e-book readers), schools tend to adopt more mobile digital devices for student use in the classroom to replace the more traditional desktop computers. This tendency could be one of the explanations for the drop in the average number of computers for students' use in the secondary and special (mainstream) school sectors.**

The gross student to computer ratio, which was calculated by dividing the total number of computers in respondent schools by the total number of students in those schools were: primary 4.54:1, secondary 4.21:1, special (mainstream) 1.46:1 and special (special) 1.36:1. The net student to computer ratio, which was calculated similarly by dividing the number of computers for students' use in schools by the total number of students were: primary 8.71:1, secondary 8.87:1, special (special) 3.31:1 and special (special) 3.55:1. **Among all these ratios, only the gross student to computer ratio in primary school sector has dropped. As stated in the previous paragraph, there was no significant change in the total number of computers in the respondent primary schools. The decrease in the ratio was possibly caused by the drop in the total number of students enrolled in primary schools<sup>28</sup>. The slight increase in the net student to computer ratio of primary school was caused by the decrease of number of computers for student use. Similar to the situation in special (mainstream) school sector, it was possible that traditional desktop computers were substituted by some emerging mobile digital devices. Since the total number of mobile digital devices was not included in the calculation of the item "total number of computers", thus led to a decreasing trend in the number of computers for student use.**

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<sup>28</sup> The average number of students in the respondent primary schools dropped from 617 in RS1 to 592 in RS2 (-4%).



**There was an increase in the total number of computers in special (special) school sector. However, there was a greater increase in the total number of students in this school sector. As a result, the student to computer ratio in special (special) school sector has increased just as other school sectors. For secondary and special (mainstream) school sectors, the increase in the student to computer ratios was more significant than that of other sectors. Among all sectors, special (mainstream) schools had the most notable increase in the ratio, mainly due to the relatively immense drop in the total number of computers.**

#### **4.1.2 Availability of computers and digital projectors**

The average numbers of digital devices owned by different school sectors are listed in Table 4.1.

On average, in each primary school, there were 25 computers and 21 projectors installed in classrooms, whereas there were 33 computers and 6 projectors installed in special rooms. With the number of classrooms and special rooms reported, computer and projector to classroom ratios [1.13:1 and 0.99:1 respectively], and computer and projector to special room ratios [4.74:1 and 0.88:1 respectively] were calculated. **These ratios suggested that computers and projectors were installed in almost all classrooms and special rooms in most respondent primary schools; and there was no significant change in the ratios within these three years.** In addition, 87% of the respondent schools possessed mobile projectors which can be used in classrooms and special rooms without pre-installed projectors.

In each respondent secondary school, an average of 27 computers and 28 projectors were found in classrooms, and an average of 56 computers and 13 projectors were found in special rooms. Since there are more classrooms and special rooms in secondary schools, the numbers of computers and projectors owned were higher than those obtained from the primary sector. The computer and projector to classroom ratios [0.96:1 and 0.96:1], and computer and projector to special room ratios [3.87:1 and 0.92:1] were calculated. **These ratios suggested that most schools had at least one computer and one projector in each classroom and special room.** Of all the calculated ratios, there was a relatively greater drop in the computer to classroom ratio (**-0.27:1**) **while there was no significant difference in other ratios.** In this sector, 88% of schools possessed at least one mobile projector. Among schools with mobile projectors, the percentage of schools owned more than one mobile projector was 71%.

On average, each respondent special (mainstream) school had 14 computers and 12 projectors located in classrooms, and an average of 15 computers and 6 projectors in special rooms. The computer and projector to classroom ratios were 1.04:1 and 0.80:1, respectively, whereas the computer and projector to special room ratios were 2.25:1 and 0.74:1, respectively. **Data indicated that most schools had equipped their classrooms and special rooms with at least one**

**computer and one digital projector. However, a relatively great decrease in computer to special room ratio was observed (-0.46:1). The percentage of schools that were equipped with mobile projectors has increased from 86% in RS1 to 93% in RS2.**

In each special (special) school, 17 computers and 11 projectors were installed in classrooms, whereas 25 computers and 6 projectors were installed in special rooms. The computer and projector to classroom ratios were 1.35:1 and 0.85:1 respectively, suggesting that at least one computer was installed in each classroom and most of the classrooms were equipped with projectors. The computer and projector to special room ratios were 2.97:1 and 0.69:1 respectively. **There was an increase in both the computer and projector to classroom ratio; and the increase of the computer to special room ratio was relatively more significant (+0.94:1). The percentage of schools that were equipped with mobile projectors has dropped from 93% in RS1 to 81% in RS2.**

Table 4.1 Quantity of computers and projectors (RS2PE, RS2SE, RS2EME, RS2ESE Q2a, b, c, d, k)

IT facilities	Primary			Secondary			Special (Mainstream)			Special (Special)		
	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
<b>a.</b> No. of computers – Desktop	122.83	48.71	348	214.05	71.39	337	94.64	58.37	14	83.35	31.96	37
No. of computers – Notebook	15.06	25.13	348	34.39	33.23	337	30.43	33.44	14	14.27	14.65	37
<b>b.</b> No. of computers for student use – Desktop	72.76	34.90	348	127.76	50.81	337	43.86	16.15	14	40.41	24.83	37
No. of computers for student use – Notebook	6.89	18.00	348	8.87	19.35	337	15.57	34.24	14	4.68	5.68	37
<b>c.</b> No. of computers in all classrooms	24.57	14.57	348	27.47	18.92	337	14.14	9.65	14	16.89	14.32	37
No. of digital projectors in all classrooms	21.48	8.43	348	27.84	8.20	337	12.07	7.28	14	10.68	5.71	37
<b>d.</b> No. of computers in all special rooms and laboratories	32.98	36.78	348	56.42	66.95	337	14.57	16.53	14	25.24	17.49	37
No. of digital projectors in all special rooms and laboratories	6.46	3.58	348	13.05	5.65	337	5.55	4.60	14	5.86	3.67	37
<b>k.</b> No. of digital projectors for mobile use	1.75	1.93	348	2.12	1.98	337	2.00	1.57	14	1.27	1.02	37

### 4.1.3 Availability of Internet connectivity

All respondent schools had connected their computers to the Internet. The percentage of schools that had Internet connectivity of less than 25 Mb were: primary 21%, secondary 11%, special (mainstream) 43% and special (special) 51% (Table 4.2). The data suggested that schools in all sectors (especially primary and secondary school sectors) were adopting a higher bandwidth of Internet connectivity in their schools. The percentage of schools in primary and secondary sectors that had Internet connectivity of 25 Mb to 50 Mb has dropped while a higher percentage of schools reported having Internet connectivity of higher bandwidth (i.e. 50 Mb to over 100 Mb). The Internet connectivity of 100 Mb was most commonly used by schools in these two sectors (33% and 44% in primary and secondary school sectors respectively).

Moreover, an approximately 90% of the respondent schools had in-campus Wi-Fi connectivity (Table 4.3), however, the percentages were relatively lower in 2010 (except for the special (mainstream) school sector). In this study, respondents were asked only to state if they had Wi-Fi connectivity within school campus but not specifically for all classrooms.

Table 4.2 Distribution of Internet connectivity (RS2PE, RS2SE, RS2EME, RS2ESE Q4)

Internet connectivity	Primary		Secondary		Special (Mainstream)		Special (Special)	
	Count	Percentage	Count	Percentage	Count	Percentage	Count	Percentage
		(%)		(%)		(%)		(%)
<25Mb	73	20.98	37	10.98	6	42.86	19	51.35
25-<50Mb	112	32.18	92	27.30	3	21.43	11	29.73
50-<100Mb	41	11.78	51	15.13	1	7.14	0	0.00
100Mb	116	33.33	147	43.62	4	28.57	7	18.92
>100Mb	6	1.72	10	2.97	0	0.00	0	0.00

Table 4.3 Availability of Wi-Fi connectivity within campuses (RS2PE, RS2SE, RS2EME, RS2ESE Q3h)

Items	Primary			Secondary			Special (Mainstream)			Special (Special)		
	Count	Percentage		Count	Percentage		Count	Percentage		Count	Percentage	
		(%)	N		(%)	N		(%)	N		(%)	N
Wi-Fi connectivity	311	89.37	348	312	92.58	337	14	100	14	35	94.59	37

#### 4.1.4 Availability of computers in school libraries and computer rooms for students' use beyond school hours

**Most respondent schools provided computers for students to use in libraries and/or computer rooms beyond school hours.** About 89%, 97%, 79%, and 84% of the respondent primary, secondary, special (mainstream) and special (special) schools respectively had computers in their libraries, with 5, 9, 4 and 3 computers on average. Computer rooms were available in 91%, 95%, 71% and 68% of the respondent primary, secondary, special (mainstream) and special (special) schools respectively, with an average of 39, 48, 14, and 12 computers per room (Table 4.4). **The number of computers per computer room dropped in all school sectors (except for special (special) school sector). The number of students using computer rooms beyond school hours declined in primary and secondary school sectors while no significant change in numbers was observed in the two special school sectors.** The decline was possibly due to the fact that more students had computer and Internet access at home that they no longer needed to stay at school beyond school hours for accessing computers and the Internet. About 16, 23, 8 and 5 students spent around 0.7 hour, 1 hour, 0.7 hour and 0.5 hour in computer rooms after school every day respectively. **There was no significant change in the time spent on using the computer rooms in the past three years.**

The utilisation rates<sup>29</sup> of computer rooms beyond school hours were primary 31.72%, secondary 35.30%, special (mainstream) 46.15% and special (special) 44.66%. **The utilisation rates of computer rooms for all sectors increased; this phenomenon could be explained by the relatively greater decrease in the numbers of computers per computer room as well as the opening hours of the computer rooms. The utilisation rate of computer rooms was still below 50% for all school sectors.**

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<sup>29</sup> In RS1, the utilisation rate of computer rooms was calculated by  $\frac{5.5 \times Q2h \times Q2i}{Q2f \times Q2g}$ . After a careful review, it was concluded that a constant of "5"

instead of "5.5" in the formula would be more appropriate for calculating the utilization rate in a school context, yielding a new formula  $\frac{5 \times Q2h \times Q2i}{Q2f \times Q2g}$ .

The utilization rates of computer rooms in RS1 have been revised accordingly.

Table 4.4 Computers for student use in library and computer room(s) and students' use of computer room(s) beyond school hours (RS2PE, RS2SE, RS2EME, RS2ESE Q2e, f, g, h, i)

Computers in the following locations and students' use of computer room(s)	Primary			Secondary			Special (Mainstream)			Special (Special)		
	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
e. Library	4.94	6.96	348	8.87	10.31	337	3.71	3.85	14	2.73	3.00	37
f. Number of computer room(s)	1.14	0.79	348	1.35	0.85	337	0.93	0.73	14	1.05	1.51	37
Computer(s) available	38.99	20.39	348	47.84	25.66	337	13.71	10.78	14	11.51	10.80	37
g. No. of computer room opening hours per week	3.41	2.53	348	5.34	2.95	337	3.07	2.85	14	1.78	2.39	37
h. No. of students in computer room(s) beyond school hours per day	15.88	18.09	348	23.07	17.96	337	8.07	7.84	14	5.14	7.85	37
i. No. of hours that each student uses computers in computer room(s) beyond school hours per day	0.69	0.61	348	0.94	0.57	337	0.71	0.58	14	0.45	0.61	37

#### 4.1.5 Availability of digital devices for learning purposes

Aside from computers, some schools had other digital devices (e.g. tablet computers, visualizers). Table 4.5 shows the numbers of digital devices owned by respondent schools. **Schools in all sectors possessed more digital devices for learning purposes. It also explained the drop in the average number of computers in schools because some schools tended to adopt emerging technology as a substitution of some more traditional digital devices (e.g. desktop computers).**

Table 4.5 Quantity of other digital devices (RS2PE, RS2SE, RS2EME, RS2ESE Q2j, l)

IT facilities	Primary			Secondary			Special (Mainstream)			Special (Special)		
	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
j. No. of electronic whiteboards	4.67	8.84	348	2.17	6.58	337	4.86	8.38	14	4.70	5.70	37
l. No. of other digital devices	6.91	17.41	348	6.77	15.06	337	5.29	7.38	14	4.65	5.78	37

## 4.2 Resources

In this section, resources are categorised into human resources, financial resources and digital infrastructure to facilitate analysis. **Human resources allocated in implementing ITED development plans remained mostly unchanged.** The respondent schools had an average of about three teaching staff to coordinate and implement ITED development plans. There were about one to two TSS staff members to assist other staff members in using IT. In addition, the schools had about four to five ITED team members on average. **An average of about 10% to 13% of the total annual school expenditure was spent on ITED annually. These percentages were similar to those obtained in RS1 while the percentage of schools having an annual ITED expenditure of \$0 to \$200,000 (lowest expenditure group) had dropped.** Digital infrastructure, such as school homepage and Intranet, was widely available in schools. **Part of the respondent schools also adopted some innovative digital resources to facilitate learning and teaching such as the use of applications (Apps) on mobile devices or tablet PCs, virtual private network (VPN) and network drive.**

### 4.2.1 Human resources

Table 4.6 shows the average number of staff involved in ITED development. **On average, there was no significant change in the number of teachers and/or staff involved in ITED development (all changes were within the range of  $\pm 0.5$  staff).** In the respondent primary, secondary, special (mainstream) and special (special) schools, an average of 3, 3, 4 and 3 staff members were responsible for coordinating ITED development respectively. Their duties included IT infrastructure planning, ITED-related facility procurement, ITED development planning, and ITED curriculum design. There was also at least one IT technical support services (TSS) staff member in each school (except for two primary schools). On average, there were five ITED team members in every respondent primary, secondary and special (mainstream) school and four in every respondent special (special) school.

Table 4.6 Human resources for ITED development (RS2PE, RS2SE, RS2EME, RS2ESE Q2m, n, o)

Human resources	Primary			Secondary			Special (Mainstream)			Special (Special)		
	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
m. No. of teacher(s) responsible for coordinating ITED development	3.09	2.49	348	3.15	2.04	337	3.50	2.98	14	3.16	1.77	37
n. No. of IT technical support services (TSS) staff member(s)	1.67	0.87	348	2.29	2.23	337	1.21	0.43	14	1.27	0.61	37
o. No. of ITED team members	4.52	2.45	348	4.85	2.33	337	4.71	3.02	14	4.08	2.35	37

## 4.2.2 Financial resources

The annual ITed expenditure of schools was divided into seven expenditure ranges for further analysis (Table 4.7). **Most schools in all sectors (except for primary school sector) fell into a higher expenditure range whereas in primary school sector remained in the same expenditure range.** For secondary school sector, the expenditure range that the majority group fell into has increased from \$301,000-\$400,000 in RS1 to \$401,000-\$600,000 in RS2. For special (mainstream) schools, the expenditure range that the majority group fell into had risen from the bottom two ranges (i.e. \$0-\$200,000 and \$201,000-\$250,000) to \$251,000-\$300,000<sup>30</sup>. Furthermore, the expenditure range of the majority group in special (special) school sector had risen from the lowest range to two higher ranges<sup>31</sup>. The expenditure range that a majority of respondent primary schools remained as \$301,000-\$400,000, with an increase in the percentage from 22.51% in RS1 to 25% in RS2. In general, approximately half of the respondent schools in all sectors fell into the medium expenditure groups (i.e. \$251,000-\$300,000 and \$301,000-\$400,000).

**Furthermore, the percentage of schools with an expenditure that fell into the bottom expenditure group has decreased in all sectors, primary: from 17.5% to 9.77%, secondary: 10.93% to 7.12%, special (mainstream): from 28.57% to 7.14%, and special (special): from 30% to 21.62%. Except for the special (mainstream) schools, the percentage of schools with the expenditure on ITed that fell into the highest expenditure range dropped in all school sectors. Along with the analysis on the distribution of the lowest expenditure group, it was shown that the discrepancy between different schools' annual expenditure on ITed was narrowed.**

Compared to RS1, there was no significant difference observed in the percentage of school annual expenditure spent on ITed for all school sectors (except for special (mainstream) schools) (Table 4.7). The percentage remained as: primary 12-13%, secondary 11%, special (special) 8% while the percentage has dropped from 14% to 10% in special (mainstream) school sector.

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<sup>30</sup> In special (mainstream) school sector, the percentage of schools that fell into the bottom two expenditure ranges were the same.

<sup>31</sup> In special (special) school sector, the percentage of schools that fell into the second and third lowest expenditure ranges were the same.

Table 4.7 Financial resources for ITed development (RS2PE, RS2SE, RS2EME, RS2ESE Q2p, q)

Annual ITed expenditure	Primary			Secondary			Special (Mainstream)			Special (Special)		
	Count	Percentage (%)	N	Count	Percentage (%)	N	Count	Percentage (%)	N	Count	Percentage (%)	N
0-200,000	34	9.77	348	24	7.12	337	1	7.14	14	8	21.62	37
201,000-250,000	80	22.99	348	24	7.12	337	2	14.29	14	12	32.43	37
251,000-300,000	80	22.99	348	28	8.31	337	8	57.14	14	12	32.43	37
301,000-400,000	87	25	348	81	24.04	337	2	14.29	14	5	13.51	37
401,000-600,000	45	12.93	348	102	30.27	337	1	7.14	14	0	0	37
601,000-800,000	16	4.6	348	59	17.51	337	0	0	14	0	0	37
>800,000	6	1.72	348	19	5.64	337	0	0	14	0	0	37
	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
Percentage of school annual expenditure	13.08	8.09	311	11.19	7.34	276	9.83	5.11	12	11.85	8.47	34

### 4.2.3 IT infrastructure

Different kinds of digital resources were available in schools, including homepage and Intranet. Table 4.8 shows that **school homepage, school Intranet and e-Learning Platforms/Learning Management Systems (LMS) were the most commonly used digital resources in the respondent schools. No significant change was observed in the availability of these digital resources. Also, the availability of students' and teachers' homepages dropped notably when compared to RS1.** Other digital resources, such as **forums, online learning materials, WiseNews, ftp and blogs, were also found in some of the schools. Results also showed that some of the respondent schools had employed some newly developed Apps on mobile phones or tablet computers for learning and teaching purposes.**

Table 4.8 Digital resources provided by schools (RS2PE, RS2SE, RS2EME, RS2ESE Q3a-g)

Items	Primary		Secondary		Special (Mainstream)		Special (Special)	
	Count	Percentage (%)	Count	Percentage (%)	Count	Percentage (%)	Count	Percentage (%)
		(N=348)		(N=337)		(N=348)		(N=337)
a. School homepage	348	100.00	337	100.00	14	100.00	37	100.00
b. School Intranet	329	94.54	333	98.81	13	92.86	37	100.00
c. e-Learning Platform/Learning Management System (LMS)	296	85.06	318	94.36	13	92.86	25	67.57
d. Teachers' homepage(s)	42	12.07	145	43.03	0	0.00	4	10.81
e. Students' homepage(s)	37	10.63	114	33.83	4	28.57	4	10.81
f. Campus TV	218	62.64	175	51.93	1	7.14	10	27.03
g. Others	74	21.26	112	33.23	4	28.57	13	35.14



### 4.3 IT deployment in schools

As revealed, **82%, 78%, 86% and 89% of the primary, secondary, special (mainstream) and special (special) schools had ITed development plans respectively.** Among the goals listed in the questionnaire, “to improve students’ learning outcomes” was the most important goal of the plans. Measures, such as facilitating communication among relevant stakeholders, were also adopted to facilitate workflow. **Schools also promoted Information Literacy (IL) and computer/IT skills.** Collaborative projects, such as training courses, seminars, workshops, and sharing sessions, were also organised for teachers and students.

#### 4.3.1 School-based ITed development plans

Table 4.9 shows the ITed development plans of schools in different school sectors. Results showed that **a majority of primary (82%), secondary (78%), special (mainstream) (86%) and special (special) (89%) schools had formulated ITed development plans.** Also, about one-fourth to one-third of the ITed plans were separated plans. Most of these plans lasted for one year [primary 61%, secondary 61%, special (mainstream) 100%, special (special) 73%].

Table 4.9 Basic information about school ITed development plan (RS2PE, RS2SE, RS2EME, RS2ESE Q5)

ITed development plan	Primary		Secondary		Special (Mainstream)		Special (Special)	
	Count	Percentage (%)	Count	Percentage (%)	Count	Percentage (%)	Count	Percentage (%)
Availability of ITed development plan	284	81.61 (N=348)	263	78.04 (N=337)	12	85.71 (N=14)	33	89.19 (N=37)
a. Formulated as a separate plan	85	29.93 (N=284)	103	39.16 (N=263)	3	25.00 (N=12)	11	33.33 (N=33)
b. 1 year	52	61.18 (N=85)	63	61.17 (N=103)	3	100.00 (N=3)	8	72.73 (N=11)
2 years	5	5.88 (N=85)	9	8.74 (N=103)	0	0.00 (N=3)	0	0.00 (N=11)
3 years	27	31.76 (N=85)	29	28.16 (N=103)	0	0.00 (N=3)	3	27.27 (N=11)
>3 years	1	1.18 (N=85)	2	1.94 (N=103)	0	0.00 (N=3)	0	0.00 (N=11)
c. Availability of evaluation mechanism(s)	241	84.86 (N=284)	198	75.29 (N=263)	10	83.33 (N=12)	24	72.73 (N=33)

Considerations and criteria for developing ITEd development plans were also included in the research questionnaire. **The two most important goals for primary schools were “to improve students’ learning outcomes” and “to foster students’ information literacy (IL)”** with mean scores of 4.56 (SD: 0.53) and 4.44 (SD: 0.57), respectively (Table 4.10a) [ratings ranged from “totally not important” (1) to “very important” (5)]. There was no significant change found in the past three years on the mean score of different goals, **indicating that the considerations and criteria that primary schools take into account while developing ITEd development plans did not change notably.**

Table 4.10a Importance of goals in formulating school ITEd development plan (RS2PE Q6)

Goals	Mean	SD	N
a. To improve students’ learning outcomes	4.56	0.53	284
k. To foster students’ information literacy (IL)	4.44	0.57	284
b. To enhance students’ understanding of subject content	4.38	0.56	284
d. To strengthen students’ initiative, independence and sense of responsibility in learning	4.25	0.59	284
e. To strengthen/develop students’ generic skills (e.g. analytical skills, creativity, and collaboration skills)	4.20	0.61	284
c. To provide suitable learning activities according to needs of individual students	4.15	0.61	284
j. To promote cross-subject/curricular collaboration activities for enhancing students’ learning	4.13	0.64	284
l. To promote learning through assessment	3.98	0.67	284
h. To improve communication and cooperation among school, parents and the community	3.70	0.72	284
g. To meet the expectations of the community	3.62	0.71	284
f. To meet the expectations of parents	3.49	0.72	284
i. To provide guidance/briefing sessions so as to prepare students for further studies/future careers	3.27	0.88	284
m. Others	2.64	1.60	25

**The two most important goals for secondary schools were “to improve students’ learning outcomes” [mean score: 4.47 (SD: 0.54)] and “to enhance students’ understanding of subject content” [mean score: 4.29 (SD: 0.58)] (Table 4.10b).** There was no significant change found between RS1 and RS2 on the mean score of different goals, indicating that **there was no significant change in secondary schools’ perspectives on the considerations and criteria in developing ITEd development plans.**

Table 4.10b Importance of goals in formulating school ITEd development plan (RS2SE Q6)

Goals	Mean	SD	N
a. To improve students' learning outcomes	4.47	0.54	263
b. To enhance students' understanding of subject content	4.29	0.58	263
k. To foster students' information literacy (IL)	4.20	0.62	263
e. To strengthen/develop students' generic skills (e.g. analytical skills, creativity, and collaboration skills)	4.14	0.64	263
d. To strengthen students' initiative, independence and sense of responsibility in learning	4.13	0.62	263
c. To provide suitable learning activities according to needs of individual students	4.01	0.62	263
j. To promote cross-subject/curricular collaboration activities for enhancing students' learning	3.99	0.70	263
l. To promote learning through assessment	3.97	0.65	263
h. To improve communication and cooperation among school, parents and the community	3.76	0.77	262
i. To provide guidance/briefing sessions so as to prepare students for further studies/future careers	3.71	0.72	262
g. To meet the expectations of the community	3.45	0.71	263
f. To meet the expectations of parents	3.36	0.72	263
m. Others	2.54	1.57	37

Among the 12 choices, **“to improve students' learning outcomes”** remained the most important criterion for special (mainstream) schools (Table 4.10c) [mean score 4.67 (SD: 0.45)]. As depicted, the second most important criterion in RS1 was “to provide suitable learning activities according to needs of individual students” and it has been replaced by “to enhance students' understanding of subject content” in RS2 [mean score: 4.42 (SD: 0.67)]. Also, there was significant increase in the mean score of “to meet the expectations of the community” and “to provide communication & cooperation among school, parents & the community”.

Table 4.10c Importance of goals in formulating school ITEd development plan (RS2EME Q6)

Goals	Mean	SD	N
a. To improve students' learning outcomes	4.67	0.449	12
b. To enhance students' understanding of subject content	4.42	0.67	12
c. To provide suitable learning activities according to needs of individual students	4.33	0.65	12
d. To strengthen students' initiative, independence and sense of responsibility in learning	4.33	0.65	12
k. To foster students' information literacy (IL)	4.25	0.75	12
e. To strengthen/develop students' generic skills (e.g. analytical skills, creativity, and collaboration skills)	4.08	0.67	12
j. To promote cross-subject/curricular collaboration activities for enhancing students' learning	4.08	0.67	12
h. To improve communication and cooperation among school, parents and the community	3.92	0.79	12
g. To meet the expectations of the community	3.92	0.79	12
i. To provide guidance/briefing sessions so as to prepare students for further studies/future careers	3.83	0.83	12
l. To promote learning through assessment	3.83	0.72	12
f. To meet the expectations of parents	3.58	0.90	12
m. Others	1.00	/	1

For special (special) school, as shown in Table 4.10d, the **two most important goals were “to improve students' learning outcomes” and “to provide suitable learning activities according to needs of individual students”**. The mean score was 4.58 (SD: 0.56) and 4.36 (SD: 0.55) respectively. There was no significant change on the mean score of different goals, **indicating that there was no significant change in special (special) schools' perspectives on the considerations and criteria in developing ITEd development plans.**

Table 4.10d Importance of goals in formulating school ITed development plan (RS2ESE Q6)

Goals	Mean	SD	N
a. To improve students' learning outcomes	4.58	0.56	33
c. To provide suitable learning activities according to needs of individual students	4.36	0.55	33
l. To promote learning through assessment	4.30	0.47	33
b. To enhance students' understanding of subject content	4.30	0.64	33
d. To strengthen students' initiative, independence and sense of responsibility in learning	4.24	0.61	33
j. To promote cross-subject/curricular collaboration activities for enhancing students' learning	4.09	0.58	33
e. To strengthen/develop students' generic skills (e.g. analytical skills, creativity, & collaboration skills)	4.00	0.66	33
k. To foster students' information literacy (IL)	4.00	0.66	33
h. To improve communication & cooperation among school, parents & the community	3.88	0.55	33
f. To meet the expectations of parents	3.58	0.71	33
g. To meet the expectations of the community	3.48	0.62	33
i. To provide guidance/briefing sessions so as to prepare students for further studies/future careers	3.39	0.86	33
m. Others	3.00	1.73	3

#### 4.3.2 Availability and types of mechanisms/measures deployed

To facilitate daily administrative work, different kinds of e-systems/mechanisms were employed by primary schools. **As revealed, e-systems/mechanisms were most commonly used to facilitate communication among relevant stakeholders (81%) and to manage ITed-related resources (78%) in primary school sector.** There was no significant difference on the percentages observed between RS1 and RS2. **Also, the percentage of primary schools using IT to “manage students' learning records including other learning experiences” increased remarkably from 25% in RS1 to 35% in RS2 (+10%).** Table 4.11a shows the percentage of primary schools using IT in different aspects, as well as the e-systems/mechanisms used.

Table 4.11a Percentage of schools using IT to facilitate workflow and e-system(s)/mechanism(s) used (RS2PE Q7)

Area(s)	Percentage		e-system(s)/mechanism(s) used
	Count	(%)	
	(N=348)		
c. To facilitate communication amongst relevant stakeholders	281	80.75	e-mail, SMS, Intranet, LMS
d. To manage ITEd-related resources	272	78.16	Intranet, LMS , server
a. To capture students' attendance	206	59.20	Smart card, LMS
b. To handle cash transactions	136	39.08	LMS , PPS
e. To manage booking of ITEd-related resources	127	36.49	LMS , other system
f. To manage students' learning records including other learning experiences	121	34.77	LMS , Intranet, other system
g. Others	10	9.43 (N=106)	library system, electronic notice

Similar to the primary school sector, e-systems/mechanisms were most commonly used by secondary schools to facilitate communication among relevant stakeholders (89%) and to manage ITEd-related resources (85%). Using open sources, some schools had also developed their own e-systems/mechanisms to handle administrative work. Also, the percentage of secondary schools using IT to “manage students’ learning records including other learning experiences” increased notably from 70% in RS1 to 80% in RS2 (+10%). Table 4.11b shows the percentage of schools using IT in different aspects, as well as the e-systems/mechanisms deployed.

Table 4.11b Percentage of schools using IT to facilitate workflow and e-system(s)/mechanism(s) used (RS2SE Q7)

Areas	Percentage		e-system(s)/mechanism(s) used
	Count	(%)	
	(N=337)		
c. To facilitate communication amongst relevant stakeholders	299	88.72	e-mail, SMS, LMS
d. To manage ITEd-related resources	286	84.87	Intranet, LMS , server
f. To manage students' learning records including other learning experiences	271	80.42	LMS , other self-developed system
e. To manage booking of ITEd-related resources	221	65.58	LMS , Intranet
a. To capture students' attendance	210	62.31	LMS
b. To handle cash transactions	152	45.10	LMS , PPS
g. Others	23	19.33 (N=119)	Multiple choice marking system, discipline record system

For **special (mainstream) schools**, IT was most commonly used for managing ITEd-related resources (86%). There was no significant change noted. **Percentage of special (mainstream) schools that adopted IT in managing students' learning records increased from 50% to 64%**; and it has become the second most common area that IT was used in. Moreover, the percentage of schools that employed IT in facilitating communications amongst relevant stakeholders has dropped from 71% to 57% in RS2 (-14%), while the percentage of schools that adopted IT to capture students' attendance has increased from 29% to 43%. Table 4.11c shows the percentage of special (mainstream) schools using IT in different aspects, as well as the e-systems/mechanisms deployed.

Table 4.11c Percentage of school using IT to facilitate workflow and e-system(s)/mechanism(s) used (RS2EME Q7)

Area(s)	Percentage		e-system(s)/mechanism(s) used
	Count	(%) (N=14)	
c. To facilitate communication amongst relevant stakeholders	12	85.71	Intranet, LMS
f. To manage students' learning records including other learning experiences	9	64.29	LMS, Intranet
d. To manage ITEd-related resources	8	57.14	e-mail, Intranet, SMS
a. To capture students' attendance	6	42.86	Smart card, LMS
e. To manage booking of ITEd-related resources	4	28.57	Intranet
b. To handle cash transactions	1	7.14	/
g. Others	1	20.00 (N=5)	/

The respondent **special (special) schools** used IT to help manage ITEd-related resources most frequently (95%). Approximately 90% of the respondent schools also employed IT in facilitating communication amongst relevant stakeholders as well as to manage students' learning records. As revealed, the most commonly used systems/mechanisms were **Intranet and LMS**. Table 4.11d shows the percentage of special (special) schools using IT in different aspects, as well as the e-systems/mechanisms deployed.

Table 4.11d Percentage of school using IT to facilitate workflow and e-system(s)/mechanism(s) used (RS2ESE Q7)

Area(s)	Percentage		e-system(s)/mechanism(s) used
	Count	(%)	
	(N=37)		
d. To manage ITEd-related resources	35	94.59	Intranet, server
c. To facilitate communication amongst relevant stakeholders	33	89.19	e-mail, LMS, Intranet
f. To manage students' learning records including other learning experiences	33	89.19	Intranet, LMS, self-developed system
e. To manage booking of ITEd-related resources	14	37.84	Intranet
a. To capture students' attendance	13	35.14	Smart card, LMS, self-developed system
b. To handle cash transactions	3	8.11	Self-developed system
g. Others	2	22.22 (N=9)	Teacher development system

Schools deployed different types of measures/schemes to enhance students' learning effectiveness. **A large proportion of the respondent primary schools offered free-of-charge learning resources (95%), requested teachers to include IT elements in subject-/KLA-based plan(s) (94%) and learning activity(ies) (91%).** Free-of-charge learning resources were mainly provided by publishers, HKEdCity or developed by teachers. On the other hand, fee-charging resources were used by half of the schools (59%), and such resources were mainly related to core subjects, such as Chinese, English, and Mathematics. **Around 80% of these schools provided students with on-line exercises and tests. A majority of the schools (84%) provided means, including e-mail, Intranet, e-Learning platform, forum and blog, for teachers and students to communicate.** The percentage of schools that required students to submit assignments on-line has dropped from 76% to 70% in RS2; the percentage change of this item was relatively more notable than all other items in this section. Table 4.12a shows the percentage of schools using IT to enhance students' learning effectiveness.



Table 4.12a School's use of IT to enhance students' learning effectiveness (primary) (RS2PE Q8)

Measure(s)/scheme(s)	Count	Percentage (%) (N=348)
a. Provision of free-of-charge learning resources	331	95.11
e. Teachers are requested to include IT elements in subject-/KLA-based plans as appropriate	326	93.68
f. Teachers are requested to include IT elements in learning activities	317	91.09
d. Provision of communication platform/tool(s) to enhance interaction among students and teachers	293	84.20
c. Provision of on-line exercise(s)/test database of item bank	271	77.87
g. Students are requested to submit assignment(s) via on-line means	241	69.25
b. Provision of off-line or on-line fee-charging resources	206	59.20
h. Others	12	12.24 (N=98)

**Consistency was maintained that almost all respondent secondary schools provided communication platforms/tools to enhance interactions among students and teachers (92%) and requested students to submit assignments via on-line means (92%).** There was no significant change in the percentages obtained. E-mail, LMS, and forum were commonly used as communication platforms/tools. In addition, around 80% of the secondary schools provided on-line exercises/test (84%) and free-of-charge learning resources (82%); these resources were mainly secured from publishers or HKEdCity. **The percentage of secondary schools that provided off-line or on-line fee charging resources has dropped notably from 65% to 56% in the past three years.** As reported, resources adopted were mainly related to the learning and teaching of Chinese, English, and Liberal Studies. Table 4.12b shows the percentage of schools that have adopted these measures/schemes.

Table 4.12b School's use of IT to enhance students' learning effectiveness (secondary) (RS2SE Q8)

Measure(s)/scheme(s)	Count	Percentage (%) (N=337)
d. Provision of communication platform/tool(s) to enhance interaction among students and teachers	310	91.99
g. Students are requested to submit assignment(s) via on-line means	309	91.69
e. Teachers are requested to include IT elements in subject-/KLA-based plans as appropriate	287	85.16
c. Provision of on-line exercise/test database of item bank	283	83.98
a. Provision of free-of-charge learning resources	278	82.49
f. Teachers are requested to include IT elements in learning activities	267	79.23
b. Provision of off-line or on-line fee-charging resources	188	55.79
h. Others	13	11.82 (N=110)

**The percentage of school that provided free-of-charge and fee-charging learning resources has increased for the special (mainstream) sector.** The percentage of school that provided free-of-charge resources and fee-charging has increased from 64% in RS1 to 79% in RS2 and 21% to 50% respectively. 64% of the respondent schools requested their teachers to include IT elements in learning activities. **However, there was a decrease in the percentage of all other items, especially for the item of “provision of communication platform/tool(s) to enhance interaction among students and teachers”.** One possible explanation for this phenomenon is that the total number of students in special schools is far lower than that in mainstream schools (i.e. primary and secondary schools), therefore, face-to-face interaction is more feasible and is considered a better means of communication for students and teachers. Table 4.12c shows the percentage of schools adopting certain measures/schemes.

Table 4.12c School’s use of IT to enhance students’ learning effectiveness (SpM) (RS2EME Q8)

Measure(s)/scheme(s)	Count	Percentage
		(%) (N=14)
a. Provision of free-of-charge learning resources	11	78.57
d. Provision of communication platform/tool(s) to enhance interaction among students and teachers/therapists	10	71.43
e. Teachers are requested to include IT elements in subject-/KLA-based plans as appropriate	10	71.43
f. Teachers are requested to include IT elements in learning activities	9	64.29
g. Students are requested to submit assignment(s) via on-line means	7	50.00
b. Provision of off-line or on-line fee-charging resources	7	50.00
c. Provision of on-line exercise(s)/test database of item bank	5	35.71
h. Others	0	0.00 (N=5)

**Among the respondent special (special) schools, almost all of them (97.3%) requested their teachers to include IT elements in subject-/KLA-based plans;** and the percentage increased by 7.3%. Also, over 90% of the schools provided free-of-charge learning resources. No significant difference was found on other items (Table 4.12d).

Table 4.12d School's use of IT to enhance students' learning effectiveness (SpSp) (RS2ESE Q8)

Measure(s)/scheme(s)	Count	Percentage (%) (N=37)
e. Teachers are requested to include IT elements in subject-/KLA-based plans as appropriate	36	97.30
a. Provision of free-of-charge learning resources	34	91.89
f. Teachers are requested to include IT elements in learning activities	32	86.49
d. Provision of communication platform/tools to enhance interaction among students and teachers	17	45.95
c. Provision of on-line exercise/test database of item bank	12	32.43
g. Students are requested to submit assignment(s) via on-line means	12	32.43
b. Provision of off-line or on-line fee-charging resources	3	8.11
h. Others	0	0.00 (N=9)

As shown in Table 4.13, schools also deployed measures or schemes to help needy students. Encouraging students to join the “Computer Recycling Programme” of the EDB was the most popular measure to help needy students among all school sectors (82%, 71%, 71% and 65% respectively). However, the percentage of schools that adopted this measure was generally declining due to a replacement Government policy that an alternative support programme called “i Learn at home” has been launched by the Office of the Government Chief Information Officer (OGCIO) to help eligible families acquire affordable computing facilities and Internet access services. This support programme has provided various services to approximately 48 000 families since 2011. Correspondingly, a significant increase was noted in the percentages of schools that encouraged needy students to apply for computers from other organisations [primary school 52%, 78% (+26%), secondary school 51%,70% (+19%), special (mainstream) 57%,71% (+14%), special (special) 53%,81% (+28%)].

Table 4.13 Measure(s)/scheme(s) deployed by schools to help needy students (RS2PE, RS2SE, RS2EME, RS2 ESE Q10)

Measure(s)/scheme(s)	Primary		Secondary		Special (Mainstream)		Special (Special)	
	Count	Percentage (%) (N=348)	Count	Percentage (%) (N=336)	Count	Percentage (%) (N=14)	Count	Percentage (%) (N=37)
c. Needy students are encouraged to apply to join EDB Computer Recycling Programme	285	81.90	239	71.13	10	71.43	24	64.86
d. Needy students are encouraged to apply for computers from other organisations	271	77.87	236	70.24	10	71.43	30	81.08
a. Computers/facilities [excluding those in computer room(s)] available at school for student use beyond school hours	187	53.74	230	68.45	10	71.43	18	48.65
f. Call for donation of /recycled computers from students/parents	58	16.67	70	20.83	3	21.43	6	16.22
e. Financial support given to disadvantaged students for Internet access at home	50	14.37	65	19.35	1	7.14	4	10.81
b. Portable computers are on loan to needy students for use at home	12	3.45	80	23.81	7	50.00	3	8.11
g. Others	17	17.71 (N=96)	9	8.11 (N=111)	0	0.00 (N=6)	1	11.11 (N=9)

To guide students in using IT properly, all school sectors deployed various types of measures/schemes to promote students' information literacy (IL). **For primary school sector, 96% of the respondent schools integrated IL into the Computer/IT curriculum;** and over 80% of the schools provided guidelines on use of IT for students and teachers. Seminars or courses were also provided for students to enhance their IL. However, the percentage of schools that provided seminars or courses for parents to help their child(ren) develop their IL dropped from 77% in RS1 to 66% in RS2. Table 4.14a shows the measures/schemes deployed.

Table 4.14a Measure(s)/scheme(s) deployed by schools to promote students' IL (RS2PE Q9)

Measure(s)/scheme(s)	Count	Percentage (%) (N=348)
g. IL is integrated into the Computer/IT curriculum	335	96.26
a. Seminar(s)/course(s) for students to enhance their IL	294	84.48
d. Provision of guidelines on use of IT for students	291	83.62
c. Provision of guidelines on use of IT for teachers	290	83.33
e. IL is instilled in students through teaching activities of different subjects	276	79.31
b. Seminar(s)/course(s) for parents to help their child(ren) develop their IL	230	66.09
f. IL is being taught as an independent subject	91	26.15
h. Others	12	12.90 (N=93)

**Almost all secondary schools (98%) had integrated IL into the Computer/IT curriculum**, and most of the schools provided guidelines on IT use for teachers (82%) and students (87%). However, the percentage of schools that provided seminars or courses for parents dropped from 64% to 51%. Other measures/schemes were also adopted by some schools. No significant change was observed in the percentage obtained. Table 4.14b shows the measures/schemes deployed.

Table 4.14b Measure(s)/scheme(s) deployed by schools to promote students' IL (RS2SE Q9)

Measure(s)/scheme(s)	Count	Percentage (%) (N=337)
g. IL is integrated into the Computer/IT curriculum	329	97.63
d. Provision of guidelines on use of IT for students	293	86.94
c. Provision of guidelines on use of IT for teachers	279	82.79
e. IL is instilled in students through teaching activities of different subjects	247	73.29
a. Seminar(s)/course(s) for students to enhance their IL	232	69.05(N=336)
b. Seminar(s)/course(s) for parents to help their child(ren) develop their IL	171	50.89(N=336)
f. IL is being taught as an independent subject	77	22.92(N=336)
h. Others	4	4.08 (N=98)

**Over 80% of the special (mainstream) schools reported integrating IL into the Computer/IT curriculum; however, the percentage was lower than that of RS1 [100%, 86% (-14%)].** Also, over 70% of the respondent schools provided teachers and students with guidelines on IT use; and instilled IL in students through teaching activities of different subjects. The percentage of schools that provided seminars or courses for students increased from 64% in RS1 to 79% in RS2 (15%). Table 4.14c shows the measures/schemes deployed by schools.

Table 4.14c Measure(s)/scheme(s) deployed by schools to promote students' IL (RS2EME Q9)

Measure(s)/scheme(s)	Count	Percentage (%) (N=14)
g. IL is integrated into the Computer/IT curriculum	12	85.71
c. Provision of guidelines on use of IT for teachers	12	85.71
a. Seminar(s)/course(s) for students to enhance their IL	11	78.57
e. IL is instilled in students through teaching activities of different subjects	10	71.43
d. Provision of guidelines on use of IT for students	10	71.43
b. Seminar(s)/course(s) for parents to help their child(ren) develop their IL	7	50.00
f. IL is being taught as an independent subject	4	28.57
h. Others	0	0.00 (N=5)

**Most special (special) schools continued to integrate IL into the Computer/IT curriculum (89%).** Also, the percentage of schools that provided students with seminars or courses to enhance their IL increased from 47% to 54% while no significant difference was identified in all other measures/schemes presented in this section. Table 4.14d shows the measures/schemes deployed by schools.

Table 4.14d Measure(s)/scheme(s) deployed by schools to promote students' IL (RS2ESE Q9)

Measure(s)/scheme(s)	Count	Percentage (%) (N=37)
g. IL is integrated into the Computer/IT curriculum	33	89.19
e. IL is instilled in students through teaching activities of different subjects	29	78.38
c. Provision of guidelines on use of IT for teachers	29	78.38
d. Provision of guidelines on use of IT for students	21	56.76
a. Seminar(s)/course(s) for students to enhance their IL	20	54.05
b. Seminar(s)/course(s) for parents to help their child(ren) develop their IL	19	51.35
f. IL is being taught as an independent subject	6	16.22
h. Others	0	0.00 (N=9)

### 4.3.3 Information about schools' ITed curriculum

**Almost all respondent primary schools (98%), secondary schools (97%), special (mainstream) schools, and special (special) schools kept offering Computer/IT as a discrete subject,** while integration of the IT skills into different subjects and extra-curricular activities were still available. Tables 4.15a – 4.15d show different modes of teaching computer/IT skills adopted by schools.

Table 4.15a Schools' teaching mode(s) of computer/IT skills in primary schools (RS2PE Q13)

Teaching mode(s)	Count	Percentage (%) (N=348)
a. Computer/IT is offered as a discrete subject	342	98.28
c. Computer/IT skills are integrated into extra-curricular activities	274	78.74
b. Computer/IT skills are integrated into the school curriculum (i.e., across different disciplines)	268	77.01
d. Others	4	4.21 (N=95)

Table 4.15b Schools' teaching mode(s) of computer/IT skills in secondary schools (RS2SE Q13)

Teaching mode(s)	Count	Percentage (%) (N=337)
a. Computer/IT is offered as a discrete subject	328	97.33
b. Computer/IT skills are integrated into the school curriculum (i.e. across different disciplines)	247	73.29
c. Computer/IT skills are integrated into extra-curricular activities	239	70.92
d. Others	6	5.36 (N=112)

Table 4.15c Schools' teaching mode(s) of computer/IT skills in special (mainstream) schools (RS2EME Q13)

Teaching mode(s)	Count	Percentage (%) (N=14)
a. Computer/IT is offered as a discrete subject	14	100.00
b. Computer/IT skills are integrated into the school curriculum (i.e. across different disciplines)	12	85.71
c. Computer/IT skills are integrated into extra-curricular activities	8	57.14
d. Others	0	0.00 (N=7)

Table 4.15d Schools' teaching mode(s) of computer/IT skills in special (special) schools (RS1ESE, RS2ESE Q13)

Teaching mode(s)	Count	Percentage (%) (N=37)
a. Computer/IT is offered as a discrete subject	32	86.49
b. Computer/IT skills are integrated into the school curriculum (i.e., across different disciplines)	28	75.68
c. Computer/IT skills are integrated into extra-curricular activities	23	62.16
d. Others	2	20.00 (N=10)

#### 4.3.4 Teachers' ITed-related professional development

**Professional development opportunities were provided in various ways** (Table 4.16). **In-school sharing sessions** were the most commonly organised activities in all school sectors [primary 74%, secondary 66%, special (mainstream) 71%, special (special) 95%]. **Sharing sessions organised with other schools through school networking activities were becoming more common among all school sectors** [primary 15%, 48% (+33%), secondary 12%, 44% (+32%), special (mainstream) 14%, 57% (+43%), special (special) 7%, 19% (+12%)]. A significant decrease was observed in the percentages of schools that organised school visits as well as seminar(s) /course(s)/ workshop(s) conducted by tertiary institutions/ NGO(s)/ IT industries. Table 4.16 shows the details of measure(s)/scheme(s) deployed by schools to promote staff's professional development on ITed.

Table 4.16 Measure(s)/scheme(s) deployed by schools to promote staff's professional development on ITed in the last school year (RS2PE, RS2SE, RS2EME, RS2ESE Q11)

Measure(s)/scheme(s)	Primary		Secondary		Special (Mainstream)		Special (Special)	
	Count	Percentage (%)	Count	Percentage (%)	Count	Percentage (%)	Count	Percentage (%)
	(N=348)		(N=337)		(N=14)		(N=37)	
a. Sharing session(s) organised for teachers within school	257	73.85	223	66.17	10	71.43	35	94.59
b. Sharing session(s) organised for teachers with other schools	166	47.70	149	44.21	8	57.14	7	18.92
c. Seminar(s)/course(s)/workshop(s) conducted by tertiary institutions/NGO(s)/IT industries for teachers	84	24.14	73	21.66	3	21.43	17	45.95
d. Staff development programme(s) conducted on-site by EDB	55	15.80	60	17.80	3	21.43	5	13.51
e. School visit(s)	52	14.94	46	13.65	3	21.43	9	24.32
f. Incentive Scheme(s)	24	6.90	12	3.56	1	7.14	0	0.00
g. Others	4	3.23 (N=124)	5	3.88 (N=129)	0	0.00	0	0.00 (N=13)



### 4.3.5 Collaborative projects/activities organised by schools

Collaboration allows schools to share experiences. More than half of the respondent schools participated in collaborative projects/activities (Table 4.17). **Collaborative activities that were most commonly employed by all school sectors (except for special (mainstream) schools) included training courses, seminars, workshops, and sharing sessions.** For special (mainstream) sector, the percentage of schools that launched development of IT tool(s)/system(s)/e-Learning resources increased significantly; and they became the most commonly launched collaborative projects/activities among special (mainstream) schools.

Table 4.17 Collaborative project(s)/activity(ies) on the use of IT for learning/teaching launched (RS2PE, RS2SE, RS2EME, RS2ESE Q12)

Project(s)/activity(ies)	Primary		Secondary		Special (Mainstream)		Special (Special)	
	Count	Percentage (%)	Count	Percentage (%)	Count	Percentage (%)	Count	Percentage (%)
		(N=348)		(N=337)		(N=14)		(N=37)
a. Training course(s)/seminar(s)/workshop(s)/sharing session(s)	209	60.06	178	52.82	6	42.86	23	62.16
d. Development and/or trial use of e-Learning resource(s)	185	53.16	165	48.96	9	64.29	18	48.65
e. Development of IT tool(s)/system(s) to facilitate learning/teaching	155	44.54	135	40.06	9	64.29	19	51.35
f. Development of IT tool(s)/system(s) to facilitate administration/management work	138	39.66	141	41.84	5	35.71	18	48.65
g. Development of emerging technological device(s) for learning/teaching	130	37.36	95	28.19	8	57.14	16	43.24
b. School visit(s)	80	22.99	90	26.71	3	21.43	13	35.14
c. Joint publications	42	12.07	34	10.09	2	14.29	2	5.41
h. Others	3	2.94 (N=102)	4	3.45 (N=116)	0	0.00 (N=6)	3	27.27 (N=11)

#### **4.4 IT deployment for learning and teaching**

Data revealed that **most teachers in the respondent schools had been getting more and more confident in using IT for learning/teaching.** Also, **more teachers adopted emerging technology** (e.g. Web 2.0 technology, Blog, Wiki and Podcast) for teaching and learning. **In gist, e-Learning has become on the trend.**

##### **4.4.1 Teachers' confidence in using IT**

To supplement, views of the subject panel heads were also collected to understand teachers' confidence in using IT.

**For primary schools,** around 78% of the teachers felt confident or very confident of using IT for learning/teaching. Over 70% of the teachers from all subjects were confident or very confident in using IT for learning/teaching, except Physical Education. Most teachers (90%) felt confident of using IT for computer-related subjects. (Table 4.18a)

**For secondary schools,** around 77% of the respondent teachers felt confident or very confident of using IT for learning/teaching. Over 70% of the teachers from all subjects were confident or very confident of using IT for learning/teaching, except teachers teaching English Language Education (69%). Most teachers (96%) felt confident of using IT for computer-related subjects. **No significant change was identified in the percentage obtained for all subjects/KLAs.** (Table 4.18b)

**For special (mainstream) schools,** 79% of the respondent teachers were confident or very confident of using IT for learning/teaching. In terms of the eleven KLAs, teachers in Computer-related subjects were most confident of using IT for teaching (96%). Also, the percentage of teachers in Arts Education who reported feeling confident in using IT for teaching has increased from 56% to 81%. (Table 4.18c)

**For special (special) schools,** over 70% of the respondent teachers felt confident or very confident of using IT. In general, most teachers teaching Computer-related subjects (84%) felt confident of using IT for learning/teaching. (Table 4.18d)

#### 4.4.2 Ways of using IT

In primary school sector, 85% of the teachers used IT for learning/teaching in the recent month. Besides, **more teachers reported having utilised emerging technology in teaching. In general, the percentage of teachers who utilised emerging technology in teaching increased from 27% in RS1 to 41% in RS2 (+14%). The utilisation rate of emerging technology in all individual subjects/KLAs increased by at least 10%** and the Computer-related subjects had the highest utilisation rate of 57%.

Teachers have been using e-Learning resources increasingly, for example, the **Depository of Curriculum-based Learning and Teaching Resources** developed by the EDB, Chapter 2.1 referred. As shown, approximately one-third of the respondent teachers used it for learning and teaching, while the percentage of teachers who used other free-of-charge resources had dropped from 76% to 59% in RS2. The figures suggested that more teachers preferred using open resources in alignment with the local curriculum for strengthening the effectiveness of learning and teaching. The utilisation rate of **fee-charging** resources remained at 20% while near half of the respondent teachers had assigned students to use IT to perform learning tasks beyond school hours. (Table 4.18a)

Table 4.18a Teachers' use of IT for learning/teaching (RS2PE Q15)

Subject/KLA	N=	Count (%) of teachers who reported to						
		be confident or very confident of using IT for learning/teaching	have used emerging technology (e.g. Web 2.0 technology such as Blog, Wiki and Podcast) for learning/teaching	have used IT for learning/teaching in the past month	have used Depository of Curriculum-based Learning and Teaching Resources developed by EDB for learning / teaching in the past month	have used free-of-charge resources for learning/teaching in the past month	have used off-line or on-line fee-charging resources for learning/teaching in the past month	have assigned students to use IT to perform learning tasks beyond school hours in the past month
Overall	28040 <sup>32</sup>	22000 (78)	11469 (41)	23793 (85)	8720 (31)	16646 (59)	5668 (20)	13164 (47)
a. Chinese Language Education	4912	3779 (77)	1984 (40)	4423 (90)	1858 (38)	3174 (65)	1083 (22)	2629 (54)
b. English Language Education	4058	3159 (78)	1594 (39)	3682 (91)	1129 (28)	2647 (65)	1209 (30)	2255 (56)

<sup>32</sup> This number did not represent the total number of respondent teachers because some teachers taught more than one subject.

Subject/KLA	N=	Count (%) of teachers who reported to						
		be confident or very confident of using IT for learning/teaching	have used emerging technology (e.g. Web 2.0 technology such as Blog, Wiki and Podcast) for learning/teaching	have used IT for learning/teaching in the past month	have used Depository of Curriculum-based Learning and Teaching Resources developed by EDB for learning /teaching in the past month	have used free-of-charge resources for learning/teaching in the past month	have used off-line or on-line fee-charging resources for learning/teaching in the past month	have assigned students to use IT to perform learning tasks beyond school hours in the past month
c. Mathematics Education	4140	3306 (80)	1574 (38)	3673 (89)	1832 (44)	2661 (64)	877 (21)	2000 (48)
d. General Studies	4850	3877 (80)	2306 (48)	4388 (90)	1883 (39)	3192 (66)	1048 (22)	2804 (58)
e. Computer-related subject(s)	2590	2333 (90)	1467 (57)	2405 (93)	779 (30)	1747 (67)	726 (28)	1859 (72)
f. Arts Education	3441	2634 (77)	1324 (38)	2839 (83)	679 (20)	1767 (51)	324 (9)	1037 (30)
g. Physical Education	1845	1264 (69)	554 (30)	765 (41)	238 (13)	497 (27)	117 (6)	232 (13)
h. Others	2204	1648 (75)	666 (30)	1618 (73)	322 (15)	961 (44)	284 (13)	348 (16)

In **secondary schools**, over 82% of the teachers used IT for learning/teaching in the month prior to the survey. Over 80% of the teachers used IT for learning/teaching for all subjects, except for Mathematics and Physical Education. There was no significant difference observed in these percentages obtained in RS1 and RS2 (Table 4.18b). **However, as noted in RS2, a significant increase of 10% was identified in the utilisation rate of emerging technology for all subjects.** Around one-fourth of the respondent teachers used the Depository of Curriculum-based Learning and Teaching Resources developed by EDB while the percentage of teachers who used other free-of-charge resources had decreased from 74% to 62% (-12%). The utilisation rate of **fee-charging** resources dropped by 7%. The statistics suggested that more teachers have started to adopt emerging technology and open resources in alignment with the local curriculum for strengthening the effectiveness of learning and teaching. Almost half of the respondent teachers had assigned students to use IT to perform learning tasks beyond school hours (Table 4.18b).

Table 4.18b Teachers' use of IT for learning/teaching (RS2SE Q15)

Subject/KLA	N=	Count (%) of teachers who reported to						
		be confident or very confident of using IT for learning/teaching	have used emerging technology (e.g. Web 2.0 technology such as Blog, Wiki and Podcast) for learning/teaching	have used IT for learning/teaching in the past month	have used Depository of Curriculum-based Learning and Teaching Resources developed by EDB for learning/teaching in the past month	have used free-of-charge resources for learning/teaching in the past month	have used off-line or on-line fee-charging resources for learning/teaching in the past month	have assigned students to use IT to perform learning tasks beyond school hours in the past month
Overall	25711 <sup>3</sup> <sub>2</sub>	19801 (77)	13526 (53)	21002 (82)	6105 (24)	15948 (62)	5677 (22)	11892 (46)
a. Chinese Language Education	4005	2791 (70)	2071 (52)	3324 (83)	755 (19)	2467 (62)	727 (18)	1768 (44)
b. English Language Education	4206	2907 (69)	2164 (51)	3522 (84)	856 (20)	2422 (58)	1387 (33)	2443 (58)
c. Mathematics Education	3319	2518 (76)	1465 (44)	2319 (70)	588 (18)	1828 (55)	362 (11)	741 (22)
d. Science Education	2652	2258 (85)	1440 (54)	2257 (85)	698 (26)	1799 (68)	482 (18)	1021 (39)
e. Technology Education	1020	811 (80)	468 (46)	846 (83)	235 (23)	591 (58)	160 (16)	489 (48)
f. Computer-related subject(s)	1552	1489 (96)	1167 (75)	1482 (95)	476 (31)	1166 (75)	480 (31)	1321 (85)
g. Personal, Social & Humanities Education	3024	2283 (76)	1576 (52)	2506 (83)	810 (27)	1928 (64)	513 (17)	1195 (40)
h. Arts Education	942	801 (85)	572 (61)	835 (89)	218 (23)	626 (66)	162 (17)	590 (63)
i. Physical Education	889	621 (70)	310 (35)	423 (48)	154 (17)	312 (35)	75 (8)	164 (18)
j. Liberal Studies for Senior Secondary Levels	3015	2427 (81)	1821 (60)	2639 (88)	1144 (38)	2199 (73)	1194 (40)	1826 (61)
k. Others	1087	895 (82)	472 (43)	849 (78)	171 (16)	610 (56)	135 (12)	334 (31)

Similar to the primary and secondary school sectors, an increasing trend on the use of IT in learning and teaching was observed in the special (mainstream) and special (special) schools. 76% and 87% of the teachers in special (mainstream) and special (special) schools used IT for learning/teaching in the month prior to the survey respectively. **Significant difference was also identified in the utilisation rate of emerging technology for all subjects. The overall utilisation increasing rate was 20% and 28% respectively between 2009/10 and 2011/12.**

For the special (mainstream) schools, subjects of Computer-related, Practical Skills and Technology Education reached an utilisation rate of emerging technology at 70%. Around one-third of the respondent teachers used the Depository of Curriculum-based Learning and Teaching Resources developed by EDB. A total of 64% and 19% of the respondent teachers used free-of-charge resources and fee-charging resources respectively. The percentage of teachers who assigned students to use IT to perform learning tasks beyond school hours had increased from 25% in RS1 to 31% in RS2 (+6%) (Table 4.18c)

Table 4.18c Teachers' use of IT for learning/teaching (RS2EME Q15)

Subject/KLA	N=	Count (%) of teachers who reported to						
		be confident or very confident of using IT for learning/teaching	have used emerging technology (e.g. Web 2.0 technology such as Blog, Wiki and Podcast) for learning/teaching	have used IT for learning/teaching in the past month	have used Depository of Curriculum-based Learning and Teaching Resources developed by EDB for learning /teaching in the past month	have used free-of-charge resources for learning/teaching in the past month	have used off-line or on-line fee-charging resources for learning/teaching in the past month	have assigned students to use IT to perform learning tasks beyond school hours in the past month
Overall	636	505 (79)	357 (56)	484 (76)	216 (34)	405 (64)	121 (19)	194 (31)
a. Chinese Language Education	95	66 (69)	45 (47)	71 (75)	30 (32)	60 (63)	7 (7)	27 (28)
b. English Language Education	70	60 (86)	39 (56)	59 (84)	26 (37)	48 (69)	14 (20)	33 (47)
c. Mathematics Education	81	61 (75)	35 (43)	59 (73)	22 (27)	44 (54)	4 (5)	15 (19)
d. General Studies/ Science Education	51	38 (75)	26 (51)	38 (75)	16 (31)	35 (69)	10 (20)	12 (24)
e. Technology Education	23	17 (74)	16 (70)	18 (78)	8 (35)	14 (61)	6 (26)	7 (30)
f. Computer-related subject(s)	52	50 (96)	43 (83)	45 (87)	15 (29)	30 (58)	13 (25)	27 (52)

Subject/KLA	N=	Count (%) of teachers who reported to						
		be confident or very confident of using IT for learning/teaching	have used emerging technology (e.g. Web 2.0 technology such as Blog, Wiki and Podcast) for learning/teaching	have used IT for learning/teaching in the past month	have used Depository of Curriculum-based Learning and Teaching Resources developed by EDB for learning /teaching in the past month	have used free-of-charge resources for learning/teaching in the past month	have used off-line or on-line fee-charging resources for learning/teaching in the past month	have assigned students to use IT to perform learning tasks beyond school hours in the past month
g. Personal, Social, & Humanities Education	72	57 (79)	47 (65)	63 (88)	42 (58)	56 (78)	32 (44)	19 (26)
h. Arts Education	47	38 (81)	27 (57)	37 (79)	12 (26)	26 (55)	10 (21)	18 (38)
i. Physical Education	36	28 (78)	14 (39)	14 (39)	6 (17)	15 (42)	0 (0)	3 (8)
j. Practical Skills	28	27 (96)	20 (71)	21 (75)	13 (46)	19 (68)	1 (4)	2 (7)
k. Liberal Studies for Senior Secondary Levels	42	35 (85)	22 (54)	34 (83)	16 (39)	34 (83)	19 (46)	25 (61)
l. Others	40	28 (70)	23 (58)	25 (63)	10 (25)	24 (60)	5 (13)	6 (15)

As regards teachers in special (special) schools (Table 4.18d referred), they reported having consistent use of IT for learning/teaching and **there was a significant increase in the utilisation rate of emerging technology for teaching all subjects/KLAs with an overall rate increasing from 16% to 44% (+28%) in the past three years.** Around one-third of the respondent teachers used the Depository of Curriculum-based Learning and Teaching Resources developed by EDB. The percentage of teachers who used free-of-charge resources for teaching dropped from 78% to 66% (-12%) whereas the percentage of teachers who used fee-charging resources increased from 5% to 14% (+9%). 13% of the respondent teachers in this school sector had assigned students to use IT to perform learning tasks beyond school hours.

Table 4.18d Teachers' use of IT for learning/teaching (RS2ESE Q15)

Subject/KLA	N=	Count (%) of teachers who reported to						
		be confident or very confident of using IT for learning/teaching	have used emerging technology (e.g. Web 2.0 technology such as Blog, Wiki and Podcast) for learning/teaching	have used IT for learning/teaching in the past month	have used Depository of Curriculum-based Learning and Teaching Resources developed by EDB for learning /teaching in the past month	have used free-of-charge resources for learning/teaching in the past month	have used off-line or on-line fee-charging resources for learning/teaching in the past month	have assigned students to use IT to perform learning tasks beyond school hours in the past month
Overall	2177	1668 (77)	953 (44)	1893 (87)	730 (34)	1446 (66)	294 (14)	276 (13)
a. Language	368	275 (75)	174 (47)	351 (95)	124 (34)	256 (70)	64 (17)	47 (13)
b. Mathematics	340	242 (71)	120 (35)	291 (86)	153 (45)	208 (61)	37 (11)	21 (6)
c. General Studies	276	209 (76)	137 (50)	261 (95)	138 (50)	211 (76)	36 (13)	38 (14)
d. Technology Education	108	86 (80)	48 (44)	90 (83)	34 (31)	73 (68)	7 (6)	13 (12)
e. Computer-related subject(s)	147	123 (84)	79 (54)	142 (97)	51 (35)	123 (84)	41 (28)	62 (42)
f. Arts Education	242	201 (83)	106 (44)	216 (89)	50 (21)	161 (67)	16 (7)	17 (7)
g. Physical Education	154	124 (81)	58 (38)	94 (61)	47 (31)	72 (47)	16 (10)	7 (5)
h. Practical Skills	234	165 (71)	67 (29)	165 (71)	50 (21)	110 (47)	27 (12)	5 (2)
i. Liberal Studies for Senior Secondary Levels	162	132 (81)	96 (59)	155 (96)	48 (30)	136 (84)	37 (23)	58 (36)
j. Others	146	111 (76)	68 (47)	128 (88)	35 (24)	96 (66)	13 (9)	8 (5)



### 4.4.3 Extent of IT use

The extent of IT use for learning/teaching was determined using a Likert scale ranging from “never” (1) to “always” (5).

For primary schools, IT was most frequently used in Computer-related subjects (4.92). **The mean scores for all subjects/KLAs were higher than 4 (A lot), except for Physical Education (2.38) and Arts Education (3.83).** Also, there was a growth in the extent of IT used for teaching all subjects/KLAs, except Physical Education. The degree of increase in the usage of IT in teaching Mathematics Education was the highest among all subjects [4.26, 4.36 (+0.1)] (Table 4.19a).

Table 4.19a Extent of teachers’ use of IT for learning/teaching (RS2PE Q14)

	<b>Subject/KLA</b>	<b>Mean</b>	<b>SD</b>	<b>N</b>
<b>e.</b>	Computer-related subject(s)	4.92	0.30	348
<b>d.</b>	General Studies	4.59	0.59	348
<b>b.</b>	English Language Education	4.44	0.69	348
<b>c.</b>	Mathematics Education	4.36	0.71	348
<b>a.</b>	Chinese Language Education	4.33	0.72	348
<b>f.</b>	Arts Education	3.83	0.88	348
<b>g.</b>	Physical Education	2.38	0.77	348
<b>h.</b>	Others	3.78	0.97	263

Scores obtained were above 3 (Sometimes) for most of the subjects in secondary schools, except for Physical Education (2.56). IT was most frequently used in Computer-related subjects. **There was a growth in the extent of IT used for teaching all subjects/KLAs. The degree of increase in the usage of IT in teaching Liberal Studies for Senior Secondary Levels (4.34) and Arts Education (4.05) was the highest among all subjects** (Table 4.19b).

Table 4.19b Extent of teachers’ use of IT for learning/teaching (RS2SE Q14)

	<b>Subject/KLA</b>	<b>Mean</b>	<b>SD</b>	<b>N</b>
<b>f.</b>	Computer-related subject(s)	4.89	0.37	337
<b>j.</b>	Liberal Studies for Senior Secondary Levels	4.34	0.79	337
<b>h.</b>	Arts Education	4.05	0.90	336
<b>d.</b>	Science Education	4.00	0.83	337
<b>g.</b>	Personal, Social & Humanities Education	3.91	0.82	337
<b>b.</b>	English Language Education	3.88	0.80	336
<b>e.</b>	Technology Education	3.84	0.88	336
<b>a.</b>	Chinese Language Education	3.69	0.82	336
<b>c.</b>	Mathematics Education	3.24	0.87	336
<b>i.</b>	Physical Education	2.56	0.90	336
<b>k.</b>	Others	3.95	0.96	221

The mean scores representing the extent of teachers' use of IT for learning/teaching in special (mainstream) schools were all above 3 (Sometimes) except for Physical Education (2.58). In terms of the eleven KLAs, IT was most frequently used in Computer-related subjects (4.86). **There was a significant growth in the extent of IT used for teaching in all subjects/KLAs** in which an increase of 0.5 score (out of 5) was recorded in General Studies/Science Education (4.57), Liberal Studies for Senior Secondary Levels (4.54), Personal, Social, & Humanities Education (4.07) and Arts Education (3.79) (Table 4.19c).

Table 4.19c Extent of teachers' use of IT for learning/teaching (RS2EME Q14)

Subject/KLA	Mean	SD	Mean
f. Computer-related subject(s)	4.86	0.36	14
d. General Studies/Science Education	4.57	0.65	14
k. Liberal Studies for Senior Secondary Levels	4.54	0.78	14
a. Chinese Language Education	4.14	0.87	14
e. Technology Education	4.08	0.79	14
b. English Language Education	4.07	0.83	14
g. Personal, Social, & Humanities Education	4.07	1.07	14
c. Mathematics Education	3.86	0.95	14
h. Arts Education	3.79	0.97	14
j. Practical Skills	3.50	0.76	14
i. Physical Education	2.58	0.67	14
l. Others	3.91	1.22	12

As shown in Table 4.19d, the scores obtained in were above 3 (Sometimes) for most of the subjects, with only Practical Skills and Physical Education scoring below in special (special) schools. IT was most frequently used in Computer-related subjects (4.88). **There was a growth in the extent of IT used for teaching all subjects/KLAs while the degree of increase in the usage of IT in teaching Liberal Studies for Senior Secondary Levels between RS1 and RS2 [4.08, 4.34 (+0.26)] was the highest among all subjects.**

Table 4.19d Extent of teachers' use of IT for learning/teaching (RS2ESE Q14)

Subject/KLA	Mean	SD	Mean
e. Computer-related subject(s)	4.88	0.42	37
c. General Studies	4.22	0.76	37
i. Liberal Studies for Senior Secondary Levels	4.22	0.76	37
a. Language	4.03	0.83	37
f. Arts Education	3.89	0.91	37
b. Mathematics	3.76	1.04	37
d. Technology Education	3.60	1.04	37
h. Practical Skills	2.91	1.01	37
g. Physical Education	2.77	1.03	37
j. Others	3.92	0.97	29

#### 4.5 Students' awareness/competency in use of IT

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).

According to the data collected, **there was no significant change observed in primary school students' level of IL and computer/IT skills. The mean scores of both students' level of IL and computer/IT skills remained between 4 (Competent) and 3 (Fairly competent); while a more significant growth was identified in their competency in the use of emerging technical device(s) (3.70).** As shown, students were “competent” in operating computers (4.33) and searching for information (4.29) (Table 4.20a).

Table 4.20a Students' level of competency in IL and computer/IT skills (RS2PE Q16)

Competency	Mean	SD	Mean
f. Computer operation skills	4.33	0.58	348
a. Information search	4.29	0.58	348
e. Proper use of IT	3.86	0.62	348
d. Reporting and presentation	3.78	0.60	348
i. Use of emerging technical device(s)	3.70	0.76	348
h. Use of digital resources	3.69	0.63	348
b. Information selection	3.56	0.62	348
c. Information collation & analysis	3.48	0.61	348
g. Chinese characters input	3.32	0.59	348
j. Others	3.50	0.55	85

**For secondary school sector, no significant change was found between RS1 and RS2 in most of the items, except “Use of emerging technical device(s)” [3.79, 4.08 (+0.29)].** In terms of IL, secondary students were between “competent” and “fairly competent”, whereas in terms of computer/IT skills, they were generally “competent” on average. Students performed particularly well in “information search” (4.46) and “computer operation skills” (4.30) (Table 4.20b).

Table 4.20b Students' level of competency in IL and computer/IT skills (RS2SE Q16)

Competency	Mean	SD	Mean
a. Information search	4.46	0.60	336
f. Computer operation skills	4.30	0.62	336
i. Use of emerging technical device(s)	4.08	0.76	336
g. Chinese characters input	3.91	0.71	336
h. Use of digital resources	3.80	0.69	336
d. Reporting and presentation	3.68	0.69	336
b. Information selection	3.61	0.65	336
e. Proper use of IT	3.53	0.62	336
c. Information collation and analysis	3.49	0.67	336
j. Others	4.00	0.87	84

According to data obtained from school representatives, **no significant change was identified in the mean scores of both students' level of IL and computer/IT skills. The mean scores of these items remained between 4 (Competent) and 3 (Fairly competent). However, there was a relatively notable growth in students' competency in using emerging technical device(s) [3.31, 3.71 (+0.4)].** Finally, students in special (mainstream) schools scored highest in computer operation skills (4.00). Table 4.20c summarises the ratings given by school representatives on their students' level of competency in IL and computer/IT skills.

Table 4.20c Students' level of competency in IL and computer/IT skills (RS2EME Q16)

Competency	Mean	SD	Mean
f. Computer operation skills	4.00	0.78	14
a. Information search	3.93	0.73	14
i. Use of emerging technical device(s)	3.71	0.73	14
d. Reporting and presentation	3.64	0.50	14
g. Chinese characters input	3.57	0.76	14
b. Information selection	3.50	0.76	14
e. Proper use of IT	3.43	0.65	14
h. Use of digital resources	3.43	0.65	14
c. Information collation & analysis	3.21	0.58	14
j. Others	2	/	5

In terms of computer/IT skills, students in special (special) schools remained as “fairly competent”. **The level of students' computer/IT skills was generally higher than their IL.** In terms of IL, students were close to “fairly competent” (3) and they continued to score highest on “computer operation skills” (3.47) (Table 4.20d).

Table 4.20d Students' level of competency in IL and computer/IT skills (RS2ESE Q16)

Competency	Mean	SD	Mean
f. Computer operation skills	3.47	1.08	37
h. Use of digital resources	3.18	0.81	37
a. Information search	3.06	0.90	37
i. Use of emerging technical device(s)	2.94	0.74	37
e. Proper use of IT	2.94	0.85	37
b. Information selection	2.81	0.69	37
g. Chinese characters input	2.72	0.81	37
d. Reporting & presentation	2.65	0.75	37
c. Information collation & analysis	2.53	0.67	37
j. Others	2.33	1.15	10

## 4.6 Parental support

Computers and Internet access have been commonly available for students at home. A majority of schools continued to encourage parents to visit the school website/Intranet and to get involved in ITed-related activities.

### 4.6.1 Provision of computers and Internet access at home

The data suggested that students who had computer access and Internet access at home had increased for most school sectors [except special (mainstream) schools]. More than 90% of the students in primary school and secondary school sector had computer and Internet access at home. The percentage of students who had computer access at home in each school sector was: primary 91%, secondary 94%, special (mainstream) 76%, special (special) 73%. The percentage of students who had Internet access at home in each school sector was: primary 90%, secondary 93%, special (mainstream) 78%, special (special) 70% (Table 4.21).

Table 4.21 Estimated percentage of students with computer and Internet access at home (RS2PE, RS2SE, RS2EME, RS2ESE Q18)

Computer/Internet access	Primary			Secondary			Special (Mainstream)			Special (Special)		
	Mean (%)	SD (%)	N	Mean (%)	SD (%)	N	Mean (%)	SD (%)	N	Mean (%)	SD (%)	N
a. Computer access at home	90.98	9.51	347	93.56	9.01	333	75.71	18.38	14	72.72	23.54	36
b. Internet access at home	89.91	11.76	346	92.72	9.77	333	78.00	15.50	14	70.39	24.51	36

### 4.6.2 Parents' participation

To encourage parents to participate in ITed in schools and to assist their children to use ITed for learning, certain activities/measures were adopted. **Among all the activities/measures, encouraging parents to visit the school's website/Intranet to know more about ITed developments in the school was the most popular measure.** 90% of the respondent primary and secondary schools encouraged parents to visit the school website/Intranet. In the two special school sectors, this rate has dropped notably [special (mainstream) 93%, 71% (-22%), special (special) 100%, 84% (-16%)] (Table 4.22). The percentage of schools in all sectors that had provided ITed-related activities for parents has dropped when compared with RS1, especially for special (mainstream) school sector. Finally, 78%, 61% and half of the primary, secondary and special schools encouraged parents to instil the proper principles, values and attitude in the use of IT into their children.

Table 4.22 Activity(ies)/measure(s) organised to encourage parents to participate in related work of ITed in schools (RS2PE, RS2SE, RS2EME, RS2ESE Q17)

Activity(ies)/measure(s)	Primary		Secondary		Special (Mainstream)		Special (Special)	
	Count	Percentage (%) (N=348)	Count	Percentage (%) (N=336)	Count	Percentage (%) (N=14)	Count	Percentage (%) (N=37)
a. Encouraged parents to visit the school website/Intranet so as to understand the situation	329	94.54	301	89.58	10	71.43	31	83.78
d. Encouraged parents to instil the proper principles, values and attitude in the use of IT into their child(ren)	273	78.45	205	61.01	7	50.00	21	56.76
b. Provided ITed-related activities for parents	237	68.10	164	48.81	5	35.71	22	59.46
c. Explained the work of ITed in school to parents	181	52.01	134	39.88	3	21.43	20	54.05
e. Others	7	8.05 (N=87)	5	5.32 (N=94)	0	0.00 (N=5)	0	0.00 (N=7)

#### 4.7 School expectations on ITed

Respondent generally felt “satisfied” with the ITed development in their schools. However, the level of satisfaction dropped slightly in all school sectors when compared with RS1.

Professional support in the mode of workshops remained a preference in primary school sector. In terms of resource support, **e-Learning resources were most needed**. Also, **schools were most concerned about the benefits given to TSS staff members**; and the renewal and maintenance of IT facilities. These expectations were also found in the secondary schools.

While schools in special (mainstream) sector suggested that professional support in the mode of “workshops” or “training courses” could be provided to enhance teachers’ knowledge on ITed. **They also proposed to have more resources for enhancing the multi-media computer rooms as well as the broadband Internet connection**. Similarly, special (special) schools expressed a need for more “e-Learning resources” as well as “mobile learning devices”.

#### 4.7.1 Satisfaction with current ITed development in schools

Schools' level of satisfaction with ITed development was assessed using a Likert scale ranging from "totally not satisfied" (1) to "very satisfied" (5). Table 4.23 shows the mean score for schools' satisfaction level. **Respondents were "satisfied" with current ITed development in schools**, with a slight drop in RS2 [primary schools 3.68, 3.62 (-0.06), secondary schools 3.74, 3.65 (-0.09), special (mainstream) schools 3.86, 3.64 (-0.22), special (special) schools 3.77, 3.59 (-0.18)].

Table 4.23 Overall satisfaction with ITed or ITed development in their schools (RS2PE, RS2SE, RS2EME, RS2ESE Q21)

	Primary			Secondary			Special (Mainstream)			Special (Special)		
	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N
Level of satisfaction	3.62	0.57	348	3.65	0.56	337	3.64	0.63	14	3.59	0.60	37

#### 4.7.2 Professional support

Different modes of professional development were listed in the questionnaire. Respondents were asked to choose at least one of the options to show their desired mode(s) of professional development. **"Workshops" remained the most preferred professional development mode** [primary schools 32%, secondary schools 32%, special (mainstream) 39%, special (special) 33%]. The second most preferred professional development mode was **"training courses"** [primary schools 28%, secondary schools 29%, special (mainstream) 32%, special (special) 31%].

Table 4.24a ITed professional development's mode(s) more preferred (RS2PE, RS2SE, RS2EME, RS2 ESE Q20)

Mode(s)	Primary		Secondary		Special (Mainstream)		Special (Special)	
	Count	Percentage (%) (N=879)	Count	Percentage (%) (N=822)	Count	Percentage (%) (N=28)	Count	Percentage (%) (N=106)
Workshops	285	32.42	259	31.51	11	39.29	35	33.02
Training courses	250	28.44	238	28.95	9	32.14	33	31.13
Special lectures	131	14.90	145	17.64	4	14.29	13	12.26
Seminars	116	13.20	110	13.38	3	10.71	12	11.32
School visits	75	8.53	46	5.60	1	3.57	10	9.43
Training camps	17	1.93	18	2.19	0	0.00	3	2.83
Others	5	0.57	6	0.73	0	0.00	0	0.00

### 4.7.3 Resource support

To better understand schools' needs on facilities and services, school representatives were also asked about their resource needs. They were allowed to choose no more than three options from a list of facilities/services. Tables 4.25a-d show the choices made by schools in different sectors.

Table 4.25a shows that **“e-Learning resources” was most needed in primary schools (19%) while “mobile learning devices” (15%) was the second most. Internet connection-related items increased notably [“Enhanced broadband Internet connection” 4.76%, 6.63% (+1.87%), “Wireless network” 3.62%, 8.39% (+4.77%)].** Similar results were also found in schools' responses to the open-ended question, which will be further discussed in Section 4.7.4.

Table 4.25a Facility(ies)/service(s) most needed (RS2PE Q19)

Facility(ies)/service(s)	Count	Percentage(%) (N=1025)
e-Learning resources	190	18.54
Mobile learning devices [e.g. Personal Digital Assistant (PDA), Pocket Personal Computer (PC), Netbook, etc.]	157	15.32
Computers and projectors in classrooms	154	15.02
e-Learning platform/Learning Management System (LMS)	98	9.56
Interactive electronic whiteboards	91	8.88
Wireless network	86	8.39
Multi-media computer rooms	84	8.20
Enhanced broadband Internet connection	68	6.63
Enhanced on-site technical support services	48	4.68
IT Management Tools	21	2.05
School campus TV	10	0.98
e-mail system	7	0.68
Others	11	1.07

For secondary schools, **“e-Learning resources” were most needed (22%) while the second most needed item was “mobile learning devices” (14%).** Respondent schools' need for **“wireless network”** was increased [3.16%, 7.73% (+4.57%)] (Table 4.25b).



Table 4.25b Facility(ies)/service(s) most needed (RS2SE Q19)

Facility(ies)/service(s)	Count	Percentage(%) (N=996)
e-Learning resources	218	21.89
Mobile learning devices [e.g. Personal Digital Assistant (PDA), Pocket Personal Computer (PC), Netbook, etc.]	137	13.76
Computers and projectors in classrooms	129	12.95
e-Learning platform/Learning Management System (LMS)	104	10.44
Wireless network	77	7.73
Enhanced broadband Internet connection	69	6.93
Multi-media computer rooms	67	6.73
IT Management Tools	58	5.82
Enhanced on-site technical support services	48	4.82
Interactive electronic whiteboards	39	3.92
School campus TV	22	2.21
e-mail system	13	1.31
Others	15	1.51

**Most special (mainstream) schools needed “multi-media computer rooms” (17.95%).** The percentage has increased by *13.19%* when compared with RS1. The second most needed item was “**enhanced broadband Internet connection**” (12.82%) (Table 4.25c).

Table 4.25c Facility(ies)/service(s) most needed (RS1EME, RS2EME Q19)

Facility(ies)/service(s)	Count	Percentage(%) (N=39)
Multi-media computer rooms	7	17.95
Enhanced broadband Internet connection	5	12.82
e-Learning resources	4	10.26
Mobile learning devices [e.g. Personal Digital Assistant (PDA), Pocket Personal Computer (PC), Netbook, etc.]	4	10.26
Computers and projectors in classrooms	4	10.26
Assistive technology device(s)	4	10.26
e-Learning platform/Learning Management System (LMS)	3	7.69
IT Management Tools	3	7.69
Wireless network	2	5.13
Interactive electronic whiteboards	1	2.56
Enhanced on-site technical support services	1	2.56
School campus TV	1	2.56
E-mail system	0	0.00
Others	0	/

**Special (special) schools needed “e-Learning resources” the most (21.50%) and “mobile learning devices” the next (16.82%)** (Table 4.25d). Similar results were also found in schools’ responses to the open-ended question, which will be further discussed in the next section.

Table 4.25d Facility(ies)/service(s) most needed (RS2ESE Q19)

Facility(ies)/service(s)	Count	Percentage(%) (N=107)
e-Learning resources	23	21.50
Mobile learning devices [e.g. Personal Digital Assistant (PDA), Pocket Personal Computer (PC), Netbook, etc.]	18	16.82
Interactive electronic whiteboards	13	12.15
Enhanced broadband Internet connection	12	11.21
Computers and projectors in classrooms	10	9.35
e-Learning platform/Learning Management System (LMS)	8	7.48
Assistive technology device(s)	6	5.61
Multi-media computer rooms	4	3.74
IT Management Tools	4	3.74
School campus TV	3	2.80
Enhanced on-site technical support services	2	1.87
Wireless network	2	1.87
E-mail system	0	0.00
Others	2	1.87

#### 4.7.4 Other comments on school ITEd development

As a supplement to the other 21 questions, Question 22 was an open-ended question designed to obtain more flexible data regarding teachers' expectations on ITEd and their possible difficulties for implementing ITEd in schools. Their responses were compiled into meaningful small pieces for coding according to the coding tree described in Section 3.5.2. As revealed, the inter-rater reliability of the two raters for each school sector was on the high side with primary schools 79.15% ( $K^{33}=0.768$ ,  $p < .05$ ), secondary schools 78.60% ( $K=0.809$ ,  $p < .05$ ), special (mainstream) 87.50% ( $K=0.862$ ,  $p < .05$ ), special (special) 75.00% ( $K=0.721$ ,  $p < .05$ ).

Four major themes (Table 4.26) were identified with elaborations listed as follows.

##### 4.7.4.1 Financial provisions for ITEd-related hardware, computer facilities and manpower

- Respondents from all school sectors were much concerned with the efficiency of their campus IT-infrastructure, for example, WiFi coverage and connectivity including bandwidth to the Internet, etc. to facilitate mobile learning and teaching efficacy;

<sup>33</sup> K: Kappa is the Inter-rater reliability, refer to Chapter 3.5.2 for the details on qualitative data analysis.

- There were suggestions to increase provisions on “replace/repair/upgrade existing computer facilities/software”, for example, the interactive whiteboards and mobile learning devices, including tablet computers. The touch-screen features would be more effective, in particular, assisting children with Down Syndromes and Autism, etc. in expressing their thoughts/needs and enabling their motor skills, etc; and
- Some respondents suggested including TSS staff into the regular staff establishment of school to handle the complexity of computing network and help solving technical problems encountered by teachers.

#### **4.7.4.2 Provision of e-Learning resources**

- Provision of more open electronic learning resources for students to strengthen their self-directed learning while the special schools opined that available e-Learning materials were mainly designed for mainstream school students, more tailor-made teaching resources for students with special education needs could be provided.

#### **4.7.4.3 Teacher professional development**

- More professional support for teachers on e-Learning should be provided through professional development programmes. The special schools also proposed to include more training programmes for parents; and
- Professional consultants/subject specialists could provide schools with onsite support to suit their pace of development.

#### **4.7.4.4 Others**

- There were some views that since the cross-border students living on Mainland China may not have access to the Internet on par with the local students, their on-line learning beyond school hours would need adjustments.

Table 4.26 School representatives' comments on school ITed development (RS2PE, RS2SE, RS2EME, RS2ESE

Q22)

	Primary			Secondary			Special (Mainstream)			Special (Special)		
	Count	Percent N=539	Ranking	Count	Percent N=430	Ranking	Count	Percent N=24	Ranking	Count	Percent N=48	Ranking
A. Provision/subsidy of computer facilities and accessories	0	0.0	26	0	0.0	26	0	0.0	14	0	0.0	18
i. Inside the school	0	0.0	26	0	0.0	26	0	0.0	14	0	0.0	18
1.Increase the numbers of computer/IT facilities/software	55	10.2	5	26	6.1	6	2	8.3	5	7	14.6	1
2.Replace/repair/upgrade existing IT facilities/software	79	14.7	2	62	14.4	2	2	8.3	5	1	2.1	10
3.Internet connection	17	3.2	10	18	4.2	7	1	4.2	7	1	2.1	10
ii. Outside the school	0	0.0	26	0	0.0	26	0	0.0	14	0	0.0	18
1.Computer/IT facilities	2	0.4	19	3	0.7	17	0	0.0	14	0	0.0	18
2.Internet connection	1	0.2	22	1	0.2	23	0	0.0	14	0	0.0	18
B. Financial support	0	0.0	26	0	0.0	26	0	0.0	14	0	0.0	18
i. For hiring supporting staff	5	0.9	14	8	1.9	13	1	4.2	7	0	0.0	18
1.TSS	86	16.0	1	87	20.2	1	3	12.5	2	4	8.3	4
2.TA/ITA	2	0.4	19	3	0.7	17	0	0.0	14	1	2.1	10
ii. CITG	1	0.2	22	0	0.0	26	0	0.0	14	0	0.0	18
1.Increase the provision of funding	78	14.5	3	54	12.6	3	4	16.7	1	7	14.6	1
2.Increase the flexibility of spending the funding	1	0.2	22	1	0.2	23	0	0.0	14	1	2.1	10
C. Training and workshops	6	1.1	13	5	1.2	15	0	0.0	14	1	2.1	10
i. Teachers	21	3.9	9	10	2.3	10	3	12.5	2	1	2.1	10
ii. Parents	23	4.3	7	14	3.3	8	3	12.5	2	4	8.3	4
iii. Students	5	0.9	14	3	0.7	17	0	0.0	14	0	0.0	18
iv. Other staff	1	0.2	22	3	0.7	17	1	4.2	7	0	0.0	18
D. Provision of electronic resources	0	0.0	26	0	0.0	26	0	0.0	14	0	0.0	18
i. Learning and teaching	62	11.5	4	52	12.1	4	1	4.2	7	7	14.6	1
ii. Administrative	2	0.4	19	1	0.2	23	0	0.0	14	0	0.0	18
iii. Storage for resources	0	0.0	26	6	1.4	14	0	0.0	14	3	6.3	7
E. Others	0	0.0	26	0	0.0	26	0	0.0	14	0	0.0	18
i. Curriculum design	7	1.3	12	11	2.6	9	1	4.2	7	1	2.1	10
ii. Collaborative activities	9	1.7	11	9	2.1	12	0	0.0	14	2	4.2	8
iii. Promotion	4	0.7	16	4	0.9	16	0	0.0	14	0	0.0	18
iv. Simplification of clerical/ administrative work	3	0.6	17	3	0.7	17	0	0.0	14	0	0.0	18
v. Professional support – hotline/advices	44	8.2	6	34	7.9	5	0	0.0	14	4	8.3	4
vi. Enhance the connection with parents and families	3	0.6	17	2	0.5	22	1	4.2	7	2	4.2	8
vii. Government ITed policies	22	4.1	8	10	2.3	10	1	4.2	7	1	2.1	10

## Chapter 5

### Comparisons with other ITed-related studies

Sections 2.1 and 2.3 described studies related to ITed conducted in Hong Kong and overseas, and the focus of this chapter will be placed on comparisons between the results from those studies with this Review Survey. For studies in Hong Kong, data will be mainly drawn from Phase (I) Study 2006; and for overseas studies, related findings from New Zealand (2020 Communication Trusts, 2011), some states of Australia [including New South Wales (Howard & Carceller, 2010) and Victoria (Department of Education and Early Childhood Development, 2012)], South Korea (KERIS, 2011), Japan (MEXT, 2012) and EU countries (European Commission Information Society and Media, 2011), will be considered.

#### 5.1 IT facilities and accessibility

ITed has been promoted for years, because of the Government's support, increase in schools' IT infrastructure has been observed. When compared with Phase (I) Study conducted in 2006 in Hong Kong, Table 5.1 shows that schools possessed more computers in 2012, and the increment of the number of computers (+22.79%, +44.73%, +1.65%, +21.42%) and digital projectors (+23.02%, +104.11%, +101.84%, +78.60%) in classrooms were significant. Moreover, the number of computers (+606.21%, +266.60%, +239.63%, +488.34%) and digital projectors (+151.36%, +286.09%, +217.14%, +234.86%) in special rooms and laboratories almost doubled. In Phase (I) Study, only a few schools reported that there was an electronic whiteboard in school. Recently, most schools have possessed at least one electronic whiteboard.

Table 5.1 Comparisons on IT infrastructure

Indicators	Phase (I) Study (2006)			RS2 (2012)			
	Pri	Sec	Special	Pri	Sec	SpM	SpSp
<b>No. of computers - Desktop</b>	115.23	209.46	68.02	122.83	214.05	94.64	83.35
<b>No. of computers - Notebook</b>	12.68	64.32	12.87	15.06	34.39	30.43	14.27
<b>No. of computers in all classrooms</b>	20.01	18.98	13.91	24.57	27.47	14.14	16.89
<b>No. of digital projectors in all classrooms</b>	17.46	13.64	5.98	21.48	27.84	12.07	10.68
<b>No. of computers in all special rooms and laboratories</b>	4.67	15.39	4.29	32.98	56.42	14.57	25.24
<b>No. of digital projectors in all special rooms and laboratories</b>	2.57	3.38	1.75	6.46	13.05	5.55	5.86
<b>No. of computers in school library for student use</b>	5.46	10.33	3.65	4.94	8.87	3.71	2.73
<b>No. of electronic whiteboards</b>	0.18	0.38	0.15	4.67	2.17	4.86	4.70
<b>No. of digital projectors for mobile use</b>	2.12	0.78	2.55	1.75	2.12	2.00	1.27

When compared with the findings from other countries, the figures revealed that generally classrooms in Hong Kong schools are well-equipped and networked. However, due to the notable dense population in Hong Kong, the student to computer ratio in Hong Kong schools is relatively higher<sup>34</sup>.

Table 5.2 Number of students to 1 computer for students' use

Indicators		Victoria, Australia	New Zealand	EU	South Korea	Japan	Hong Kong (RS2 2012)
No. of Students to 1 computer for students' use	Primary	2.16	5	7.14	4.5	7.5	8.71
	Lower Secondary	1.09	4	5.26	5.0	6.5	8.87
	Upper Secondary			3.23-4.76	3.7	5.1	
	Special				1.5	3.5	3.31-3.55

Compared with New Zealand and Japan, Hong Kong's classrooms are generally equipped with a computer and a projector, which is not a common practice in New Zealand and Japan. This variance may be due to their different school practice of ITed. Most of the computers in Japan's schools are located in computer rooms and the proportions of laptop computers to desktops are also higher than that of Hong Kong. It may indicate that ITed is carried out more in computer rooms in Japan and when needed, laptops and mobile projectors would be deployed for classroom use.

In New Zealand, video conferencing is popular with 45% of her secondary schools purchased or leased room-based video conferencing equipment. Besides, a considerable number of schools in New Zealand allow their students to bring their own mobile phones, laptops, netbooks and tablets to schools. For example, they would be spending over 80% of their time with the laptops for educational purposes. The situation is also similar for the State of Victoria in Australia where a netbook project has been implemented to head towards a 1:1 ratio of students to wireless-enabled computer. Overall, the well-equipped classrooms in Hong Kong would contribute to the frequent use of IT during the lessons and high confidence for teachers to deploy IT in their instructions revealed in subsequent sections.

<sup>34</sup> For example, the average number of students in a primary school was 321 in Japan and 592 in Hong Kong. Lower and upper secondary schools in Japan had on average 335 and 652 students in a school while the same figure for Hong Kong was 973. Number of students in special school sectors was relatively similar between Japan and Hong Kong.

Table 5.3 Number of computers, projectors, mobile devices and electronic blackboards in school

Indicators		New Zealand	Japan	Hong Kong (RS2 2012)
No. of computers in each classroom	Primary		0.36	1.13
	Secondary		0.24	0.96
	Special		0.28	1.04-1.35
No. of projectors and/or visualizers in each classroom	Primary	>0.28	0.28	0.99
	Secondary	>0.34	0.11	0.96
	Special		0.07	0.80-0.85
No. of projectors and/or visualizers in each special room	Primary	>0.28	0.11	0.88
	Secondary	>0.34	0.11-0.12	0.92
	Special		0.10	0.74-0.69
No. of mobile learning devices in each school <sup>35</sup>	Primary		7.55	13.8
	Secondary		7.50-16.35	15.64
	Special		12	9.33-20.86
No. of electronic whiteboards in each school	Primary		2.1	4.67
	Secondary		1.9-2.2	2.17
	Special		1.6	4.70-4.86

Regarding the networking infrastructure, Hong Kong is among the leading countries in terms of network bandwidth and wireless network coverage. Hong Kong has similar bandwidth to that in Japan with reference to the proportion of schools having a bandwidth of 25/30 Mbps or above.

In recent years, Government of both New Zealand and South Korea have been putting huge resources in improving schools' networking capacity. In particular, South Korea was the first country in the world to provide high-speed Internet access to every school in 2009 and most of the schools in South Korea are equipped with Internet bandwidth of 100 Mbps or above. While in New Zealand, the Government has been implementing the ultra-fast broadband initiative (UFB) and rural broadband initiative (RBI) to advance networking in both cities and rural areas. Findings revealed that schools in New Zealand will soon have similar bandwidth of 100 Mbps or above. However, it is more common for Hong Kong schools to possess wireless networks than the above mentioned countries.

<sup>35</sup> This measure included portable computers, tablets and other mobile learning device for students' use.

Table 5.4 Networking Infrastructure

Indicators		New Zealand	South Korea	Japan	Hong Kong (RS2 2012)
Proportion of schools with bandwidth of 25/30 Mb <sup>36</sup> or above	Primary			71.4%	79.05%
	Secondary			66.5-73.1%	89.02%
	Special			69.1%	48.65-57.14%
Proportion of schools with 100 Mb or above bandwidth	Primary	31% <sup>37</sup>	70%		35.05%
	Secondary	36% <sup>37</sup>			46.59%
	Special				18.92-28.57%
Proportion of schools with WiFi <sup>38</sup>	Primary	66%		26.8%	89.37%
	Secondary	39%		13.2-26.2%	92.58%
	Special			15.8%	94.59-100%

## 5.2 Resources

As shown in Table 5.5, the number of TSS hired by schools in Hong Kong is about the same as between 2006 and 2012 (-5.65%, +12.81%, +7.08%, +12.39%), while the number of ITed team members has slightly decreased (-23.26%, -10.19%, +26.27%, +9.38%).

Table 5.5 Comparison on human resources

Indicators	Phase (I) Study (2006)			RS2 (2012)			
	Pri	Sec	Special	Pri	Sec	SpM	SpSp
No. of TSS staff member(s)	1.77	2.03	1.13	1.67	2.29	1.21	1.27
No. of ITed team members	5.89	5.40	3.73	4.52	4.85	4.71	4.08

As regards the average budget allocated for ICT in education, on school basis, Hong Kong has been spending more on IT each year which comprises a larger proportion of the total school expenditure as compared to New Zealand and South Korea. However, when calculating the average budget for ITed per student, Hong Kong spends less than South Korea, probably due to higher school student enrollment.

<sup>36</sup> As the data of bandwidth were in different ranges, the most meaningful comparison of ranges was extracted. The data for Japan represented bandwidth equal to or higher than 30Mb while for Hong Kong represented equal to or higher than 25Mb.

<sup>37</sup> These were the *expected* value by Dec 2012 filled out by New Zealand schools in 2011.

<sup>38</sup> The Japan data presented were the proportions of *classrooms* with Wifi instead of schools.



Table 5.6 School's budget on ITEd

Indicators		New Zealand <sup>39</sup>	South Korea <sup>40</sup>	Hong Kong (RS2 2012)
Average budget for ICT in education (HKD)	Primary	216,806	218,310	322,845
	Secondary	773,333	232,394 - 323,944	449,110
	Special			231,081 - 282,143
Average budget for ICT in education per student (HKD)	Primary		1186	545
	Secondary		609 - 906	461
	Special			1656 - 1738
Percentage of school annual expenditure spent on ITEd	Primary	10.5%	5.33%	13.08%
	Secondary	11.6%	4.05-5.02%	11.19%
	Special			9.83-11.85%

By comparing with Phase (I) Study (Table 5.7), schools are now equipped with more digital resources than in 2006, among which interactive platform is more favorable, such as Intranet (+13%, +4%, +6%, +13%) and learning platform (+9%, +11%, +40%, +15%), while fewer schools offer teachers' (-10%, -17%, ±0%, +4%) or students' homepage (-4%, -14%, -4%, +7%).

Table 5.7 Digital resources

Indicators	Phase (I) Study (2006)			RS2 (2012)			
	Pri	Sec	Special	Pri	Sec	SpM	SpSp
Availability of school homepage	98%	100%	95%	100.00%	100.00%	100.00%	100.00%
Availability of school Intranet	82%	95%	87%	94.54%	98.81%	92.86%	100.00%
Availability of e-Learning Platform / Learning Management System (LMS)	76%	83%	53%	85.06%	94.36%	92.86%	67.57%
Availability of teachers' homepage(s)	22%	60%	7%	12.07%	43.03%	7.14%	10.81%
Availability of students' homepage(s)	15%	48%	4%	10.63%	33.83%	0.00%	10.81%

When compared with New Zealand, EU countries and Japan, Hong Kong schools are better equipped with school homepage and learning management system (LMS) (Table 5.8). Regarding functions enabled by the e-system, the extent of IT use in more administrative tasks is similar in Japan and Hong Kong whereas, Hong Kong schools deployed IT more extensively in facilitating communications between relevant stakeholders and managing ITEd-related resources (Table 5.9). This shows that schools of Hong Kong have a more extensive use of IT.

<sup>39</sup> The 2011 average exchange rate was used which 1 HKD = 0.162 NZD

<sup>40</sup> The 2011 average exchange rate was used which 1 HKD = 142 KRW

Some information about various emerging digital resources from different countries is also noted. The extent of Cloud computing enabled by the e-system is surveyed in Japan and it is found that about one-fourth to one-third of the e-systems supported the usage of Cloud computing technology. Furthermore, 29.4% and 17.3% of primary schools and junior secondary schools in Japan have been using digital textbooks respectively. The South Korean Government has also proposed the plan to use digital textbooks in all schools across every subject and level by 2015. These phenomena will be further discussed in Chapter 6.

Table 5.8 Schools' digital resources

Indicators		New Zealand	EU	Japan	Hong Kong (RS2 2012)
Schools with homepage	Primary			86.4%	100%
	Secondary			85.5-99.0%	100%
	Special			98.6%	100%
Schools with Learning Management System (LMS)	Primary	50%	~33%	65.1%	85.06%
	Lower Secondary	78%	56%	65.8%	94.36%
	Upper Secondary		61-63%	88.8%	
	Special			82.2%	67.57-92.86%

Table 5.9 Coverage of e-system / mechanism

Coverage of e-system / mechanism		Japan <sup>41</sup>	Hong Kong (RS2 2012)
To capture students' attendance	Primary	55.14%	59.20%
	Secondary	56.39-70.86%	62.31%
	Special	63.95%	35.14% - 42.86%
To facilitate communication amongst relevant stakeholders	Primary	31.05%	80.75%
	Secondary	29.54-40.14%	88.72%
	Special	38.39%	85.71% - 89.19%
To manage ITEd-related resources	Primary	57.55%	78.16%
	Secondary	58.23-75.39%	84.87%
	Special	77.93%	57.14% - 94.59%
To manage booking of ITEd-related resources	Primary	24.35%	36.49%
	Secondary	24.35-30.19%	65.58%
	Special	32.39%	28.57% - 37.84%

<sup>41</sup> The Japan survey reported the proportion of schools with e-systems and within these schools, whether particular functions could be performed by these systems. The data presented here were the product of these two percentages, which represented the proportion of schools with the various functions enabled by e-systems in all schools context.

### 5.3 IT deployment in schools

Compared with New Zealand, the proportion of schools having ITEd development plan is similar to that of Hong Kong with the majority being a one-year plan. (Table 5.10)

Table 5.10 ITEd development plan

Indicators			New Zealand	Hong Kong (RS2 2012)
Schools with ITEd development plan	Primary		76%	81.61%
	Secondary		80%	78.04%
	Special			85.71%-89.19%
Duration of ITEd development plan	Primary	1 year	52%	61.18%
		2 years	14%	5.88%
		≥ 3 years	32%	32.94%
	Secondary	1 year	42%	61.17%
		2 years	31%	8.74%
		≥ 3 years	25%	30.10%
	Special	1 year		72.73%-100%
		2 years		0%
		≥ 3 years		0%-27.27%

“To improve students’ learning outcomes” (+3.40%, +0.68%, +3.32%, +1.33%) and “To foster students’ information literacy (IL)” (+2.54%, +0.24%, +6.78%, +0.50%) are schools’ major considerations when they formulate their ITEd plans. Table 5.11 shows the areas of concern by schools in Phase (I) Study and RS2. Other goals showing greater increment include “To enhance students’ understanding of subject content” (+2.10%, +1.18%, +5.49%, 2.63%) and “To provide suitable learning activities according to needs of individual students” (+2.72%, +2.04%, +0.93%, +1.63%), indicating that to improve teaching effectiveness is still a high priority.

Table 5.11 IT deployment in schools

Indicators	Phase (I) Study 2006			RS2 (2012)			
	Pri	Sec	Special	Pri	Sec	SpM	SpSp
To improve students' learning outcomes	4.41	4.44	4.52	4.56	4.47	4.67	4.58
To enhance students' understanding of subject content	4.29	4.24	4.19	4.38	4.29	4.42	4.30
To provide suitable learning activities according to needs of individual students	4.04	3.93	4.29	4.15	4.01	4.33	4.36
To strengthen students' initiative, independence and sense of responsibility in learning	4.28	4.20	4.23	4.25	4.13	4.33	4.24
To strengthen / develop students' generic skills (e.g. analytical skills, creativity, & collaboration skills)	4.17	4.09	4.10	4.20	4.14	4.08	4.00
To meet the expectations of parents	3.73	3.57	3.69	3.49	3.36	3.58	3.58
To meet the expectations of the community				3.62	3.45	3.92	3.48
To improve communication & cooperation among school, parents & the community	3.83	3.62	3.81	3.70	3.76	3.92	3.88
To provide guidance / briefing sessions so as to prepare students for further studies / future careers	3.68	3.73	3.96	3.27	3.71	3.83	3.39
To promote cross-subject / curricular collaboration activities for enhancing students' learning	3.94	3.83	3.85	4.13	3.99	4.08	4.09
To foster students' information literacy (IL)	4.33	4.19	3.98	4.44	4.20	4.25	4.00
To promote learning through assessment	3.92	3.85	4.15	3.98	3.97	3.83	4.30

Concerning the policy in IT use in learning and teaching, it is more common for Hong Kong schools to request teachers to include IT elements in subject-/KLA-based plans as appropriate and provide guidelines on use of IT for teachers and students (Table 5.12).

Table 5.12 Policy on ITED

Indicators		EU	Hong Kong (RS2 2012)
Has a policy which it enacts to use ICT for teaching and learning in specific subjects	Primary	45%-56%	93.68%
	Secondary		85.16%
	Special		71.43%-97.30%
Has a policy for responsible internet behavior	Primary	61%-69%	83.62%
	Secondary		86.94%
	Special		56.76%-71.43%
Has a written statement about the use of ICT specifically for teaching and learning	Primary	34%-38%	83.33%
	Secondary		82.79%
	Special		78.38%-85.71%

## 5.4 IT deployment for learning and teaching

Apart from the related hardware, teacher is another important agency for promoting ITed. Over 70% of the teachers (78%, 77%, 79%, 77%) in the RS2 feel confident or very confident in using IT for learning / teaching, which is similar to the results obtained from RS1 (Table 5.13). Besides, the current survey also reviewed teachers' use of the Depository of Curriculum-based Learning and Teaching Resources developed by EDB. About 30% of the teachers (31%, 24%, 34%, 34%) have used the resources from this Depository before. Yet, some of them cannot distinguish between resources developed by EDB and those by the HKEdCity.

Table 5.13 The overall situation of teachers' use of IT in learning / teaching in different sectors

Sector		No. of Teachers who Reported to (%)						
		be confident or very confident in using IT for learning / teaching	have used emerging technology (e.g. Web 2.0 technology such as Blog, Wiki and Podcast) for learning / teaching	have used IT for learning / teaching <i>in the past month</i>	have used Depository of Curriculum-based Learning and Teaching Resources developed by EDB for learning / teaching <i>in the past month</i>	have used free-of-charge resources other than the mentioned Depository for learning / teaching <i>in the past month</i>	have used off-line or on-line fee-charging resources for learning / teaching <i>in the past month</i>	have assigned students to use IT to perform learning tasks beyond school hours <i>in the past month</i>
Pri	RS1 (N=27877)	22967 (82)	7520 (27)	24395 (88)	21053 (76) <sup>42</sup>		5681 (20)	13360 (48)
	RS2 (N=28040)	22000 (78)	11469 (41)	23793 (85)	8720 (31)	16646 (59)	5668 (20)	13164 (47)
Sec	RS1 (N=22656)	17530 (77)	9127 (40)	19071 (84)	16803 (74) <sup>42</sup>		6584 (29)	11631 (51)
	RS2 (N=25711)	19801 (77)	13526 (53)	4173 (16)	6105 (24)	15948 (62)	5677 (22)	11892 (46)
SpM	RS1 (N=667)	468 (70)	239 (36)	439 (66)	429 (64) <sup>42</sup>		129 (19)	168 (25)
	RS2 (N=636)	505 (79)	357 (56)	484 (76)	216 (34)	405 (64)	121 (19)	194 (31)
SpSp	RS1 (N=1927)	1594 (83)	307 (16)	1700 (88)	1503 (78) <sup>42</sup>		91 (5)	220 (11)
	RS2 (N=2177)	1668 (77)	953 (44)	1893 (87)	730 (34)	1446 (66)	294 (14)	276 (13)

When compared with the data from overseas studies, more Hong Kong teachers respond that they feel confident in using IT for learning and teaching (Table 5.14) with about 80% of them having used IT for learning and teaching within the month prior to the survey. This prevalence of use of IT is similar to that in EU countries (Table 5.15). Hong Kong teachers have also been using emerging technologies in their teaching more frequently though not as common as in New Zealand.

<sup>42</sup> This number indicates teachers who have used free-of-charge resources.

Table 5.14 Teachers' confidences in using IT for learning/teaching

Indicators		NSW, Australia	New Zealand	EU <sup>43</sup>	Japan	Hong Kong (RS2 2012)
Teachers confident in using IT for learning / teaching	Primary	69.7% <sup>44</sup>		~66%	67.4%	78.46%
	Secondary			~66%	60.8-66.1%	77.01%
	Special			~66-82.5%	60.8%	76.62-79.40%

Table 5.15 Proportion of teachers who have used IT in learning and teaching

Indicators		New Zealand	EU	Hong Kong (2012)
Have used IT for learning / teaching in the past month	Primary		86%	85%
	Secondary		81%-87%	82%
	Special			76%-87%
Have used emerging technology (e.g. Web2.0 technology such as Blog, Wiki and Podcast) for learning / teaching	Primary	82%		41%
	Secondary	90%		53%
	Special			44%-56%

Considering the extent of IT use in different subjects/KLAs, it is found that the English Language and Mathematics teachers in both New Zealand and Hong Kong have higher extent of IT use while Science teachers in Hong Kong are exercising higher usage of IT (Table 5.16).

Table 5.16 Extent of IT use in different subjects

Extent of IT use in		New Zealand <sup>45</sup>	Hong Kong (RS2 2012)
English Language	Primary	4.27	4.44
	Secondary		3.88
	Special		4.07
Mathematics	Primary	4.22	4.36
	Secondary		3.24
	Special		3.76-3.86
Science	Primary	3.55	4.59
	Secondary		4.00
	Special		4.22-4.57

<sup>43</sup> Teachers' confidence was denoted on a scale from 1 to 4 with 1 being "not at all" and 4 being "a lot". For the sake of comparison, these scores were converted to percentages.

<sup>44</sup> This number includes schools choosing 'agree' and 'strongly agree'

<sup>45</sup> These scores were originally in a three-point scale with "Never" being 1, "Sometimes" being 2 and "Often" being 3. For the sake of comparison, the scores were converted in a five-point scale.

To use IT effectively in learning / teaching, different training programmes have been provided for teachers, which allow them to have better understanding on the latest development of ITed. According to the data from RS2 (Table 5.17), around 60% of the surveyed teachers participated in ITed-related training, which is similar to the data from Phase (I) Study. Results also show that teachers prefer training in the forms of workshops (32%, 32%, 39%, 33%) and training courses (28%, 29%, 32%, 31%).

Table 5.17 Professional development programmes on ITed

Indicators	Phase (I) Study (2006)			RS2 (2012)			
	Pri	Sec	Special	Pri	Sec	SpM	SpSp
Training course(s)	40%	46%	52%	60.06% <sup>46</sup>	52.82% <sup>46</sup>	42.86% <sup>46</sup>	62.16% <sup>46</sup>
Workshop(s)	61%	60%	76%				
Seminar(s) / sharing session(s)	32%	38%	33%				
Joint publications	8%	2%	5%	12.07%	10.09%	14.29%	5.41%

Compared with overseas studies, Hong Kong teachers have more opportunities for professional development. It is also more common for Hong Kong teachers to participate in sharing sessions organised within the schools (Table 5.18). All these help teachers build up their confidence in exploring the pedagogical potentials of IT in their teaching.

Table 5.18 Professional development programmes and sharing for teachers

Indicators		NSW, Australia	New Zealand	EU	Japan	Hong Kong (2012)
Professional development programmes	Primary	66.4%			26.5%	86.49%
	Secondary				16.9-18.1%	79.23%
	Special				24.4%	78.57-97.30%
Sharing session organized for teachers within school	Primary		58%	47-57%		73.85%
	Secondary		72%			66.17%
	Special					71.43-94.59%

<sup>46</sup> This number only includes providing training courses / workshops / seminars / sharing sessions with other organisations. If training courses / workshops / seminars / sharing sessions within schools are also included, the percentage will be much higher.

## 5.5 Students' awareness/competency in use of IT

ITEd has been implemented for years, students have generally acquired basic knowledge in using IT. Therefore, teachers' evaluations on students' IL and competency in using IT have correspondingly increased when compared with results obtained from Phase (I) Study conducted in 2006 (average scores were used to calculate the percentages as shown below) (Table 5.19). The increase in students' "Information search" (+6.99%, +13.68%, +7.67%, +26.45%) and "Reporting & presentation" (+4.85%, +4.52%, +14.24%, +27.40%) skills are quite significant. But primary school students' skills on "Information selection" (-3.00%, +1.03%, +5.11%, +24.89%), "Information collation & analysis" (-3.47%, -0.66%, +1.58%, +17.67%) and "Chinese characters input" (-5.28%, +7.03%, -2.72%, +11.02%) scored lower than those in 2006. Therefore, apart from providing teachers with training on using IT, schools considered it would be essential for the students to acquire the said skills/competency.

Table 5.19 Students' awareness and competency in using IT

Indicators	Phase (I) Study (2006)			RS2 (2012)			
	Pri	Sec	Special	Pri	Sec	SpM	SpSp
<b>Information search</b>	3.91 <sup>47</sup> 4.10 <sup>48</sup>	3.91 <sup>49</sup> 3.86 <sup>50</sup> 4.00 <sup>51</sup>	3.65 <sup>52</sup> 2.42 <sup>53</sup>	4.29	4.46	3.93	3.06
<b>Information selection</b>	3.60 <sup>47</sup> 3.74 <sup>48</sup>	3.56 <sup>49</sup> 3.56 <sup>50</sup> 3.60 <sup>51</sup>	3.33 <sup>52</sup> 2.25 <sup>53</sup>	3.56	3.61	3.50	2.81
<b>Information collation &amp; analysis</b>	3.54 <sup>47</sup> 3.67 <sup>48</sup>	3.51 <sup>49</sup> 3.53 <sup>50</sup> 3.50 <sup>51</sup>	3.16 <sup>52</sup> 2.15 <sup>53</sup>	3.48	3.49	3.21	2.53
<b>Reporting &amp; presentation</b>	3.49 <sup>47</sup> 3.72 <sup>48</sup>	3.50 <sup>49</sup> 3.54 <sup>50</sup> 3.57 <sup>51</sup>	3.16 <sup>52</sup> 2.08 <sup>53</sup>	3.78	3.68	3.61	2.65
<b>Chinese characters input</b>	3.47 <sup>47</sup> 3.54 <sup>48</sup>	3.56 <sup>49</sup> 3.68 <sup>50</sup> 3.72 <sup>51</sup>	3.67 <sup>52</sup> 2.45 <sup>53</sup>	3.32	3.91	3.57	2.72

<sup>47</sup> P2

<sup>48</sup> P4

<sup>49</sup> S2

<sup>50</sup> S4

<sup>51</sup> S6

<sup>52</sup> Mainstream curriculum

<sup>53</sup> Special curriculum



When compared with EU countries' secondary school students, the IL competency of Hong Kong student in information selection and proper use of IT is comparable to the European students. Both of them scored around 3 to 4 with 5 being the highest score. In terms of IT skills, Hong Kong students' skills in computer operation and the use of digital resources are relatively better (Table 5.20).

Table 5.20 Students' level of competency in IL and IT skills

Students' level of competency in the following		EU <sup>54</sup>	Hong Kong (RS2 2012)
<b>Computer operation skills</b>	Primary		4.33
	Secondary	3.45	4.30
	Special		3.47-4.00
<b>Information selection</b>	Primary		3.56
	Secondary	3.44	3.61
	Special		2.81-3.50
<b>Proper use of IT (e.g Internet security, Intellectual Property awareness, Personal Data Privacy Awareness)</b>	Primary		3.86
	Secondary	3.81	3.53
	Special		2.94-3.43
<b>Use of digital resources</b>	Primary		3.69
	Secondary	3.20 <sup>55</sup>	3.80
	Special		3.18-3.43

## 5.6 Parental support

To facilitate schools' e-Learning activities, basic IT infrastructure is also necessary at students' home to allow them to have self-directed learning after school. As shown in the data from RS2, around 90% of the students have computer access at home (91%, 94%, 76%, 73%) as well as Internet access (90%, 93%, 78%, 70%), which is comparable to the result from New South Wales of Australia and higher than the figures in the EU study (Table 5.21).

Although exact figures are not available, students in Japan and South Korea are using IT considerably after school. While Japan teenagers are used to surfing the web with their mobile

<sup>54</sup> These scores were originally in a four-point scale with "Not at all" being 1 and "A lot" being 4. For the sake of comparison, the scores were converted in a five-point scale.

<sup>55</sup> This score was quoted average from "students' confidence in social media skills" which referred to the ability to participate in an online discussion forum; the ability to create and maintain blogs or websites; and the ability to participate in social networks.

phones, the South Korean students are using IT intensely in Internet cafes, “cram schools” and their homes where they can use the world’s fastest home Internet connections – on average 100 Mbps now (with planning to be increased to 1 Gbps by the end of 2012<sup>56</sup>).

Table 5.21 Computer and internet access at home

Indicators		NSW, Australia	EU	Hong Kong (RS2 2012)
Computer access at home	Primary	95.4%	77%	90.98%
	Secondary			93.56%
	Special			72.72-75.71%
Internet access at home	Primary	91.9%	73%	89.91%
	Secondary			92.72%
	Special			70.39-78.00%

Hong Kong schools have launched different programmes to help needy students use computer at home, including lending portable computers on loan to needy students for use at home (3%, 24%, 50%, 8%), encouraging needy students to apply for computers from other Government sponsored organisations (78%, 70%, 71%, 81%) and calling for donation of / recycled computers from students / parents (17%, 21%, 21%, 16%) (Table 5.22).

Table 5.22 Availability of computer and Internet access for students at home

Indicators	Phase (I) Study (2006)			RS2 (2012)			
	Pri	Sec	Special	Pri	Sec	SpM	SpSp
Computer access at home	94%	96%	82% <sup>52</sup> 67% <sup>53</sup>	90.98%	93.56%	75.71%	72.72%
Internet access at home	95%	98%	90% <sup>52</sup> 83% <sup>53</sup>	89.91%	97.72%	78.00%	70.39%
Portable computers on loan to needy students for use at home	6%	86%	62%	3.45%	23.81%	50.00%	8.11%
Needy students encouraged to apply for computers from other organisations [e.g. NGOs, IT industries]	55%	29%	63%	77.87%	70.24%	71.43%	81.08%
Call for donation of / recycled computers from students / parents	27%	17%	37%	16.67%	20.83%	21.43%	16.22%

To cooperate with school’s ITed plan, parents’ knowledge on using IT is also important. Hence, many schools have provided parents with different activities with an aim to equipping them with better understanding of ITed. However, by comparing the results from RS2 and Phase (I) Study, the percentage of schools which have organised activities to encourage parents to participate in ITed was decreased (Table 5.23). This may be due to some particular issues, for example, IL is

<sup>56</sup> Source: [http://www.nytimes.com/2011/02/22/technology/22iht-broadband22.html?\\_r=0](http://www.nytimes.com/2011/02/22/technology/22iht-broadband22.html?_r=0)

new to the majority of the parents in 2006 and schools inclined to provide more related activities for parents. While the utilization of the Internet has become more common in recent years, the need for this kind of activities is not pressing. However, as some schools also reflected, the change in ITEd paradigm enabled by the emerging technologies would require a closer home-school communication.

Table 5.23 Parental support

Indicators	Phase (I) Study (2006)			RS2 (2012)			
	Pri	Sec	Special	Pri	Sec	SpM	SpSp
Encouraged parents to visit the school website / Intranet so as to understand the situation	91%	91%	81%	94.54%	89.58%	71.43%	83.78%
Provided ITEd-related activities for parents	82%	84%	81%	68.10%	48.81%	35.71%	59.46%
Explained the work of ITEd in school to parents	60%	54%	48%	52.01%	39.88%	21.43%	54.05%
Encouraged parents to instill the proper principles, values and attitude in the use of IT into their child(ren)	86%	75%	77%	78.45%	61.01%	50.00%	56.76%

## 5.7 School expectations on ITEd

Table 5.24 shows the three most needed facilities in RS2 and Phase (I) Study. In 2006, the most needed three items were “Computers and projectors in classrooms”, “Multi-media computer rooms” and “e-Learning platform / Learning Management System (LMS)”. According to the current survey, 91% of primary schools, 95% of secondary schools, 71% of special (mainstream) schools and 68% of special (special) schools have multi-media computer room(s). Therefore, schools’ demand on multi-media computer room decreased. This will be further discussed in Chapter 6, in alignment with the global trend that ITEd has been taking place in ordinary classrooms.

For RS2, the three most needed facilities are “Mobile learning devices” (15%, 14%, 10%, 17%), “Computers and projectors in classrooms” (15%, 13%, 10%, 9%), and “e-Learning platform / Learning Management System (LMS)” (10%, 10%, 8%, 7%). Among all items, the demand for “Mobile learning devices” increased while the demand for “Multi-media computer rooms” decreased. This reflects the change in schools’ ITEd plan shifting from using IT as a tool to supplement teaching to its integration into everyday learning and teaching. Mobile learning is also common in schools.

Table 5.24 School's most needed IT facilities

Indicators	Phase (I) Study (2006)			RS2 <sup>57</sup> (2012)			
	Pri	Sec	Special	Pri	Sec	SpM	SpSp
Multi-media computer rooms	48%	43%	33%	8%	7%	18%	4%
Enhanced broadband Internet connection	10%	17%	15%	7%	7%	13%	11%
Computers and projectors in classrooms	57%	60%	54%	15%	13%	10%	9%
Wireless network	25%	25%	19%	8%	8%	5%	2%
Interactive electronic whiteboards	25%	20%	17%	9%	4%	3%	12%
School campus TV	28%	23%	13%	1%	2%	3%	3%
Mobile learning devices	32%	30%	29%	15%	14%	10%	17%
e-Learning platform / Learning Management System (LMS)	45%	54%	54%	10%	10%	8%	7%

<sup>57</sup> Calculations for RS2 and Phase (I) Study differ. Hence, direct comparison cannot be made.

## Chapter 6

### Summary and Recommendations

This chapter concludes the major findings of this research, analyses the progress of the Third ITed Strategy – “Right Technology at the Right Time for the Right Task”, and provides direction for the next stage of development for ITed. Gist of the findings will be delineated according to the conceptual framework of the seven review areas, namely, IT facilities and accessibility, resources, IT deployment in schools, IT deployment for learning and teaching, students’ awareness/competency in use of IT, parental support, and school expectations on ITed. For the last review area, school expectations on ITed, the feedback from schools will be incorporated into the relevant preceding six areas for easy reference and ended up with recommendations.

#### Summary of the findings

##### 6.1.1 IT facilities and accessibility

The research shows that the traditional IT facilities possessed by schools did not change significantly in this three-year study period. However, a significant increase was noted in the schools’ possession of innovative devices such as mobile devices. The schools also adopted a higher bandwidth for their Internet connectivity and about 90% had wireless network coverage.

The gross student to computer ratio (including all the computers of the schools) and net student to computer ratio (including only computers for student use) of the primary school sector were 4.54:1 and 8.71:1, respectively; 4.21:1 and 8.87:1 for the secondary school sector; 1.46:1 and 3.31:1 for the special (mainstream) school sector; and 1.36:1 and 3.55:1 for the special (special) school sector. These two ratios did not change significantly during the overall study period between the RS1 and RS2 conducted in the 2009/10 and 2011/12 school years respectively. Nevertheless, when the ratios were compared with the findings from the earlier Second ITed Strategy period, the net student to computer ratio showed some increases (primary +1.94, secondary +4.24, special +1.07 to 1.31). Furthermore, ratios reflecting the number of computers and projectors in classrooms and special rooms remained at around 1, which indicated that most of the schools’ classrooms and special rooms provided at least one computer and projector.

A number of schools also reflected that the electronic devices in their schools were becoming obsolete and upgrading or replacement would be required. In the meantime, the number of emerging i-devices, for example, electronic whiteboards, personal digital assistant (PDA), eBook reader and tablet PC, etc. showed significant growth over the three-year study period. This

indicated that when schools renewed their IT facilities, they also adopted other emerging electronic devices as substitutes. This progression was not shown in the above ratios because they only included traditional computers. Some special schools also reported and strongly recommended the use of tablet computers to assist the learning of students with impaired communication or motor abilities.

Regarding the use of computer rooms beyond school hours, the number of students who used computer rooms after school dropped. In primary schools, the average number dropped from 19 to 16 whereas in secondary schools the number dropped from 26 to 23. Meanwhile, the opening hours of computer rooms beyond school hours were shortened, possibly because of the further improvement in the availability of computers and Internet access for students at home. The collected data will be discussed in details on parental support in paragraph 6.1.6. Generally, the need for multimedia computer rooms was no longer the schools' greatest concern. Instead, more schools chose mobile learning devices as one of the three most needed facilities/services to provide an environment conducive to ITed. The widespread use of mobile devices in recent years prompted several schools to adopt the idea of "Bring your Own Device" (BYOD) and encouraged students to utilize their own mobile devices for learning purposes. All of these developments indicated that e-Learning was no longer confined to computer rooms, but was carried out more extensively in classrooms and around the school campus.

Further improvements in the networking infrastructure of schools had also been implemented. All schools had Internet access and schools across all sectors adopted higher bandwidth. In the primary and secondary school sectors, the percentage of schools with Internet bandwidth below 50 Mb dropped as schools switched to a bandwidth higher than 50 Mb. The most commonly used bandwidth was 100 Mb with a percentage increased from 21% in 2009/10 to 44% in 2011/12 in the primary school sector, and from 18% to 44% in the secondary sector. The percentages of schools with wireless networks were 89.37% in the primary sector, 92.58% in the secondary sector, 100% in the special (mainstream) school sector, and 94.59% in the special (special) school sector. Apart from matching the growth of information flow on the Internet, higher bandwidth adoption was also installed to meet the higher requirement of some newly implemented ITed schemes such as mobile learning and electronic schoolbags launched by EDB. The schools looked forward to further upgrading their broadband and wireless networking systems.

### 6.1.2 Resources

This study divided schools' IT resources into three categories, namely, **human resources, financial resources and IT infrastructure.**

In the study period, the **human resources** of schools generally did not have significant changes. Schools across all sectors had on average about three teachers responsible for coordinating ITED development, and four to five teachers who were ITED team members. The number of IT technical support services (TSS) staff remained between one and two, with only two primary schools reported having no TSS staff. As noted, one of the greatest concerns for schools was about employing a TSS staff. Many schools reflected that the lower salary of this position when compared with similar manpower positions in the job market led to a higher turnover rate. Though the computer rooms were less in use and more mobile i-devices put in place, the complexity of the IT infrastructure networks in schools required extra engagement of TSS in the development and implementation of ITED. Many school respondents suggested regular provision of TSS and a salary scale on par with the laboratory assistants.

With respect to the financial resources, the average annual ITED expenditures of schools increased. The discrepancies of the amount of expenditures between schools also narrowed. For the sake of convenience for schools to report their expenditures, schools were only asked to choose among the suitable expenditure ranges (e.g., \$251,000 to \$300,000) without being asked to provide the exact annual expenditures. In 2010, most secondary schools reported that their expenditures were in the range of \$301,000 to \$400,000, which accounted for 24.38% of the entire secondary school sector. In 2012, the greatest percentage of schools had spent around \$401,000 to \$600,000, which accounted for 30.27% of the entire sector. A similar upward pattern also existed in the special school sectors. For the primary school sector, this greatest percentage group remained at the range of \$301,000 to \$400,000, but the figure went up from 22.51% to 25%.

On average, school expenditures on ITED had been slightly increased, with ratio of this expenditure to the whole expenditure of school remained at 12% to 13% in the primary school sector, 11% in the secondary school sector, whereas the special (mainstream) school sector reported a decline from 14% to 10%, and the special (special) school sector remained at 8%. Some of the special schools showed their wish for additional Government funding due to their smaller number of operating classes with lesser funding received.

Regarding the IT infrastructure in schools, all schools had their own school webpage while 95% of primary schools, 99% of secondary schools, 93% of special (mainstream) schools, and 100% of special (special) schools had school Intranet. The percentages of schools with e-Learning platform or Learning Management System (LMS) were 85% in the primary school sector, 94% in the secondary school sector, and 93% and 68% in the special (mainstream) and special (special)

school sectors respectively. These figures reflected that most schools were equipped with basic IT infrastructure. Moreover, some schools had also started to use smart phones' or tablet PCs' applications (Apps).

### **6.1.3 IT deployment in schools**

Respondent schools were generally satisfied with the ITEd development in their schools and the level of satisfaction was about the same in the overall study period. With reference to a Likert scale ranging from “totally not satisfied” (1) to “very satisfied” (5), the score for the level of satisfaction in the primary school sector was 3.68, 3.74 for the secondary school sector, and 3.86 and 3.77 for the special (mainstream) and special (special) school sectors respectively. The scores for the four school sectors were between “fairly satisfied” (3) and “satisfied” (4).

Regarding the ITEd development plan, 82% of primary schools, 78% of secondary schools, 86% of special (mainstream) schools, and 89% special (special) schools had formulated an ITEd development plan, among which 30%, 39%, 25% and 33% were independent plans separated from the whole school development plan. Most of these independent plans were one-year plans and majority of the schools' ITEd development plans included evaluation mechanism. Schools continued to perceive “To improve students' learning outcomes” as the most important goal in formulating school ITEd development plans scoring higher as compared with the previous ITEd Strategy period. Schools expressed that the Government may wish to provide onsite school support by, for example, KLA specialists and online depository learning materials to strengthen their ITEd development.

Schools also extensively utilized e-systems/mechanisms to facilitate work flow. The most commonly used system was e-mail, SMS, Intranet, or others to facilitate communication among relevant stakeholders. In secondary and primary schools, the percentages were 89% and 81%, respectively. The second was in the area of management of ITEd-related resources, which accounted for 78% and 85% in secondary and primary schools respectively. In particular, more schools used IT to manage students' learning records, including other learning experiences. This percentage in primary schools increased from 25% to 35%, and from 70% to 80% in secondary schools in this three-year study period. About 40% of secondary and primary schools had collaborated with other organisations to develop IT tools or systems to facilitate more efficient administration or management work.

Moreover, for the measures/schemes deployed to enhance students' learning effectiveness, most schools provided free-of-charge learning resources and over half of the schools provided off-line or on-line fee-charging resources. Nearly 40% to 50% schools had collaborated with other organisations to develop or had tried using IT tools or systems to facilitate learning and teaching.



30% to 40% of secondary and primary schools and 50% to 60% of special schools had collaborated with other organisations to develop from or make use of the emerging technological devices to enhance the effectiveness of learning and teaching. Nevertheless, many respondent schools suggested that it would be beneficial to have more e-Learning resources to facilitate students' self-directed learning in the mainstream schools and tailor-made e-resources for students in special schools.

Regarding curriculum planning, almost all of the schools offered Computer/IT as a discrete subject for teaching the students computer/IT skills in the primary (98%), secondary (97%), special (mainstream) (100%), and special (special) (76%) schools. Over 70% of the schools integrated computer/IT skills into the school curriculum across different disciplines and extra-curricular activities. In addition, 80% to 90% of the secondary and primary schools requested teachers to include IT elements in subject-/Key Learning Areas(KLAs)-based plans where appropriate or in learning activities like project-/enquiry-based learning. Nearly all of the schools integrated information literacy (IL) into the IT curriculum [primary, 96%; secondary, 98%; special (mainstream), 86%; and special (special), 89%]. Across school sectors, 70% to 80% had instilled IL in the students through teaching activities of different subjects. The data above showed that most schools appreciated the pedagogical effectiveness and importance of ITed across the school curriculum.

#### **6.1.4 IT deployment for learning and teaching**

This study revealed that the majority of Hong Kong teachers remained confident in using IT for education. The percentages of teachers who responded “confident” or “very confident” in using IT for learning or teaching were 78% in primary schools, 77% in secondary schools, and 79% and 77% in special (mainstream) and special (special) schools, respectively. The percentages of teachers of different subjects who expressed to have confidence in using IT did not have significant changes in the study period. Moreover, the percentages of respondents who had used IT for learning or teaching in the month prior to the conduct of this questionnaire Survey remained at high levels—the percentages were 85% in primary schools, 82% in secondary schools, and 76% and 87% in special (mainstream) and special (special) schools, respectively.

With regard to the extent of teachers' use of IT for learning or teaching, on a Likert scale ranging from 1 (“never”) to 5 (“always”), except for Physical Education and Arts Education, all other subjects scored greater than 4 (“a lot”) in the primary school sector. In the secondary school sector, except for Physical Education, the extent of IT use in all other subjects scored greater than 3 (“sometimes”), with many subjects scoring near or even higher than 4. All these indicated that teachers continued to utilize IT in assisting teaching with confidence.

Furthermore, with respect to the pedagogical resources used by the teachers in the month prior to the conduct of the Survey, the percentages of using free-of-charge resources for learning or teaching generally showed downward trends—in the primary school sector, the percentage dropped from 76% to 59%, and from 74% to 62% in the secondary school sector. These free-of-charge resources were mainly provided by textbook publishers and the HKEdCity/EDB, etc. For the percentages of using offline or online fee-charging resources stayed at 20% in primary schools, but dropped from 29% to 22% in secondary schools. Most of these resources were for KLAs, such as the Chinese Language, the English Language and Mathematics.

Correspondingly, the percentages for using emerging technologies such as Web 2.0 (e.g., blog, wiki, and podcast) showed upward trends in all four school sectors—in the primary school sector, this percentage increased from 27% in 2010 to 41% in 2012; in the secondary school sector, from 40% to 53%; in the special (mainstream) school sector, from 36% to 56%; and in the special (special) school sector, from 16% to 44%. Moreover, the percentages of schools that used the e-resources of the Depository of Curriculum-based Learning and Teaching Resources were 31% for primary schools, 24% for secondary schools, 34% for special (mainstream) schools, and 34% for special (special) schools.

As mentioned in the previous section, many respondent teachers were concerned with the availability of online e-Learning resources, for example, the Depository of Curriculum-based Learning and Teaching Resources which were useful to their teaching preparations. Also, they had easier access to open-source and diversified digital teaching materials (e.g., wiki and podcast).

Nevertheless, the above data revealed an encouraging phenomenon, i.e. teachers were less dependent on pre-designed teaching materials, whether freeware or chargeable, they resorted more to tailor-make their own teaching resources for catering learner diversity. Besides, some schools also partnered with other organisations in developing e-Learning resources or innovative devices to enhance learning and teaching while the use of Web 2.0 technology further transformed pedagogy and students' role from a user of learning resources to a director of self-learning.

Aside from the above e-Learning resources covered by this Survey, the on-going “Pilot Scheme on e-Learning in Schools,” launched in 2010 across three years to be completed in the 2013/14 school year, aims to pave the way for the wider adoption and sustainable development of e-Learning in schools. Moreover, the EDB endeavours to develop the e-textbook market and launched a scheme, namely the “E-Textbook Market Development Scheme (EMADS)”, which aims to facilitate and encourage the participation of potential and aspiring e-textbook developers in creating a diverse range of e-textbooks in accordance with local curricula. These schemes/projects would help generate more e-Learning pedagogical exemplars and quality electronic resources.

Concerning the teachers' ITEd-related professional development deployed by schools, in-school sharing sessions remained the most commonly organized activities, with the percentages of 74% in the primary school sector, 66% in the secondary school sector, and 71% and 95% in the special (mainstream) and special (special) school sectors, respectively. Besides, professional development activities for school teachers organized by tertiary institutions/NGOs/IT industries, as well as school visits, were found getting less common. On the contrary, sharing sessions co-organized with the other schools became more popular with the percentages in primary schools increased from 15% to 48%, 12% to 44% in secondary schools, 14% to 57% in special (mainstream) schools and 7% to 19% in special (special) schools. These percentages indicated that schools became more involved and engaged in exchanges and collaborations among peers.

In addition, workshops and training courses were the most preferred professional development modes perceived by schools, with about one-third of schools expressing preference for both modes. Similarly, the most common collaborative projects/activities with other organisations on the use of IT for learning or teaching remained to be "training courses/seminars/workshops/sharing sessions".

In sum, despite teachers had to make more efforts on tailoring and preparing their teaching materials and familiarising themselves with the innovative technology, their confidence and extent of using IT in teaching remained at a high level, indicating that Hong Kong teachers are competent and ready for more in-depth and extensive application of IT in teaching across all disciplines.

### **6.1.5 Students' awareness/competency in use of IT**

The school teachers were asked to rate their perception of students' awareness/competency in use of IT on a Likert scale ranging from 1 ("totally not competent") to 5 ("very competent") for a set of related items. Competency in using emerging technical devices showed a significant growth. The rating increased from 3.60 in RS1 to 3.70 in RS2 for primary school students and from 3.79 to 4.08 for secondary school students respectively.

The ratings in other areas did not have significant changes. Overall, students' IL and IT skills remained good generally. The different aspects of IT skills of primary school students generally rated between 3 ("fairly competent") and 4 ("competent"), of which "computer operation skills" (4.33) and "information search" (4.29) scored the highest. In the secondary school sector, students' IL on average was between "fairly competent" and "competent", while IT skills continued to be assessed as "competent". The two items that scored the highest were the same as those in the primary school sector and also identical with the findings in 2010. They were "information search" (4.46) and "computer operation skills" (4.30).

Moreover, in the special (mainstream) school sector, students' IL and IT skills remained "fairly competent" to "competent," but with high growth in the aspect of using emerging technical devices, with the rating increasing from 3.31 to 3.71. The two highest-rating items were also "computer operation skills" (4.00) and "information search" (3.93). Whereas in the special (special) school sector, students' ratings in all areas stayed at the level of "fairly competent". The highest-rating area was "computer operation skills" (3.47).

Students generally had better ratings in the item "information search". If this item was excluded, the remaining four IL-related items, namely, information selection, information collation and analysis, reporting and presentation, and proper use of IT (e.g., Internet security, intellectual property awareness, and personal data privacy awareness), had on average lower ratings than those of IT skills. This difference was larger among secondary school students than primary school students, indicating that throughout primary and secondary education, students' advancement in IT skills was greater than their advancement in IL.

In contrast to the previous Second ITed Strategy period, this study revealed that students generally had better ratings in all IT aspects. In particular, students' ratings in "information search" (primary +6.99%, secondary +13.68%, special (mainstream) +7.67%, special (special) +26.45%) and "reporting and presentation" (primary +4.85%, secondary +4.52%, special (mainstream) +14.24%, special (special) +27.40%) showed more significant increases. Only in the areas of "information selection", "information collation and analysis" and "Chinese characters input" slight decreases were found in the primary school sector (-3.00%, -3.47%, and -5.28%, respectively).

Based on the findings above, students are generally equipped with good awareness and competency in use of ITed. The previous section has revealed that school teachers also have sufficient abilities to apply various IT and electronic resources. All these have scaffolded the stage for more in-depth implementation of e-Learning in Hong Kong.

### **6.1.6 Parental Support**

In general, the percentages of students who have computer and Internet access at home increased. In the primary school sector, the percentage of students with computer and Internet access at home increased from 86.54% to 90.98% and from 81.13% to 89.91% respectively. In the secondary school sector, the same upward trend was reported. The percentage of those with computer and Internet access at home increased from 92.21% to 93.56% and from 90.93% to 92.72% respectively. However, in the special (mainstream) school sector, the percentage of students with computer access at home decreased from 86.36% to 75.71% and from 83.21% to 78% for Internet access.

In the special (special) school sector, the percentage of students with computer and Internet access at home increased from 63.87% to 72.72% and from 59.50% to 70.39% respectively.<sup>60</sup>

With regard to the measures or schemes deployed to help needy students use IT for their learning after-class, encouraging students to join the “Computer Recycling Programme”<sup>61</sup> of the EDB was the most popular measure among all school sectors. This measure was adopted by 82% of primary schools, 71% of secondary schools, 71% of special (mainstream) schools, and 65% of special (special) schools. The percentages of schools that encouraged needy students to apply for computers from other organisations increased, say the “i Learn at home” Internet Learning Support Programme run by the Office of the Government Chief Information Officer (OGCIO) since July 2011. Collected figures in the study revealed there were significant increases—for primary schools, from 52% in 2010 to 78% in 2012, and from 51% to 70% for secondary schools. The support measures rendered by the Government above can best explain the higher penetration of computer and Internet access at students’ homes.

With respect to the activities or measures carried out to encourage parents to participate in schools’ ITed work, most schools encouraged parents to visit the school website or Intranet to understand more about the school’s ITed development. The percentage was 95% in primary schools, 90% in secondary schools, 71% in special (mainstream) schools, and 84% in special (special) schools. The school openness and transparency were appreciated. Moreover, 60% to 80% of secondary and primary schools encouraged parents to instill the proper values and attitudes toward IT use in their children. ITed-related activities for parents had been organised by 50% to 70% of schools, whereas 40% to 50% of them had explained the school’s ITed development to parents.

As revealed, the percentages of special schools that organized the above activities were in general lower than those of secondary and primary schools. However, they generally remarked to conduct parental trainings when Internet learning is becoming widely adopted that they need to understand more of the school’s ITed planning and online learning in order to provide suitable assistance to their children at home.

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<sup>60</sup> These percentages were reported by teachers and not by students or their parents. For a broader picture, from a recent household survey by the census and statistics department, 77.9% of households (including households that did not have students) had computer access; in which 98% of them also had Internet access, which means that 76.4% of households had both computer and Internet access. All percentages have improved compared to those in previous years. For more information, you may refer to (<http://www.censtatd.gov.hk/hkstat/sub/sp453.jsp?productCode=C0000052>).

<sup>61</sup> With the implementation of the Subsidy for Internet Access Charges in the 2010/11 school year, application for the one-year free Internet access service under the “Computer Recycling Programme” was closed in mid-2010, and was replaced by the provision of recycled computers only. The application for recycled computers was also closed on 5 February 2011 and replaced by a new scheme, the “i Learn at home” Internet Learning Support Programme run by the Office of the Government Chief Information Officer (OGCIO) since July 2011. Details are at ([http://www.ogcio.gov.hk/en/community/internet\\_learning](http://www.ogcio.gov.hk/en/community/internet_learning)) and (<http://www.gov.hk/en/theme/ilearnathome/news>).

## **Recommendations**

### **6.2.1 IT facilities and accessibility**

1. Schools to upgrade their IT facilities are needed and they should focus more on longer-term ITED investment, such as wireless network, server, and cloud computing technology. These facilities will steer schools' ITED development to a path more concurrent with global IT development and to capture the pedagogical opportunities brought by the advancement of IT.
2. Schools should start to establish a reserve of certain amounts of mobile learning devices in their schools to enable the transformation of an ordinary classroom into a digitalized e-classroom when needed. More innovative and sustainable e-Learning pilot projects can be implemented to pave the way for a variety of learning and teaching strategies for schools.

### **6.2.2 Resources**

1. For long-term ITED development, TSS staff may be considered within the school regular establishment to help teachers handle the complexity of the emerging computer/Internet network and i-devices, etc. and facilitate schools in drawing up/implementing the ITED development plan.
2. Apart from increasing the provision of funding to schools, the financial source of ITED development should also come from two other parties, namely, schools and parents. Schools should establish school-based mechanisms to build their own fund to support ITED development. In the meantime, after thorough communication and discussion between schools and parents, suitable financial support from parents can be established based on the respective ITED development plans of schools, especially in equipping students to bring to school with their own device (BYOD) without reliance on the school. This will enable students with a greater learning flexibility and customise their use of the tablets, for example, to mark notes on what they have learnt in class or data storage beyond the school hours for class exchanges the other days. To streamline administration, schools can prepare some reserves for needy students as a contingency.

### **6.2.3 IT deployment for learning and teaching**

1. To formulate a school-based ITED plan, schools should consider a longer-term (say, three to five years') and more comprehensive planning to integrate ITED across the school curriculum with a whole-school approach, involving for example, the leading school management, the

curriculum teacher leader, IT coordinator, and teachers. Hence, IT resources can be fully utilized for sustainable school development.

2. To formulate efficient ITed development plans, schools should organise more professional development activities for teachers and the management, including school supervisors for updates on the development of school-based ITed and platforms for professional exchanges.
3. Computer/IT standing as a discrete school subject has its own curriculum value. With the rapid development of IT, planning for a more suitable IT curriculum will be vital and the overlapping or unconnected IT curriculum between primary and secondary schools should be addressed. The current guidelines of Information Technology Learning Targets (CDC, 2000) used in the previous Second ITed strategy period requires reviews. Suggested examples are first, the teaching of IT and information literacy (IL) should be further integrated into different subject / KLA disciplines to enable the students to use IT as a generic ability for improving learning outcomes instead of just a separate discrete skill. Second, students' computer literacy should be enhanced with a well-balance of theoretical principles of IT and applications.
4. Extensive resource-sharing system, for example, the cloud computing technology mechanism should be established that it is more user-friendly and does not require immense computing speed or hard disk storages of the computers. In this regard, schools will only need an Internet connection to create or connect to clouds thus facilitating students to gain quick access to the vast e-Learning resources online.

#### **6.2.4 Professional development programmes for teachers**

1. Professional development programmes for teachers, for example, the five-week refresher training course sponsored by the EDB, should be continued with a view to equipping school teachers for the preparation of tailor-made e-Learning resources to address student diversity.
2. E-platforms for inter-school collaborations and experience sharing, for example, through the Clouds, can be established provided that school teachers can discuss, share and exchange their ideas, experiences and e-Learning resources.

#### **6.2.5 Students' awareness/competency in use of IT**

1. School IT equipment has been greatly enhanced, for example, with computers/projectors in most classrooms and electronic whiteboards in some. This facilitates the development of

students' 21<sup>st</sup> Century learning abilities (e.g., self-directed learning, critical thinking, and information selection and evaluation) and generic skills (e.g., analytical, creative, and collaborative skills) in the process of learning and teaching. Besides, mobile learning devices have realised learning and teaching within the school campus instead of being restricted to computer rooms in the past.

2. The above provides good opportunities to foster the paradigm shift from a teacher-centred education mode to student-centred and development of students' 21<sup>st</sup> century learning skills, capacity of IL, and learner diversity.

### 6.2.6 Parental Support

1. To minimise the digital divide, Government support measures, for example, the "Internet Learning Support Programme" for needy students with both computer and Internet access, should be continued that all students can perform e-Learning at home.
2. Home-school co-operations and communications should be maintained that parents can better understand the mode of e-Learning both within the school campus and beyond school hours.

### Conclusion

This report has summarised the progress of the ITED Strategy in the seven review areas, and revealed the basic completion of schools' fundamental IT infrastructure, gradual utilization of mobile devices in schools, more partnership and collaboration between schools and other sectors/organisations, and capabilities of teachers and students for the next phase of ITED. All these findings indicated that **schools are ready for a paradigm shift towards the mode of student-centred e-Learning**. Digital interactive learning and teaching in classrooms have become possible with the advancement and adoption of mobile technology and devices. Furthermore, advanced Internet networks and cloud computing technology have enabled mobile learning anywhere and across space. In this regard, students' learning can be customerised with for example, one-to-one learning and other forms of self-directed learning can be further developed in the next phase of ITED development. Nevertheless, the success will require a clear ITED planning and extensive discussions and collaborations among the Government, schools, parents, and other stakeholders.

Before closing, the limitations of this study should be deliberated. First, given that the data were reported by the schools' principals or teachers, their responses could be biased with their status and perception. For more in-depth knowledge, for example, field studies in selected sample schools, including the special schools, may be included for the next evaluation research.



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