LC Paper No. CB(2)159/07-08(01)

Right Technology at the Right Time for the Right Task

Consultation Document on the Third Strategy on Information Technology in Education

Education Bureau • October 2007

PROLOGUE

Looking Forward – the Challenges and Potential of Information Technology in Education

The promise of information technology (IT) has prompted governments around the globe to formulate strategies and invest substantially to realize its potential in education. Embracing IT in education will involve changes in mindset and practices in the learning environment. The Government's role is to facilitate the use of IT so that the most effective learning environment can emerge. Planning effectively to facilitate the desired changes to happen requires understanding the technological trends that are bringing about the changes. We can identify two main technological trends that are shaping the learning environment.

Technological Trends Shaping the Learning Environment

The first trend is the use of web-based environment for collaboration and sharing (or "Web 2.0 applications" as coined by Mr Tim O'Reilly in 2004). In many advanced economies including Hong Kong, teachers and students are using blogs, wikis, and RSS feeds for collaborative learning and sharing knowledge in cyber-connected communities. The value of such peer-to-peer knowledge exchanges and collaboration is that the more a student knows about a relevant subject, the more he/she is recognized and sought out by peers for his/her knowledge. In turn, the more he/she shares his/her knowledge, the deeper and richer his/her understanding of the subject becomes. In addition, by facilitating students to work together to investigate problems according to their interest, these applications can help them develop inquisitive learning skills.

The other trend is m-learning which generally refers to the pedagogical applications of mobile technologies to enable "learning anywhere, anytime". Innovative m-learning projects have been conducted across Europe and some schools in Hong Kong are experimenting with similar ideas. Examples of these projects are classroom response systems, laptops and tablets with standard software, portable e-whiteboards, text message alerts sent to mobile phones, small-group learning with wireless devices, multimedia museum guides, and ubiquitous language learning with mobile phones. Advocates of m-learning often emphasize that m-learning is not about learning with mobile devices or cramming educational contents and activities onto small screens. It is about

more versatile learning patterns by making interactivity more pervasive as evidenced by examples of m-learning projects quoted above.

New Learning Environment, Changing Demands

These trends point to the emergence of a new learning environment which will be more flexible, interactive, and student-centred. Such a development calls for a holistic strategy to respond to changing demands at different levels.

At the physical level, the structure of the school should be able to accommodate appropriate IT facilities in classrooms and workstations for access to digital resources in other areas (e.g. in the school library), in contrast to the old structural design where one or two classrooms are refurbished into a dedicated computer room or a multimedia laboratory. IT may accelerate different designs of learning spaces which will be more open, flexible and connected.

At the infrastructure level, as the extent and sophistication of use of IT grows, schools need resources to meet all related expenses on upgrading IT hardware and software as well as higher bandwidth of Internet connection. However, it is anticipated that students themselves will be increasingly connected for m-learning.

At the people level, we need to strengthen school leadership to cope with two major e-challenges: effective resources planning to capture the opportunities that evolving technology promises; and change management to embrace a new IT-enabled environment. Teachers face no less, if not more, challenges in embracing IT in the learning and teaching process than principals. They need support to acquire new IT skills and integrate appropriate technology and digital resources which add value to day-to-day learning and teaching activities. At the same time, they have to manage the transition from the traditional classroom environment where the teacher can control the scope and pace of learning to an emerging interactive environment where students may play a more important role in determining the scope and pace of learning. At the student level, given that they can gain access to a plethora of information from traditional to emerging media, they are expected to acquire a higher level of information literacy beyond basic computer skills. They should be literate in at least three aspects: managing the information effectively (i.e. gather, select, evaluate, and use information); developing

critical thinking, problem-solving, and decision-making skills with the use of IT; and acting as good digital citizens by being able to practise safe, legal, and responsible use of information and to demonstrate personal responsibility for lifelong learning. Teachers have a critical role to play in developing this literacy among students so as to help them become better learners.

At the policy level, the challenge is how to manage a paradigm shift from managing a school system which is primarily "organized around yesterday's ideas, yesterday's needs, and yesterday's resources"[1] to supporting a system where schools are learning institutions in the information age. Practically, this means the need for important changes to the way curriculum is designed and organized and how IT is embedded in it. In addition, there should be more administrative flexibility, especially in funding, to enable schools to embrace appropriate technologies smoothly.

Strategy – Techno-centric Thinking and Human Factor

In reviewing research papers supporting the formulation of strategies on IT in education, we are aware of the common advice of avoiding techno-centric thinking. That is the tendency towards focusing on hardware, software, and budgetary considerations for IT procurement. The danger of techno-centric thinking is jumping on the bandwagon without critically examining whether adopting a particular technology will genuinely improve learning outcomes. The rapid pace of transformational technologies has confounded various efforts by systems and schools to be "up-to-date". Even advocates of m-learning point out that in some circumstances, the value of using mobile devices in learning activities is merely the "novelty effect" to attract the attention of students[2].

In recent years, governments have been asking the same question of whether the investment in IT in education has resulted in genuine improvement in students' learning outcomes. Many research studies, such as *The ICT Impact Report*[3] commissioned by the European Commission, have then been carried out with an attempt to assess the impact of using IT on learning outcomes. Improving learning outcomes has also become the central theme of recent

1 Schank, R.C., & Cleary, C. (1995). *Engines for Education*. Hillsdale, NJ: Lawrence Erlbaum Associates.

2 Sharples, M. (Ed.) (2007). *Big Issues in Mobile Learning: Report of a workshop by the Kaleidoscope Network of Excellence Mobile Learning Initiative*. Available at http://mlearning.noe-kaleidoscope.org/repository/BigIssues.pdf

3 Balanskat, A., Blamire, R., & Kefala, S. (2006). *The ICT Impact Report: A review of studies of ICT impact on schools in Europe*. Available at http://insight.eun.org/ww/en/pub/insight/misc/specialreports/impact_study.htm

strategies on IT in education in other jurisdictions. An example is the Australian *Ministerial Council on Education, Employment, Training and Youth Affairs Joint Statement on Education and Training in the Information Economy* released in 2005[4].

In short, the recent focus of IT in education strategies or action plans is the human factor rather than the technical factor. A school of thought suggests that the use of IT should be put in the wider context of a learning environment in which IT is only one of many mediators in learning and teaching. Teachers and students will need to decide whether the use of IT is the most effective mediator for a particular learning and teaching activity. This explains why *Right Technology at the Right Time for the Right Task* is the theme of this strategy.

Looking forward, we suggest a balanced, baseline approach. The underlying thinking is that to maximize the potential of IT as one of many mediators of learning and teaching, there should be a balance between IT-enabled learning activities on the one hand and systematic guidance by teachers and perhaps parents on the other. We are mindful of the differences in schools' priorities, teachers' readiness and students' motivation, and the danger of imposing additional workload on schools, teachers and students. Although our strategic focus is the human factor, we do not ignore the need of providing extra resources and enhancing flexibility of existing operational grants to help schools make necessary upgrading and replacement of IT facilities which will support student learning. We have not set goals according to a projection of what a future school will be, nor would it be a simple task had we decided to do so. Instead, we seek to provide the necessary conditions and practical advice on pedagogical applications of IT to reduce the barriers to the integration of IT into education at present. At the same time, we keep an open mind on pioneering ideas.

The proposals in the consultation document are the necessary building blocks in the light of our strategic focus on the human factor. The ultimate result of using IT is to facilitate the learning goals of the curriculum reform. We welcome suggestions on what should be added to widen the base to support future development in IT in education.

Chris WARDLAW
Deputy Secretary for Education

4 AICTEC (2005). *Building a Knowledge Culture: An education and training action plan for the information economy 2005 – 2007*. Available at http://www.aictec.edu.au/aictec/file3048

FOREWORD

The Government of the Hong Kong Special Administrative Region published the first strategy document on promoting IT in education in November 1998 and an updated strategy document in July 2004.

We need to adjust our strategy to meet the changing needs of schools, teachers, and students as their capacity to use IT in the learning and teaching process develops.

Based on relevant research findings on IT in education in advanced economies and feedback of stakeholders, we propose in this consultation paper an action plan to take IT in education forward. We appreciate comments and suggestions to enrich our proposals. Please send your views to the Education Bureau on or before 28 November 2007.

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SECTION 1

OVERVIEW

Background

1. Like the governments of many advanced economies which have formulated strategies to promote the use of information technology (IT) in learning and teaching, the Government of the Hong Kong Special Administrative Region needs to adjust its strategy to meet the changing needs of schools, teachers, and students as their capacity to use IT to improve learning and teaching develops over time.

2. The publication of the strategy document entitled *Information Technology for Learning in a New Era: Five-Year Strategy 1998/99 to 2002/03* in November 1998 marked the beginning of the first phase of structured development of IT in education in Hong Kong. As stated in the document, our vision is to:

   - turn our schools into dynamic and innovative learning institutions where students can become more motivated, inquisitive and creative learners;
   - link up our students with the vast network world of knowledge and information to enable them to acquire a broad knowledge base and a global outlook;
   - develop in our students capabilities to process information effectively and efficiently; and
   - develop in our students the attitude and capability for independent life-long learning.

3. The focuses of the Government's work in the initial phase of development from 1998/99 to 2002/03 were on providing schools with IT equipment and connecting them to the Internet, professional development of teachers, development of digital learning resources, and fostering a community-wide culture conducive to using IT to learn.

4. In July 2004, the Government published the second strategy document on IT in education entitled *Empowering Learning and Teaching with Information Technology*. This marked the second phase of development to achieve the seven goals stated in the document, including empowering students and teachers to use IT to improve learning and teaching, enhancing e-leadership in schools, enriching digital resources for learning, developing IT pedagogy, and involving the community in supporting IT in education. Many of the initiatives to achieve the seven goals are on-going. The progress of the major initiatives under each of the seven goals is summarized at **Annex A**.

5. Since the 1998/99 school year, the Government has invested about $7.2 billion in IT in education. Out of which, about $5.4 billion has been invested in non-recurrent projects such as the initial set up of IT facilities in schools and establishing school and teacher networks to share good practices in using IT in education while about $1.8 billion has been spent on recurrent items such as hiring of technical personnel or services for schools and maintenance and repair of IT hardware. A detailed breakdown of the expenditure is at **Annex B**.

6. After implementing IT in education for nine years, we consider that it is high time to review what we have achieved and explore what we should do more to ensure that our strategy serves our objectives and creates maximum value to stakeholders. Before we look ahead, it is useful to revisit the fundamental questions of what we mean by IT in education and why we should care about it.

What is IT in Education

7. "IT in education" is often used loosely to refer to all or any of the following areas, depending on the context in which the term is used –

   (a) using IT to increase efficiency and effectiveness of school administration;

   (b) enhancing the information literacy of students; and

   (c) using IT to improve students' learning outcomes across the curriculum.

8. In Hong Kong, we have been promoting IT in education in all these three aspects. The Education Bureau (EDB) has launched the WebSAMS system to assist public sector schools in using IT to increase efficiency and effectiveness of school administration. We are planning to provide schools with extra resources to upgrade their servers to enhance the efficiency of the system. Regarding students' information literacy, we have prepared the *Information Literacy Framework for Hong Kong Students* to set out, as learning targets, the skills that students should attain in order to manage information effectively. But it is effective integration of IT into learning and teaching that creates the greatest positive impact on student's learning outcomes. The focus of our deliberation in the current context of IT in education is on such integration.

Why IT in Education

9. We have reviewed selected research findings on the impact of IT on learning outcomes in advanced economies from literature as listed at **Annex C**. The findings of some studies suggest that using IT will have positive impact on learning outcomes in Mathematics and Science. However, some research findings suggest that the use of IT has statistically significant positive impact on language learning but not on learning outcomes in other subjects. Despite the variance in research findings, there is a consensus that the use of IT helps the learning and teaching process by making visualization of concepts easier, motivating students, stimulating interaction among students and teacher-student interaction, and facilitating the adoption of student-centred learning approaches (such as collaborative learning, project-based learning, and self-learning).

10. More importantly, many research findings suggest that substantial gains in student attainment are achievable where the use of IT in schools is planned, structured, and integrated effectively. This is indeed the most challenging area in taking IT in education forward. The Government's role is to provide schools and teachers with the necessary support. Actual planning and integration in schools can however only be effected by school heads and teachers.

Where We Are

11. It is difficult to evaluate quantitatively the effectiveness of IT in education. In international benchmarking, student-to-computer ratio is commonly used as a convenient indicator of development in IT in education. For example, student-to-computer ratio is an indicator in the *OECD Education at a Glance*. But the ratio at best measures availability of computers for access by students in schools rather than serves as a valid indicator of the effectiveness of using IT to enhance students' learning outcomes. Thus, we need to rely on both quantitative and qualitative assessments to gauge the positive impact of IT on education and to identify strategic areas for further enhancement to maximize the impact.

12. Based on the data collected from the *Thematic Household Survey on Information Technology Usage and Penetration* conducted by the Census and Statistics Department from June to August 2006, three surveys on the reform of the school curriculum and the implementation of key learning area (KLA) curricula in schools conducted by different tertiary institutions from 2003 to 2005 and *Phase I Evaluative Study on IT in Education Strategy (2004/07)* conducted by the Hong Kong Institute of Education in October 2005 and October 2006, we have compiled a list of indicators on IT in Education in Hong Kong in **Box 1**. Briefly, the indicators point to the following conclusions –

(a) there is adequate hardware and software in schools and more than 90% of students have access to computers and the Internet at home;

(b) the majority of stakeholders, i.e., school leaders, teachers, students, and parents, have positive attitude towards the use of IT for learning and teaching;

(c) school leaders and teachers report significant progress in implementing "IT for interactive learning" which is one of the 4 key tasks in the curriculum reform; and

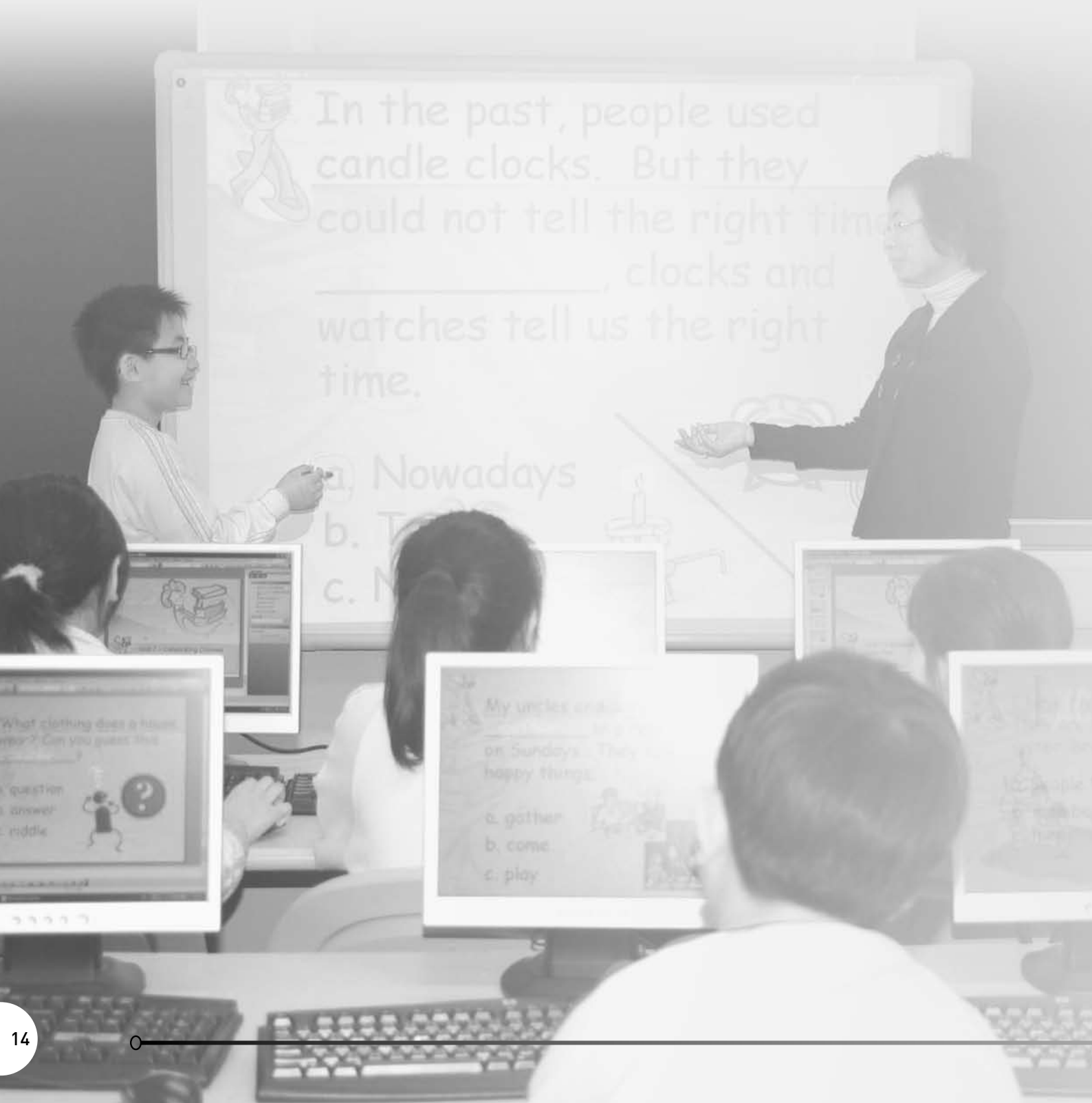
(d) students are more receptive to using IT in class and ready to do so than teachers.

Box 1 Indicators of IT in Education in Hong Kong

- All public sector schools have broadband connection to the Internet.
- The student-to-computer ratios are 6:1 in primary schools and 4:1 in secondary schools. This is comparable to the ratio of 5:1 in OECD countries which are more advanced in IT in education such as the United Kingdom, United States, Australia and Canada.
- Nearly 90% of primary school students and nearly 80% of secondary school students like to use computers to learn in class.
- 85% of primary school students and 60% of secondary school students like to use computers to learn beyond school hours.
- IT in education is perceived by both school heads and teachers as one of the top facilitating factors contributing to the progress in the implementation of the curriculum reform.
- 86% of primary school teachers and 71% of secondary school teachers agree that use of IT can make teaching more effective.
- 62% of primary school teachers and 52% of secondary school teachers are confident in selecting appropriate digital resources to teach.
- Just over 50% of teachers frequently use IT in class.
- 60% of parents endorse the use of IT for learning.
- 95% of primary and secondary school students have access to computers at home. Out of these students, 97% have access to the Internet at home.
- 99% of primary and secondary school students claim that they have knowledge of using computers.

SECTION 2

THE NEXT STEP



13. Hong Kong has apparently gone beyond the stage of making IT facilities available in schools although there is a need to assist schools in maintaining effective IT facilities. In addition to standard facilities like computers, wired and wireless access to the Internet, and e-learning platforms[1], many schools are equipped with projectors and visualizers as teaching aids. Some schools have launched campus TV where students are actively involved in producing multimedia learning materials uploaded to the websites of their schools while others have experimented with interactive whiteboard and e-textbooks. We however recognize that not all schools have a comprehensive strategic plan to integrate IT into the learning and teaching process and not all teachers have the required support to use IT to teach effectively.

Stakeholders' Feedback

14. Why are some schools using IT in the learning and teaching process more extensively than others and why are some teachers using IT to teach more readily than others? To understand the factors affecting the effective deployment of IT in the learning and teaching process, we gauge the opinions and expectations of stakeholders through the *Phase I Evaluative Study on IT in Education Strategy (2004/07)* conducted by the Hong Kong Institute of Education, on-going consultation with schools, sharing sessions among school heads and teachers, and focus group discussions. The Steering Committee on Strategic Development of IT in Education[2], which comprises representatives from the school sector, centres of IT in education of tertiary institutions, parents' association, and the IT sector, has also tendered valuable advice on measures to take IT in education forward. Salient views of the stakeholders are summarized in **Box 2**.

1 An e-learning platform is an on-line application for student learning activities. Usually, an e-learning platform includes interactive exercises and tools for generating individual students' test scores. It also includes communication tools for peer-to-peer and student-teacher communications to support collaborative learning.

2 The membership list of the Steering Committee is at Annex D.

Box 2 What Our Stakeholders Say

- Successful integration of IT into learning and teaching requires a clear strategy in the school development plan, support from school leaders, and adequate on-site technical support to solve technical problems.
- Although school leaders are satisfied with the IT facilities available in schools, they expect adequate recurrent resources to replace or upgrade the facilities on a regular basis to sustain development. Mostly quoted IT facilities or services to be upgraded or enhanced are "computers and projectors in classrooms", "multimedia computer rooms", "e-learning platforms" and "mobile learning devices".
- 80% of school heads regard digital resources from the website of the Hong Kong Education City Limited (HKEdCity) and the Internet important.
- Teachers expect the HKEdCity to focus on assisting teachers to source, locate, and acquire curriculum-based digital resources.
- Integration of IT into the teaching of KLAs of the curriculum is the key to seamless integration of IT into education.
- Teachers, especially secondary school teachers, may be too busy to select and integrate digital resources into their lesson plans.
- Students should be aware of the social impact of rapid and indiscriminate exchange of information over the Internet and be able to exercise judgment in using and publishing information on the Internet.
- Although parents seldom participate in activities related to IT in education organized by schools, they expect assistance to enable them to guide their children in using IT responsibly and legally at home.

Right Technology at the Right Time for the Right Task

15. We suggest that the key to the success of taking IT in education forward is to enable teachers to use the right technology at the right time for the right task. Teachers play a pivotal role in integrating IT into the learning and teaching process effectively to create positive impact on learning outcomes. For one thing, many, if not most, of the learning activities still take place in classrooms and teachers are the key player in determining the learning environment therein. IT is one of many mediators of learning and teaching that a teacher may use to perform his/her tasks in classrooms. There are push factors encouraging teachers to use IT to perform their tasks and pull factors discouraging them from doing so. If the push factors are overwhelmingly offset by the pull factors, it is unlikely that a teacher will use IT even though he/she recognizes that IT is the most effective mediator. Our strategy is to strengthen the push factors while reducing the pull factors.

Push factors

16. Push factors are those that create an environment conducive to the use of IT in learning and teaching activities in schools. We consider that the most important push factors are (a) integration of IT into the curriculum; (b) stakeholders' attitude towards using IT in the learning and teaching process; and (c) a clear school-based strategy to integrate IT into the process. We have started to incorporate IT into the curriculum since the launch of the first IT in Education Strategy. Suggested common teaching and learning strategies of using IT, and specific strategies for individual curricula, have been incorporated into the KLA curriculum guides for basic education and New Senior Secondary curriculum and assessment guides. They are an important foundation for teachers to consider how to use IT and digital resources to implement the intended curriculum. Regarding stakeholders' attitude, the majority of stakeholders have positive attitude towards using IT in the learning and teaching process as revealed in the findings of the evaluative study by the Hong Kong Institute of Education. Recognizing that not all schools have an effective school-based IT in education development plan, we should

encourage and support schools to draw up and implement school-based IT in education development plan to strengthen the conducive environment for integration of IT into learning and teaching in schools. The value of such an IT in education development plan is that it lays down clear directions and milestones against which school management and teachers can collaborate to achieve the expected results more effectively.

Pull factors

17. The findings of the *Phase I Evaluative Study on IT in Education Strategy (2004/07)* as summarized in **Box 1** suggest that there are pull factors holding back teachers to use IT to perform their tasks. While the percentages of primary school teachers and secondary school teachers who agree that use of IT can make teaching more effective are as high as 86% and 71% respectively, the percentages of teachers who are confident in selecting appropriate digital resources to teach (62% for primary school teachers and 52% for secondary school teachers) and the overall percentage of teachers who are using IT frequently in class (just over 50%) are comparatively low. In other words, teachers are not doing what they think they should do to raise effectiveness of teaching.

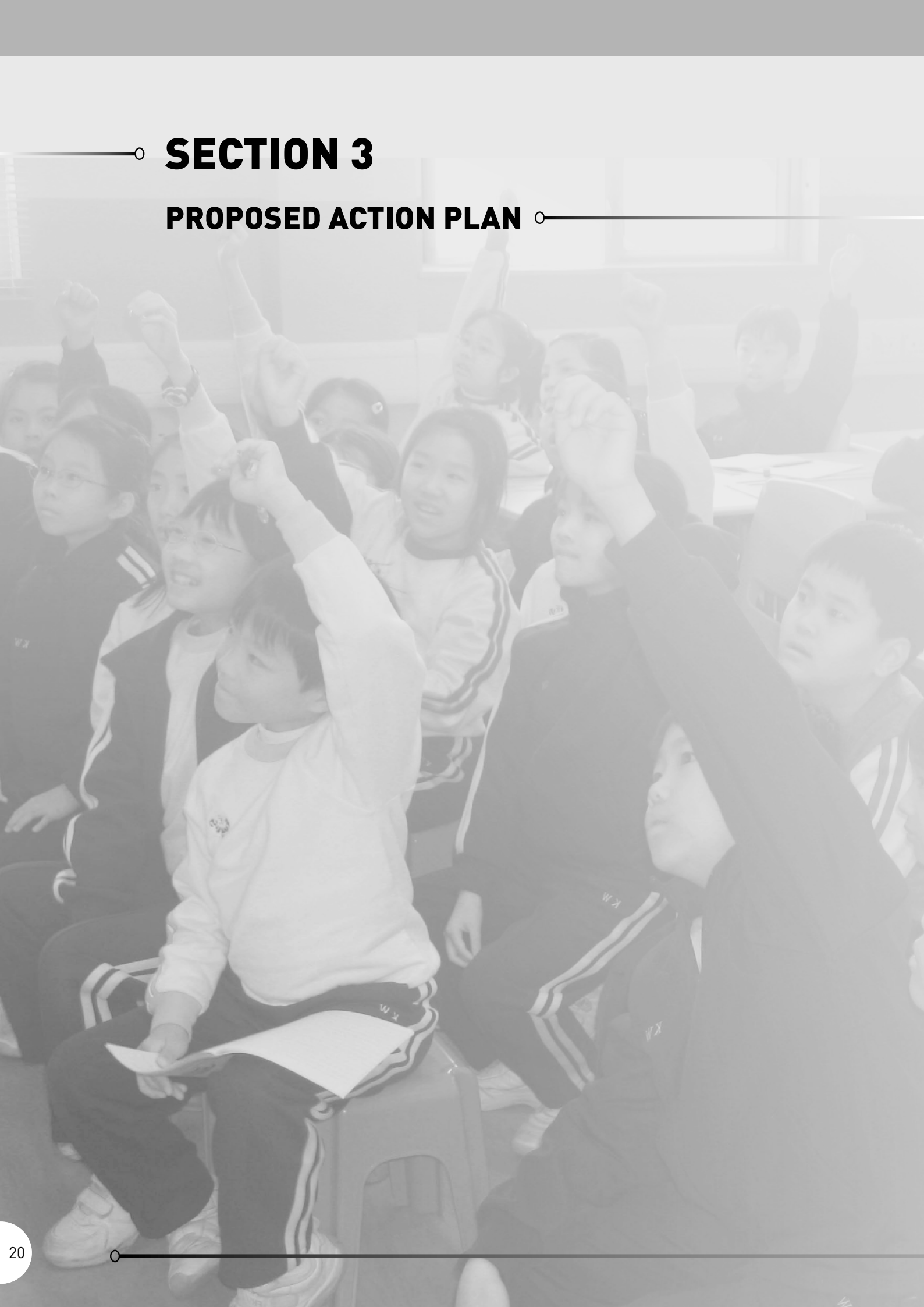
18. The pull factors often encountered by teachers are (a) the time and effort required to search for the appropriate digital resources and then tailor them into the desired teaching strategies and materials to be used; and (b) technical problems. To minimize these pull factors, our targets in future are to reduce the burden of teachers in the process of integrating appropriate digital resources into learning and teaching activities, strengthen our technical support to schools and teachers, and sharpen teachers' IT pedagogical skills.

19. The above discusses the future directions in taking IT in education forward in schools. An important attribute of IT as a mediator for education is that it can assist better learning to take place at home. Given the high household penetration rates of personal computers and Internet connectivity in Hong Kong, there is great potential to harness IT for learning activities at home. According to stakeholders' feedback, we need to provide more support to parents to guide their children to use IT for learning at home.

20. The next section on Proposed Action Plan discusses how to take IT in education forward in practice.

SECTION 3

PROPOSED ACTION PLAN



21. To unleash the potential of using IT to improve learning and teaching effectively in Hong Kong, our priorities are to reduce the burden on teachers in integrating IT into their core activities from lesson planning to assessment of students, continue to sharpen teachers' IT pedagogical skills, generate a favourable environment at the school level, and equip parents with the skills to guide their children to use IT to learn at home. We propose to take the following actions in future –

(a) to provide a depository of curriculum-based teaching modules with appropriate digital resources;

(b) to continue to sharpen teachers' IT pedagogical skills;

(c) to assist schools to draw up and implement school-based IT in education development plans;

(d) to enable schools to maintain effective IT facilities;

(e) to strengthen technical support to schools and teachers; and

(f) to collaborate with non-governmental organizations to raise information literacy of parents and launch parental guidance programmes on e-learning at home.

Action 1 To provide a depository of curriculum-based teaching modules with appropriate digital resources

22. To achieve the objective of enabling teachers to use the right technology at the right time for the right task, we need a two-pronged approach of providing teachers with practical advice on how to integrate IT into learning and teaching and building their IT capacity. We therefore propose to develop an on-line structured depository of teaching modules which support the curriculum targets set out in selected KLAs similar to the *Practical Support Pack* (http://www.teachernet.gov.uk/supportpack) available to teachers in the United Kingdom. Each teaching module will include advice on how to use the appropriate software or on-line tools for lesson planning, student activities, and assessment, and the recommended digital multimedia resources for these activities. For example, the teaching module on weather for secondary 1 Science may include –

(a) advice on planning a lesson to explain weather phenomena by using the readily available materials at the website of the Hong Kong Observatory;

(b) downloadable animations to visualize the formation of monsoon and hailstorm;

(c) suggestions on how students can use a spreadsheet to present and analyze rainfall and temperature data as homework; and

(d) suggestions on after-school collaborative-learning activities such as a group project on global warming. There will be links to on-line resources such as the website of the United Nations Convention Framework on Climate Change where students can obtain the appropriate information.

23. By providing practical advice and appropriate digital resources, the teaching modules should enhance teachers' confidence and reduce their burden in integrating IT into the learning and teaching process. The teaching modules are for the reference of teachers who are interested in further integrating IT into the learning and teaching of the KLAs. Teachers are free to adapt the advice and digital resources to suit their own teaching needs. In the first phase of development, we will allocate $25 million to develop the teaching modules on Chinese, English, Mathematics and Science (and General Studies in primary schools) for primary 1 to secondary 3 levels. Depending on the feedback of stakeholders, we will determine if the project should be expanded to other subjects and higher academic levels.

24. The website of the HKEdCity is the ideal platform to serve as the proposed depository of teaching modules. In fact, the website is currently hosting a collection of digital resources for different subjects at different academic levels. However, these can be organized in a more structured and accessible way that meet the needs of teachers. By serving as the proposed depository of teaching modules, the role of the website as a public education portal to promote IT in education will be greatly enhanced.

Action 2 To continue to sharpen teachers' IT pedagogical skills

25. Under the second IT in Education Strategy, we have already revamped the existing IT professional development framework for teachers. The revamped framework highlights professional development needs along four dimensions, viz. technical knowledge, pedagogical integration, managing and leading IT, and socio-cultural awareness in using IT. We have been organizing regular professional development programmes to equip and update teachers with skills on using the latest technologies to enhance learning and teaching activities. The focus of training programmes in the past two years was e-leadership for school heads. As a result of these on-going capacity building programmes, all teachers should have acquired the basic skills of using IT to perform their teaching tasks while some are competent to venture with more sophisticated applications such as real-time debating activities with English-speaking students in other countries via the Internet.

26. Since IT is a powerful mediator to enable peer-to-peer collaborative learning activities and can stimulate interaction among students as well as between students and teachers, the focus in the teacher capacity building programmes in future will be skills on using IT for student-centred learning activities such as blogging for language learning and using wiki for collaborative enquiry-based learning. Besides running locally adapted professional development programmes, we will invite overseas scholars successful in applying IT to the teaching of Mathematics and Science to raise students' academic attainment to conduct intensive workshops for teachers in Hong Kong.

27. We have started to build learning communities amongst teachers in the context of using IT for learning and teaching in different KLAs under the second IT in Education Strategy. With the "Good Practices on IT in Education" Interactive Platform in place and the formation of nine Focus Groups amongst teachers of our Centres of Excellence on IT in Education, we have been disseminating good IT pedagogical practices to teachers. We will continue to expand the existing mechanism of dissemination of good practices among teachers.

Action 3 To assist schools to draw up and implement school-based IT in education development plans

28. Successful integration of IT into learning and teaching requires a school-based plan to effect cultural change and capacity building, and to foster collaborative efforts among school management, teachers and technical support staff. The plan will provide school management and teachers with a blueprint to achieve certain milestones within a reasonable timeframe. In addition, the process of drawing up the school-based plans will help school leaders to better understand their current situation, prioritize initiatives and allocate resources more effectively, and draw on best practice from other schools or institutions. To assist school leaders in developing and implementing such a plan, the IT in Education Section of the Education Bureau will collaborate with local tertiary institutions to develop a model school-based IT in education roadmap for schools' reference and organize workshops on how to develop and implement the roadmap. A school can adapt the model roadmap to develop its own plan according to its school development priorities and needs. We envisage that the model roadmap will include concrete guidance for actions on the following areas –

(a) establishment of a dedicated team to develop school-based IT in education strategy;

(b) evaluative tools to assess the current situation;

(c) resources planning to maintain appropriate IT facilities to support learning and teaching in the most cost-effective manner;

(d) plan to guide students' self-learning through the use of IT beyond classrooms and after school hours, including measures to address students' diversified learning needs and facilitate students' personalized learning; and

(e) (for secondary schools) strategy to use IT to meet learning and teaching needs arising from the new senior secondary academic structure.

Action 4 To enable schools to maintain effective IT facilities

29. Maintaining effective IT facilities should be an important component in the school-based IT in education development plan. However, maintaining effective IT facilities should not be taken as a simple exercise of replacing or upgrading existing IT facilities. It is more about strategic use of the appropriate facilities for the appropriate tasks. This requires careful planning and prioritization of initiatives to recycle and reconsider the ways existing facilities are used and procure new facilities if necessary. The Education Bureau has allocated sufficient resources to schools on a recurrent basis to meet various operating expenses through the Expanded Subject and Curriculum Block Grant (ESCBG), Expanded Operating Expenses Block Grant (EOEBG), and Operating Expenses Block Grant (OEBG). As reflected in the historical spending pattern of schools, the Grants should be able to meet the recurrent cost of upgrading and replacing IT facilities. In addition, there are extra resources under the Composite IT Grant for meeting recurrent expenses in the procurement of consumables, technical services, Internet access service, and the employment of school-based technicians. The EDB will continue to explore how the flexibility of this funding can be enhanced to meet the needs of schools.

30. Nevertheless, we recognize that schools may need extra resources to buy more IT hardware such as laptops, projectors, visualizers, interactive whiteboards, or mobile learning devices to integrate IT into teaching in class more extensively. We plan to set aside $200 million for providing one-off grant to schools for procuring additional IT hardware and software to integrate IT into teaching in class more extensively. To ensure that a school will prioritize initiatives according to individual needs and use existing and new IT hardware and software effectively, a school which applies for the grant must commit itself to drawing up a school-based IT in education development plan to illustrate how the grant, if approved, coupled with existing resources available to schools as mentioned in paragraph 29, can help the school integrate IT into teaching in class. The ambit and timeframe of these grants will be as flexible as possible.

31. Schools can continue to apply to the Quality Education Fund for innovative deployment of IT into the learning and teaching process.

Action 5 To strengthen technical support to schools and teachers

32. In the first strategy on IT in education, we have already emphasized the importance of providing adequate technical support to schools and teachers. Many schools now have at least one technician to help teachers overcome malfunctions in hardware and software. In addition, the Education Bureau partnered with the Hong Kong Computer Society (HKCS) to set up the ITeHelp call centre in 2005 to provide IT support services to IT technicians in schools, teachers, students, and parents. To enhance technical support to schools and teachers, we will continue the collaboration with the IT sector to maintain the ITeHelp call centre service for at least five more years at a total cost of not exceeding $5 million. In addition, we will redeploy resources to set up a central technical support team in the IT in Education Section of the Education Bureau to assist schools and teachers to overcome technical problems in implementing school-based IT in education development plans. Depending on the demand for such services, we may invite seconded teachers experienced in embedding IT in learning and teaching to join the support team. If necessary, schools may also redeploy resources from the enhanced CITG and other recurrent operational grants to augment on-site technical support services.

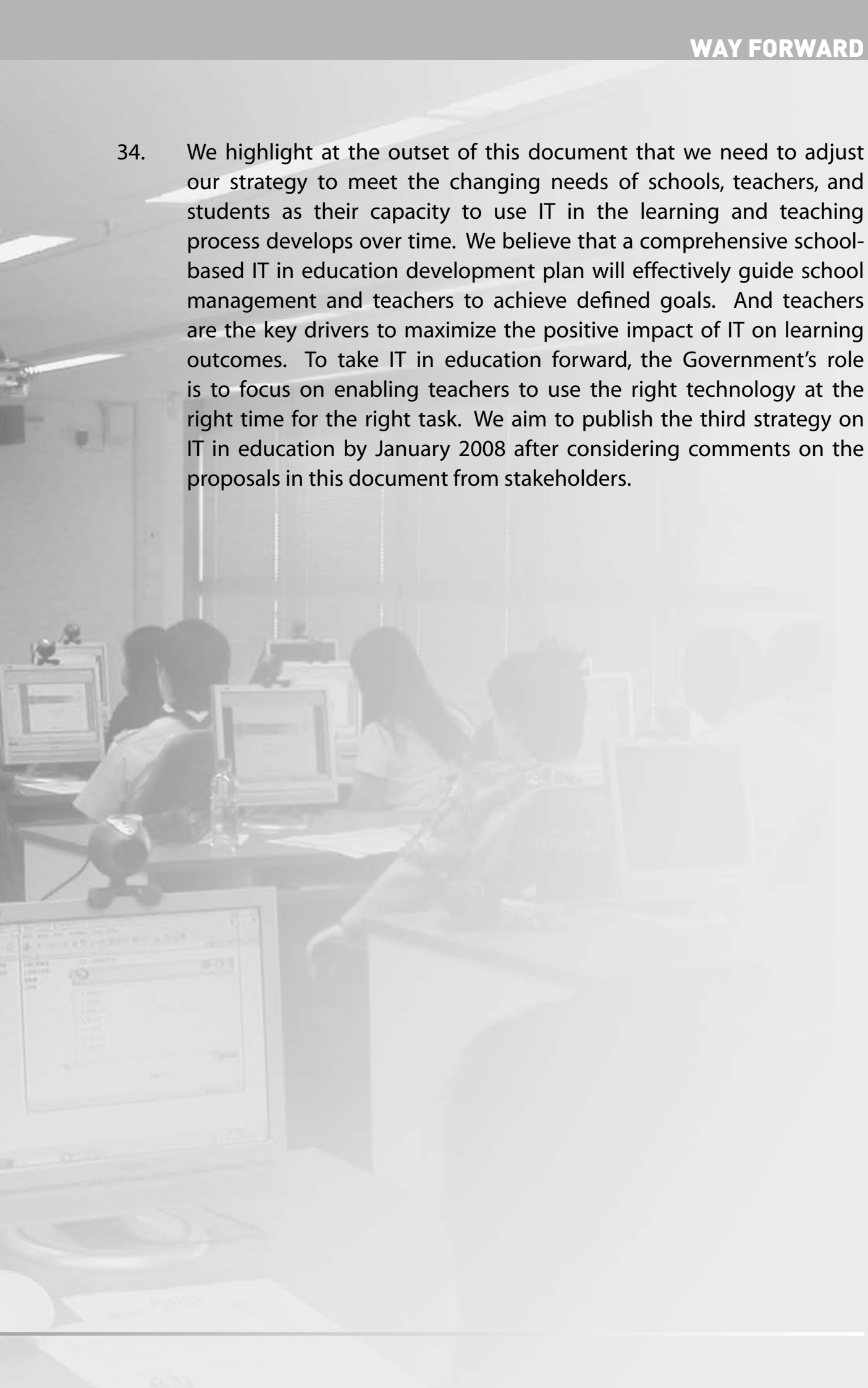
Action 6 To raise parents' information literacy and assist them in guiding children to use IT at home

33. Given the high household penetration rates of personal computers and Internet connectivity in Hong Kong, there is great potential for students to engage in on-line self-learning activities at home. Parents' associations raise concerns that many parents are not information literate and they need more support to guide children to use IT ethically and legally for learning purposes at home. Some non-governmental organizations have already developed educational and information kits to assist parents in supervising their children in using IT at home. To enhance support to parents in this respect, we will allocate $1 million to commission non-governmental organizations to develop resources and programmes to empower parents to guide their children to use IT appropriately and intelligently for learning purposes.

SECTION 4

WAY FORWARD

34. We highlight at the outset of this document that we need to adjust our strategy to meet the changing needs of schools, teachers, and students as their capacity to use IT in the learning and teaching process develops over time. We believe that a comprehensive school-based IT in education development plan will effectively guide school management and teachers to achieve defined goals. And teachers are the key drivers to maximize the positive impact of IT on learning outcomes. To take IT in education forward, the Government's role is to focus on enabling teachers to use the right technology at the right time for the right task. We aim to publish the third strategy on IT in education by January 2008 after considering comments on the proposals in this document from stakeholders.



Annex A

Progress in Implementing Initiatives of the Second Strategy on IT in Education

The following table summarizes the progress in implementing major measures to achieve the seven strategic goals stipulated in the Second Strategy on IT in Education (position as at 31 August 2007).

Goal and Implementation Measures	Progress (as at 31 August 2007)
1. Empowering Learners with IT	
a. To draw up an Information Literacy Framework for primary and secondary school students so that teachers and students have a clearer picture of the learning targets of using IT in education.	• Completed.
b. To help schools to establish e-learning platform to support learning anytime, anywhere and provide teacher training on using e-learning platforms.	• Most schools have established e-learning platforms. • Teacher training materials have been uploaded onto the website of HKEdCity for access by teachers.

Goal and Implementation Measures	Progress (as at 31 August 2007)
2. Empowering Teachers with IT	
a. To establish Learning Centres to facilitate teachers to develop, share and disseminate innovative learning and teaching methods using the latest information technologies.	• 6 Learning Centres on 8 KLAs or subjects have been established.
b. To revamp the existing training framework for teachers by incorporating modules on the use of IT in education.	• To complete by the third quarter of 2007.
c. To provide continuous professional development of teachers.	• The "Hong Kong International IT in Education Conference 2006" was successfully held to keep teachers abreast of new developments of pedagogical application of IT in other economies and provide teachers with opportunities to share experience with their counterparts overseas. • 295 Refresher Training Courses, experience sharing workshops, and in-service courses with 1088 events in total have been organized.
d. To put in place a voluntary certification system to recognize competencies and commitment of teachers who have received training by IT organizations and subject associations.	• Aborted in view of the establishment of the Qualifications Framework.

Goal and Implementation Measures	Progress (as at 31 August 2007)
e. To launch a partnership incentive scheme to encourage collaboration among schools and/or relevant organizations, including IT companies, to harness IT in learning and teaching.	• The "IT in Education Partnership Incentive Scheme" was launched in late 2006. 20 approved projects are in progress. The Education Bureau will organize seminars for teachers to share the outcome of these projects.
3. Enhancing School Leadership for the Knowledge Age	
a. To provide e-leadership training for school leaders.	• 3 batches of e-leadership training programmes for school heads and vice-principals of schools were conducted. • A symposium on "e-Leadership Stories: Pathways to Change and Innovation with IT" was organized in November 2006.
b. To increase schools' flexibility in using IT-related funding by revamping the Composite Information Technology Grant (CITG).	• 4 IT-related recurrent grants have been merged to form the CITG for disbursement to schools since the 2004/05 school year. • Provision for IT maintenance services has been subsumed under the CITG since the 2006/07 school year.
c. To strengthen the role of Centres of Excellence (CoEs), which are schools successful in integrating IT in education, in supporting schools to use IT in learning and teaching.	• 21 schools were invited to be CoEs. • They have been organized into Focus Groups to specialize in promoting best practices in using IT in the teaching of a specific KLA.

Goal and Implementation Measures	Progress (as at 31 August 2007)
4. Enriching Digital Resources for Learning	
a. To pilot the "Electronic Learning Credits" Scheme to encourage schools to acquire relevant electronic and interactive learning materials.	• Grants of $10 and $20 per student were disbursed in February 2005 and October 2006 respectively to schools for acquiring e-learning materials. • A web-based platform showcasing e-learning products and services was launched at the website of HKEdCity.
b. To encourage development of quality digital resources that meets the needs of schools.	• Additional funding was provided to HKEdCity to enhance the production of digital resources. • An incentive scheme to encourage public-private ventures to develop teaching software has been launched. 14 projects under the scheme have been completed while another 8 are in progress.
5. Improving IT Infrastructure and Pioneering Pedagogy Using IT	
a. To encourage innovation and trials of new information technologies and equipment that may enhance learning and teaching.	• Pilot schemes on the use of interactive whiteboards and innovative pedagogical application of web conferencing and mobile technology have been launched.

Goal and Implementation Measures	Progress (as at 31 August 2007)
6. Providing Continuous Research and Development	
a. To undertake studies on the effectiveness of IT in education.	• *Phase I Evaluative Study on IT in Education Strategy (2004/07)* has been completed. • Phase II of the Study is underway and is expected to be completed before the end of 2007.
b. To identify and develop exemplars on pedagogical application of IT for more effective sharing among teachers.	• The "Good Practices on IT in Education" Interactive Platform was launched in November 2005. The platform is a web-based resource support system for dissemination of good practices of using IT to learn and teach in various KLAs. • More than 200 exemplars are available on the platform.

Goal and Implementation Measures	Progress (as at 31 August 2007)
7. Promoting Community-wide Support and Community Building	
a. To collaborate with the private sector and non-governmental organizations to support IT in education.	• ITeHelp call centre was set up in collaboration with HKCS in 2005 to provide IT support services to school technical staff, teachers, students and parents. • 18 free skill-based IT courses and workshops have been offered by the HKCS to IT technical staff and teachers. • 115 free skill-based IT courses (with a total of 190 events) have been offered by a multi-national software company to teachers and school heads.
b. To put in place programmes for schools and parents-teachers associations to help parents educate their children the ethical, legal and health issues related to the use of IT.	• Parental IT programmes and various educational activities have been organized.
c. To launch the Computer Recycling Scheme to provide used computers to needy students to bridge the digital divide.	• About 10 000 families have benefited from the scheme.

ANNEX B

Indicators on Investment in IT in Education (1998/99 – 2006/07)

Since the 1998/99 school year, about $7,150.3 million has been invested in the implementation of IT in education under the two strategies. Of this, $1,801.9 million was recurrent expenditure in the form of cash grants to schools and provision of services including professional development programmes for teachers and school leaders. The remaining sum of $5,348.4 million was non-recurrent in nature and was spent on special IT in education projects. The breakdown of expenditure is in the following two tables:

Table 1: Recurrent Expenditure

Items		Total (million)
(1)	Hiring of technical personnel or services	$933.8
(2)	Maintenance and repair of IT hardware	$140.5
(3)	Daily expenses on other IT-related services and consumables	$662.6
(4)	IT refresher training for teachers	$65.0
	Total Recurrent Expenditure	**$1,801.9**

Note: Figures for items (1) to (3) in Table 1 above are for illustrative purpose only. With the implementation of the Composite IT Grant (CITG) as from the 2004/05 school year, schools can flexibly deploy their available resources under the CITG to meet their operational needs.

Table 2: Non-recurrent Expenditure

Items		Total (million)
(1)	Initial set up of infrastructure and purchase of equipment & services for schools	$3,279.3
(2)	Replacement and upgrading of IT facilities	$137.3
(3)	Implementation of various initiatives (e.g. setting up of e-learning platform, incentive scheme for developing instructional software, revamping the professional development framework for teachers, flagship conference on IT in education, pilot on-line training for school heads, strengthening the network of "Centres of Excellence", "electronic Learning Credits" Scheme, pioneering pedagogy using technology, identifying and developing exemplars, supporting programmes for parents-teachers associations, and Computer Recycling Scheme)	$126.6
(4)	Projects supported by the Quality Education Fund	$1,805.2
	Total Non-recurrent Expenditure	**$5,348.4**

ANNEX C

List of Literature Reviewed

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ANNEX D

Membership of the Steering Committee on Strategic Development of IT in Education (2007 – 2009)

Chairman

Mr Chris WARDLAW
Deputy Secretary for Education (5)

Alternate Chairman

Mr Eddie CHEUNG
Principal Assistant Secretary for Education (Education Infrastructure)

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Ms KAM Yim-mui
Headmistress, Po Leung Kuk Stanley Ho Sau Nan Primary School

Dr KONG Siu-cheung
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Prof LEE Fong-lok
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Mr NG Hok-ling
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Mr NG Yu-yum
Principal, Yuen Long Public Middle School Alumni Association Tang Siu Tong Secondary School

Mr TANG Kwai-tai
Headmaster, Queen Elizabeth School Old Students' Association Primary School

Sister Margaret WONG
Principal, St Paul's Convent School

Prof WONG Po-choi
Professor, Department of Information Engineering, Faculty of Engineering, The Chinese University of Hong Kong

Mr YIP Chee-tim
Principal, Pui Ching Middle School

Mr YU Wing-fai, Christopher
Vice-Chairman (Liaison & Support), Committee on Home-School Co-operation

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Principal Assistant Secretary for Education (Curriculum Development)

Mr Dennis PANG
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Mr FOK Kam-hung
Chief Systems Manager (Information Technology Management), Education Bureau

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Chief Curriculum Development Officer (Information Technology in Education), Education Bureau

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