Information Technology in Education - Way Forward

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Foreword

In 1998, the Government announced "Information Technology for Learning in a New Era: Five-year Strategy – 1998/99 to 2002/03". The Five-year Strategy signifies the Government's commitment to driving Hong Kong to become a leader, not follower, in the information world of tomorrow.

The Five-year Strategy heralds the beginning of our efforts to integrate information technology (IT) into learning and teaching. The quintessence of the Strategy is to transform school education from a largely teacher-centred approach to a more interactive and learner-centred approach. This "paradigm shift" is also being promoted under the curriculum reform. Five years on, we have seen tremendous changes to schools as a learning institution: all schools are connected to the Internet; teachers have acquired at least basic skills and embracing IT as a teaching tool; students are using IT and the Internet in project-based learning.

Notwithstanding the achievements of IT in education in the past five years, there are problems and challenges which we need to tackle in order that IT in education can make further progress. For example, some schools may think that IT is a "cure all" for learning and teaching. Others think that IT in education is just another time limited Government project.

This document takes stock of what we have achieved, what barriers have been met, the vision for the future, and the policy goals and implementation plans we are contemplating to make learning and teaching more effective with the use of IT. Comments and suggestions on making IT in education a further success are welcome. Please send your comments to the Education and Manpower Bureau on or before 15 May 2004 –

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Unless stated otherwise, all submissions and comments received will be assumed to be non-confidential and may be made available for inspection by the public on request.

Education and Manpower Bureau
March 2004

SECTION 1
RETROSPECT OF THE FIVE-YEAR STRATEGY

The past five years saw the introduction of IT in education in Hong Kong. With the concerted efforts of schools, teachers, tertiary institutions, the private sector and other relevant organizations, we have begun to reap harvest. Here we take stock of what we have achieved, what the opportunities and barriers are, and what have proved working and what not.

✍ What have We Achieved?

2. We have laid the necessary infrastructure, provided teachers with the basic training on the use of IT, and collected a rich repository of digital education resources. Regional centres of IT excellence have emerged, innovative pedagogies and practices have surfaced, and students' generic IT skills have improved.

Access and connectivity

3. A survey conducted early this year found that on average, each primary school now has 91 computers while secondary school has 247. These are well above the original targets of 40 in primary schools and 82 in secondary schools now in the Five-year Strategy. All schools have broadband connection to the Internet, with over 60% of them having fibre access and enjoying 10 to 100 Mbps bandwidth.

4. Hong Kong has a household personal computer (PC) and Internet penetration rate of 68% and 60% respectively in 2003. Some students have limited access to computers after school. An incentive grant has therefore been provided for over 1,000 schools to extend the opening hours of their computer rooms/facilities for use by students.

Teacher enablement

5. The Five-year Strategy recognizes the important role of teachers as the enabler of IT in education. At the end of August 2003, all teachers (about 50,600 including 4,600 teaching assistants) have completed IT training at the Basic Level, 35,600 (77%) teachers at Intermediate Level, 12,500 (27%)

teachers at Upper Intermediate Level and 2,600 (6%) teachers at Advanced Level. The Education and Manpower Bureau (EMB) provided refresher training courses, seminars and workshops to keep teachers abreast of IT developments. The Hong Kong Education City (HKEdCity), an education portal in Hong Kong, has also organized various activities to promote IT solutions to schools.

6.   Collaboration among schools has been fostered through a territory-wide network of "Centres of Excellence on IT in Education" (CoE) comprising some 20 schools in various districts.   The CoE provided professional support to schools to help meet the goals of the Five-year Strategy.

Curriculum

7.   In 2000, the "Information Technology Learning Targets" (Curriculum Development Council, 2000) were issued, paving the way for the integration of IT into the curriculum.   To support primary schools in implementing the learning targets, a computer awareness programme comprising eight learning modules was developed.   The curriculum reform document "Learning to Learn – The Way Forward in Curriculum Development" published by the Curriculum Development Council (CDC) in 2001 reinforced the role of IT as a tool to support the reform measures.   The "Basic Education Curriculum Guide – Building on Strengths" published by the CDC in 2002 provides, among others, guidance to schools on fostering an appropriate environment for interactive learning with IT, and making appropriate use of IT in teaching various subjects.

Resources

8.   As Hong Kong's market for education software was then at an early stage, EMB assumed the dual role of forerunner and facilitator in the production of curriculum resources in the past five years.   The education software developed by EMB helped the private sector and other parties understand the needs of schools. In just a few years, schools, teachers, tertiary institutions, the private sector and non-government organizations (NGOs) have produced a remarkable volume of curriculum resources and materials. Many are available for sharing online and at physical resource centres.

9.   Supported by the Quality Education Fund, the HKEdCity was launched in August 2000 to serve and promote quality education and IT for

lifelong and life-wide learning. It quickly became one of the most popular education portals in Hong Kong, offering rich learning resources and education contents, facilitating learning communities and organizing promotional activities. The HKEdCity was corporatized in 2002 and continues to receive support from the Government to develop into an e-learning and e-business platform for teachers, parents and students.

Community participation

10. Expositions, activities and competitions have been held to promote the use of IT in education. Programmes have also been held in collaboration with schools, professional bodies and private companies.

Case studies on pedagogical practices

11. Various studies have been conducted to evaluate the pedagogical and other impact of IT in education. For example, the Report of Second International Information Technology in Education Study Module 2 (SITES M2) published by the Centre for Information Technology in School and Teacher Education (CITE) of the University of Hong Kong has confirmed our success in infrastructure and training, and looked forward to more development in pedagogical practices.

? **What have Proved Working?**

12. Empirical experiences of teachers, research as well as evaluation conducted have together provided guidance on the effective application of IT in education. A number of general principles are evident –

  (a)   to ensure success in using IT in education, clear leadership and directions from the Government are important. The Government can help build the necessary culture for the use of IT in education, lead and organize promotion activities and provide resources;

  (b)   at the school level, the success of applying IT in education lies mainly with the support of school heads as visionary leaders and agents for change, and teachers as practitioners of appropriate pedagogies. Multi-level leadership in school is crucial for the success of IT in education;

(c) in respect of teachers, the concept of "paradigm shift" must be well understood and well used. Through the use of IT, learning and teaching processes should be restructured and made more "student-focused"; and

(d) in view of the diversity in schools' IT readiness, school-based flexibility in the implementation of IT plans is a key to success.

13. From empirical evidence and feedback of teachers, there is a general consensus that IT can be applied effectively in learning and teaching, e.g. –

(a) IT can be a useful tool for students to explore and collect information, e.g. for project-based learning;

(b) IT can assist teachers in preparing assessment and tests;

(c) IT can facilitate communication among schools, teachers, parents and students;

(d) multimedia learning resources can help explain abstract phenomena and arouse students' interest to learn; and

(e) where the teachers have a clear focus on valuing student-centred, inquiry oriented learning and the use of IT as a means to curriculum innovation, exciting pedagogical practices can emerge.

? **Barriers**

14. In 2000, the then Education Department commissioned a review on the implementation of IT in education in Hong Kong. The review, together with feedback from schools and teachers on the implementation of the Five-year Strategy so far, have identified the following major obstacles affecting the use of IT in learning and teaching –

Schools

(a) vision and leadership in schools focusing on using IT for the promotion of curriculum and pedagogical innovation are crucial yet have not been widespread. In some cases, appropriate professional development and support are lacking;

(b)   some schools consider that IT hardware is still insufficient. Most consider that hardware acquired some four, five years ago when the Strategy first commenced can no longer support today's teaching needs, and strategies for infrastructure renewal as well as funding such renewal need to be developed;

(c)   schools are still in need of support in handling procurement, management and maintenance of computers and networks, and use of IT across the curriculum;

(d)   there is a general lack of sharing and collaboration amongst schools, and between schools in Hong Kong and elsewhere on the use of IT in learning and teaching. Teachers are concerned about the possibility of self-made teaching materials being misused for commercial gains when being posted on the web. Some are concerned that the intellectual property rights of some self-made materials have not been fully cleared for more open and wider disclosure;

Teachers

(e)   while all teachers have been provided with basic training in the use of IT, many are still not familiar with the application of IT to enhance the effectiveness of learning and teaching;

(f)   some training courses provided have been skewed towards training in IT skills, not the application of IT to enhance learning and teaching;

(g)   increased use of IT in teaching requires the re-engineering of classroom management and routines, as teachers need to tackle the interaction between machines and students while striving for results;

(h)   some teachers have reported difficulties in making use of specific, pedagogically sound software/learning platforms in their classes due to inflexible network and management infrastructure in schools;

(i)   some teachers find it difficult to identify and select digital education resources.   Better indexing of resources is needed;

(j)   some digital education resources, including those produced by private firms, do not meet the needs of teachers;

(k)   many of the best digital learning resources are cognitive tools developed on the basis of significant cognitive and pedagogical research which cannot be easily appreciated or adopted by teachers without having undergone appropriate professional development; and

Students

(l)   there is still a problem of "digital divide". The cost of software and hardware may be prohibitively high for some students.

✍ **Opportunities**

15.   If rightly used, IT can be a powerful tool to propel change. As various Education Reform measures steam ahead, the opportunities on the use of IT lie in the following –

(a)   supporting the curriculum reform and related changes, including the provision of easily accessible curriculum resources. Indeed the use of IT for interactive learning is one of the Four Key Tasks of the Curriculum Reform (CDC, 2001);

(b)   supporting the initiatives in the Action Plan to Raise Language Standards in Hong Kong (Standing Committee on Language Education and Research, 2003), such as providing learning and teaching software and creating an environment for students to learn and practise languages;

(c)   assisting the assessment of student learning outcomes, including school-based assessment and the Basic Competency Assessment;

(d)   facilitating communication and cooperation between home and school;

(e)   supporting the continuing professional development of teachers and school principals such as the use of online learning platforms and self-learning packages;

(f)   breaking up the physical barriers of classroom learning at set times and achieving lifelong development through e-learning;

(g)   nurturing a global outlook amongst students and the teaching force by connecting with the education communities in other parts of the world, and enhancing exchange and collaboration; and

(h)   facilitating the sharing of good practices in curriculum and pedagogical changes; supporting the formation of communities of practice among teachers and principals using the Internet.

✍ Review of Five-year Strategy

16.   A consultant has been commissioned to review the progress made under the Five-year Strategy. In particular, the study will examine the readiness of schools, teachers and students to use IT for enhancing the effectiveness of learning and teaching. It will also identify areas requiring attention. The study will be substantially completed by mid-2004. We envisage that the study would shed light on the following areas –

(a)   *Infrastructure* – schools' IT development progress in terms of networking and hardware installations;

(b)   *Teachers' professional development* – teachers' needs and areas where support is required;

(c)   *Education resources* – the applications and adequacy of education resources for supporting learning / teaching processes;

(d)   *Pedagogy* – teaching practices with the use of IT;

(e)   *Students' usage of IT* – students' purposes of using IT, their IT-related habits and frequency of use; and

(f)   *Students' learning outcomes* – students' achievements in their mastery of basic IT-related knowledge and skills at different learning stages.

Findings of the study will serve as a benchmark for future studies, and provide pointers to fine-tune the implementation plan of the next IT in education strategy.

SECTION 2
VISION FOR THE FUTURE

✍ **What do We Want from IT?**

17.   We envision the schools and classrooms of tomorrow from where we are today.   Our vision on the use of IT may be epitomized as follows –

Students, teachers, schools and other stakeholders will use IT effectively as a tool for enhancing the effectiveness of learning and teaching, with a view to preparing our students for the information age, turning schools into dynamic and interactive learning institutions, and fostering collaboration among schools, parents and the community.

✍ **The Next Strategy**

18.   The first Five-year Strategy has successfully provided the necessary infrastructure for IT in education to take off.   Building upon the current strengths and having regard to the barriers identified, the next strategy will focus on the following –

(a)   using IT as a lever to support and advance the Education Reform initiatives;

(b)   fostering the development of leadership capacities in schools to develop holistic and strategic school plan for making effective uses of IT to realize the school's vision and goals;

(c)   better integration of IT into the curriculum as well as the learning and teaching processes;

(d)   defining Information Literacy levels to set targets for students to develop IT skills and use them for learning and communication; and

(e)   building partnership among various stakeholders to undertake initiatives, and pooling efforts, funding and expertise from various parties to sustain the momentum.

Strategic Goals

19.　　　Having regard to the above vision, the potential of IT in education and the barriers, as well as the views of experts, academics, school heads, teachers and private firms collected throughout the implementation of the Five-year Strategy, we have set the following six strategic goals –

- **Goal 1: Empowering Learners with IT** – Students will acquire the necessary skills, knowledge and attitudes for lifelong learning and creative problem solving in the information age. They will use IT as an information retrieval, knowledge enquiry, communication, collaboration, analytical and personal development tool.

- **Goal 2: Empowering Teachers with IT** – Teachers will be provided with professional development opportunities and support to undertake the challenge of using IT for curriculum and pedagogical innovations, and to facilitate, guide, administer and assess learning in ways that align with the goals of the curriculum reform. Support structures and mechanisms will be developed to foster the development of online and off-line communities of practice for teachers for exchanging experience and good practices as well as collaborative problem solving.

- **Goal 3: Enhancing the Leadership Capacity of Schools for the Knowledge Age** – School heads and their associates will be guided and supported to establish visions and goals as well as build teams appropriate for their school contexts, in order to enable them to effectively lead change in integrating technology into school planning, curricula, learning and teaching processes, communication and collaboration. They will be given more flexibility in making decisions that tailor to the needs of their schools.

- **Goal 4: Digital Resources for Learning** – Digital resources will be continually enriched to meet school needs. Research on knowledge management strategies will be conducted to enable resources and curriculum experiences generated from various sources, local and international, to become more easily shared, updated, retrieved, customized and utilized.

- **Goal 5: Sharing and Continuing Professional Development** – Evaluation and research will be conducted by practitioners and experts to identify effective strategies for IT in education and distill the elements of successful pedagogies. Exemplars will be more widely shared among teachers. Research will also be conducted to establish effective models of professional development such that the process will not only help teachers gain knowledge and skills, but will also provide a structure and support for continuous improvement in the application of IT in education in schools.

- **Goal 6: Community-wide Support and Community Building** – The community, in particular parents, will be involved and encouraged to motivate children towards appropriate use of IT and drive home messages on cyber ethics.

SECTION 3:
PLANS TO ACHIEVE STRATEGIC GOALS

20. The plans for achieving our strategic goals are outlined below.

Goal 1: *Empowering Learners with IT* – Students will acquire the necessary skills, knowledge and attitudes for lifelong learning and creative problem solving in the information age. They will use IT as an information retrieval, knowledge enquiry, communication, collaboration, analytical and personal development tool.

Curriculum – Clear Learning Targets Needed

21. The CDC has made significant headway in conceptualizing and embedding IT in the curriculum guides. IT for Interactive Learning is one of the Four Key Tasks, and IT skills are one of the nine sets of generic skills. Subject guidelines have been published and they are sprinkled with examples on the use of IT. Nonetheless, many schools have expressed the wish to have more support and practical guidance.

22. As the next step, schools and teachers will be guided further on integration of IT into learning and teaching inside/outside classrooms, with a view to cultivating the skills, knowledge and attitudes of students for lifelong learning. Students should be given the opportunity to make use of IT to work collaboratively with peers as well as to identify and seek input and advice from people of different sectors in the community (local and international). This can be achieved through the following –

  (a) A broad framework of "Information Literacy" for students will be developed to help teachers and students have a clearer picture on the learning targets of using IT in education. The term "Information Literacy" generally refers to the following domains of learning outcomes –

    · basic operations and concepts of IT, including when to use what tools and when not to use;

    · social and ethical issues relating to the use of IT;

·   use of IT as a productivity tool, a communication tool, a collaboration tool, a research tool and a decision-making tool;

·   strategies and skills for information retrieval and critical evaluation of different information sources;

·   use of IT tools for information management and data analysis; and

·   knowledge management concepts and practices to support sustained work and collaboration.

The "Information Technology Learning Targets" published by the CDC in 2000 can be used as a starting point for formulating the framework of Information Literacy in the light of experiences gathered. Due regard will have to be paid to the planned changes in the academic structure of senior secondary forms which are being deliberated.

(b)   Based on successful local cases of using IT in learning and teaching, guidance will be provided to schools on the application of IT in developing whole-school curricula. Such guidance will include both exemplary and suggested use of IT for learning and teaching in various subjects, and will be drawn up in consultation with teachers and experts.

(c)   Interactive tool kits (e.g. using online learning platform) will be produced for schools and teachers on the practical ways of using IT for project-based and collaborative learning as well as for other cross-curricular activities. Teachers will be encouraged to share their exemplars with others and collaborate among themselves. EMB will facilitate teachers' collaboration by jointly organizing sharing activities with professional bodies and schools. The HKEdCity will also help establish a platform for sharing among teachers and facilitate teachers to learn online.

Assessment Tools – Help Teachers Know Students' Learning Outcome

23.   To help teachers assess students' attainment on the learning targets outlined under the Information Literacy framework, we will develop appropriate

assessment tools for use by teachers. Such assessment will be performance-based and fully integrated with an IT-enriched pedagogy that focuses on learner empowerment. The assessment will also provide teachers with formative evaluation information on the IT-enriched pedagogy employed.

24.   Schools may adopt those assessment tools that are deemed appropriate for them. Schools' efforts in this regard will be reflected in the context of "whole school development" under the Quality Assurance framework.

25.   With the adoption of this outcome-based approach, it is considered no longer necessary to require at least 25% of the curriculum to be taught with the support of IT as stated in the Five-year Strategy. In this way we are putting the focus rightly back on students, not the amount of teaching time with IT.

Curriculum and Learning Materials – Going Beyond Textbooks

26.   We will encourage schools to extend the spectrum of learning materials for their students in step with the policy of school-based curriculum. Students should go beyond textbooks to find resources to help them understand concepts, acquire knowledge, and observe and explore the world outside schools. We will enhance partnership with NGOs and the private sector on programmes to promote the use of IT in learning amongst students.

27.   To enable students to engage in empowering modes of learning which include collaboration, inquiry and production of knowledge products as key features anytime, anywhere, the provision of suitably designed e-learning platforms that will support such learning activities would be essential. We will support research and evaluation to identify pedagogically appropriate e-learning platforms and help schools in setting up such platforms, providing teacher training and enhancing courseware in this regard.

Goal 2: *Empowering Teachers with IT* **– Teachers will be provided with professional development opportunities and support to undertake the challenge of using IT for curriculum and pedagogical innovations, and to facilitate, guide, administer and assess learning in ways that align with the goals of the curriculum reform. Support structures and mechanisms will be developed to foster the development of online and off-line communities**

of practice for teachers for exchanging experience and good practices as well as collaborative problem solving.

28.　　　　Teachers are one of the key players in providing the environment for learning and driving reforms.　Numerous sharing sessions, training, seminars and courses have been organized since the inception of the Five-year Strategy. We have three key observations –

(a)　　experienced teachers have emerged and they are in a position to share their experiences with others;

(b)　　training courses provided under the Five-year Strategy were mostly skewed towards the training of generic IT skills.　Teachers wish to know more about how to apply IT in the learning and teaching of different key learning areas (KLA), or even subjects; and

(c)　　after receiving training, teachers still need to overcome further hurdles in implementing new teaching approaches using IT in their own classrooms.　New models of professional development should be developed to build in mechanisms that will encourage and support the new teaching approaches.

29.　　　　The following will help support teachers' continuing professional development in the use of IT for learning and teaching –

(a)　　*Revamping the existing training framework on the use of IT in education* – the existing training framework was drawn up in 1999, a time when Hong Kong was starting to use IT in education on a large-scale.　The framework will need to be revamped and updated having regard to the experiences gathered and studies conducted. The focus of training will be on ways to facilitate exploratory learning, guide collaborative enquiries, provide learning resources, administer learning tasks, tailoring teaching to students' varied abilities and conducting assessment.　The revamped framework should seek integration into the Continuing Professional Development Framework for teachers developed by the Advisory Committee on Teacher Education and Qualifications (ACTEQ).

(b) *Supporting KLA or subject-based training and professional development courses* – tertiary institutions, qualified private firms, professional bodies and experienced teachers will be brought together to develop quality KLA or subject-based training in the context of continuing professional development for teachers. A course evaluation mechanism will be put in place. Teachers' feedback on the usefulness of the courses, quality of the training materials, pedagogies of the trainers will be collated and evaluation results will be used to improve future courses to be provided.

(c) *Continuing the sharing and collaboration among teachers* – exemplars will be recognized and disseminated; sharing will be enhanced in terms of scale, frequency and depth. We will jointly organize with tertiary educators, the private sector and the school sector flagship conferences on IT in education to enhance sharing of information and dissemination of good practices.

(d) *Establishing an online platform for sharing of good practices in IT-enriched pedagogy* – building on research conducted locally and internationally on innovative pedagogical practices using IT, an online platform will be designed and made available for the continuous collation and sharing of good practices among teachers. Such a continuously evolving database will not only help to document emerging changes in IT-enriched pedagogy but will also act as a professional development resource as well as a focal point for the development of a community of practice for teachers. As education resources may be developed in different formats which inhibit efficient sharing, consideration will be given to promoting the adoption of open standards or formulating an inter-operability framework to facilitate sharing.

(e) *Developing more online training for teachers (e-learning)* – this will offer greater flexibility in training scheduling and cater for individual learning differences. The HKEdCity will provide the necessary platform, with content to be provided by experts, private firms and experienced teachers.

(f) *Developing more instructional software and indexing resources for ease of retrieval and use* – incentive schemes will be conceived to encourage collaboration amongst schools and relevant organizations in harnessing IT in learning and teaching.

(g) *Continuing and enhancing the "train-the-trainers" scheme* – this will bring the state of the art technology to teachers, riding on the innovation and strengths of the private sector.

30. A voluntary certification system will be set up to recognize competencies and commitment of teachers who have received training. The system should provide extra, and higher, recognition for the provision of evidence and examples of how the training has led to pedagogical changes in the classroom. A "certification ladder" may be established with the assistance of IT organizations as well as subject associations to encourage continuing professional development of teachers.

31. EMB will no longer organize training on generic IT skills, as virtually all teachers have acquired the basic skills and such courses are abundant in the market. But we will support schools' initiatives to train teachers on generic skills on a need basis by enlarging the scope of use of the IT grants to schools for this purpose.

Providing Support for Schools

32. We recognize the importance of providing technical support services (TSS) to schools. Under the Five-year Strategy, EMB employed contractors to provide technical support to schools or provided a grant for schools to hire service. Starting from September 2003, the mode of operation of TSS has changed to schools hiring services on their own. In view of the key role TSS plays in ensuring success of IT in education, we will continue with TSS with schools hiring their own service in the next IT in education strategy. We will also continue to provide maintenance of computer equipment to schools. In view of the importance schools generally attach to Information Technology Coordinators in support of IT in education initiatives, schools will also be given the flexibility in designating teachers responsible for coordination of IT across the curriculum as a promotion post.

33.　　　We will continue to provide support to schools in the form of providing information on service providers.　We will, in collaboration with HKEdCity, arrange bulk purchase of software and hardware if there is economy of scale (e.g. greater discount).　Procurement guidelines will be issued and uploaded to EMB's web page to help schools source services, hardware and software.

Goal 3: *Enhancing the Leadership Capacity of Schools for the Knowledge Age* **– School heads and their associates will be guided and supported to establish visions and goals as well as build teams appropriate for their school contexts, in order to enable them to effectively lead change in integrating technology into school planning, curricula, learning and teaching processes, communication and collaboration.　They will be given more flexibility in making decisions that tailor to the needs of their schools.**

34.　　　From cases of successful application of IT for learning and teaching in Hong Kong, it is evident that school head's guidance and support is key in enabling teachers to explore and apply the use of IT in classrooms.　In some cases, teachers took a "piloting" method to refine IT-enriched pedagogies. Such pedagogies would not emerge without the support of school heads.

Building Leadership Capacities for Using IT as Lever for Curriculum Innovation

35.　　　The school leadership team needs to understand that the most important use of IT in the school curriculum should be focused on supporting the curriculum reform and that IT can be used as a lever for innovation – the essence of e-Leadership.

36.　　　Professional development should be provided to school heads and their associates to help them understand the different dimensions of a school policy and strategy (including IT infrastructure, curriculum goals for IT use, staffing policy, staff appraisal and reward policy) that will affect the implementation of IT in the school curriculum.　The professional development should also provide a structure and mechanism that will encourage and support schools in establishing their own vision, goals and strategies as well as leadership teams for IT development in schools.　It is necessary to incorporate training materials on the application of IT in education into continuing professional development courses for school heads and their associates.　The following areas may be included –

(a)   skills and practical advice on leading changes to use IT appropriately in schools for learning and teaching;

(b)   use of IT to enhance the efficiency of school administration;

(c)   use of IT for school-based assessment; and

(d)   use of IT as a communication tool with parents, students and other relevant parties.

37.   Exemplars for school level policies and strategies that are associated with successful pedagogical innovations using IT should be used as a main resource for e-Leadership development. Structures/mechanisms should be established to facilitate the continuing collation and sharing of school level exemplars of IT-supported school change and innovation.   Such a continuously evolving database of school e-Leadership exemplars will also serve as a professional development resource as well as a focal point for the development of a community of practice for school heads.

38.   Seeking better ways to lead IT-supported curriculum innovation and embedding IT as a lever for change in the school strategic development plan should be a key element in the professional development agenda for school heads. A voluntary certification system will be set up to recognize competencies and commitment of school heads and their deputies who have undertaken professional development and action learning on e-Leadership.   This system should be integrated with the professional development ladder for school heads and may be established with the assistance of appropriate professional/academic organizations.

Providing Flexibility

39.   Schools will be given the flexibility to allocate resources to support school-based IT plans and account for results.   To enhance such flexibility, we will pursue the merging of all recurrent IT grants for schools, reducing constraints on the use of such grants and enlarging the scope of permissible use of the grants.   At the same time, we will explore merging IT grants with other recurrent grants to schools, with restrictions on the usage of such grants minimized and scope of use expanded.

40.	Following the merging of various grants, schools will have much greater autonomy and flexibility to use the grants for –

(a)	employment of technical staff and support services;

(b)	purchase of new software, maintenance or replacement of hardware;

(c)	provision of training to teachers; and

(d)	piloting new technology or organizing IT activities.

Schools will also be encouraged to seek funding support from parents and other parties to support school-based IT in education initiatives.

Providing Support

41.	With the greater autonomy given, schools will need to have the capacity and procedures to plan, manage and review the use of IT. They will need to continue to build up the capacity of the team of teachers responsible for planning and implementing IT in education. The organization structure of the team will need to be stated in the school-based IT plan. We will assist schools in this respect, through support to be rendered by our Centre of Excellence network.

42.	We will provide support to schools by providing exemplars, guidance notes and practical advice on various topics, such as using IT for school administration and management. The IT industry will be encouraged to provide guidance and advice to schools on the recruitment of suitable technical staff.

Maintenance and Upgrading of IT Infrastructure

43.	We will continue to support the maintenance of IT hardware and systems, and find ways to address the issue of obsolete IT equipment provided under the previous IT in Education Strategy that no longer support today's needs for learning and teaching. While we plan to seek resources for needy schools to replace some basic IT infrastructure provided under the previous IT in Education Strategy, we will look into the possibility of promoting the use of "Open Source Software" or free software, and explore viable lower cost

alternatives for schools to reduce the cost of software and lengthen the usable life of computers. We will look to schools, parents and other sponsors to replace and upgrade extra infrastructure acquired over the years. Such cost sharing will help ensure that the procurement of computers is based on schools' demonstrated need and increase the sense of ownership among the stakeholders involved. As regards obsolete computers, we intend to give schools the free-hand to retain them for use by students, or to donate them to non-profit making NGOs which in turn will give them to children in need. We will work with HKEdCity and NGOs to facilitate the effective channelling of computers to those children. This will also help address the issue of "digital divide".

44.　　　　At present, primary and secondary schools have been provided respectively with three and six LCD projectors to facilitate IT-enriched learning and teaching. Subject to resources available and schools' readiness to match our grant in this respect and their demonstrated needs, we will consider providing schools with more LCD projectors and related systems. We will also consider enhancing the IT equipment for use by teachers on the same basis.

45.　　　　School principals and teachers need to work out the infrastructure requirements, maintenance and replacement plans in their school-based IT plans. We will support schools by providing advice.

Piloting New Technology

46.　　　　We will support and promote trial or pilot schemes to explore new technology, e.g. Internet 2. The pilot test on the use of wireless technology in ten schools has encouraging feedback. Subject to resources available and schools' willingness to match our fund, we will support the introduction of wireless technology to more schools to remove the physical barrier of learning in classroom and promote the concept of an e-campus.

Facilitating Schools' Self-Evaluation

47.　　　　We will institute a self-evaluation system on the effectiveness of school-based IT plan. In this regard, a framework for benchmarking of performance and processes will be considered. The framework will help school heads and the school management work for results by providing an accountability regime.

Facilitating Schools' Partnership

48.　　　We will encourage and facilitate schools to form partnership with other schools and the private sector, with a view to exploring efficient ways of utilizing resources and improving the use, management and maintenance of systems.　In this regard, an experience and knowledge sharing platform will be established.

Goal 4: *Digital Resources for Learning* – Digital resources will be continually enriched to meet school needs. Research on knowledge management strategies will be conducted to enable resources and curriculum experiences generated from various sources, local and international, to become more easily shared, updated, retrieved, customized and utilized.

49.　　　Although many digital education resources have been developed, quality digital education resources are still considered insufficient and sometimes resources produced do not meet schools' needs.　Retrieving the resources is another problem.　The potential of schools, teachers, tertiary institutions and the private sector to produce quality resources has yet to be fully tapped.

Bringing Resources Closer to Schools' Needs

50.　　　Digital education resources can be enriched through contribution from tertiary institutions, the private sector, schools and teachers.　In this connection, the HKEdCity will provide effective channels for resource developers and institutions to understand schools' needs, and for schools to know products and services available in the market.　It will, in consultation with the CDC, incrementally assume the role of a market facilitator to enhance public-private collaboration.　It will improve its indexing of resources and enhance its search engine in support of clients' needs.

51.　　　The HKEdCity will strengthen its role as an agent for sourcing, editing and disseminating digital education resources.　To achieve this, the HKEdCity will seek the support of serving teachers and experts.　It will also seek to form partnership with the private sector as regards e-learning contents and introduce new IT-enriched pedagogies.

52.   Different parties are producing digital education materials e.g. private developers, schools, tertiary institutions and EMB.   There has been some overlapping of the products produced and better coordination would be necessary. The HKEdCity, with support of EMB and the private developers, will undertake the role of a "market researcher" to help coordinate efforts of different parties.   We will encourage and launch incentive schemes, in collaboration with trust funds such as the Quality Education Fund, to encourage the production of quality digital resources by educators, tertiary institutions and publishers.   We will encourage publishers to turn textbooks into e-learning materials and provide teachers with after-sale service in the use of such materials.

53.   We will also consider incentive schemes to encourage the private sector to develop quality instructional content and software.   As a suggestion, a loan scheme or a matching fund may be set up to sponsor one-third or half of the production cost of a resource package, with the rest funded by the applicant. Teachers, experts, and private firms are encouraged to apply jointly so that their knowledge and resources can be pooled.   To provide incentive for participation in this scheme, the product developed may be saleable by the applicant.

54.   Teachers, students and parents will be guided in their selection of education software by allowing users to state their reviews in the HKEdCity web site, which may be read by others for reference. Curriculum specialists, teachers and private sector representatives will also be invited to comment on the quality of software.

Addressing Diversity

55.   In spite of the completion of the Five-year Strategy, the IT readiness of the schools in Hong Kong still varies. Some schools are stronger in the application of IT than the others. In the next strategy, we will direct more resources to support "under-achieved" schools through our Centres of Excellence network.   Some imminent tasks identified include the setting up of intranets or improvement of resource repositories in such schools.

Goal 5: *Sharing and Continuing Professional Development* **– Evaluation and research will be conducted by practitioners and experts to identify effective strategies for IT in education and distill the elements of successful pedagogies.   Exemplars will be more widely shared among teachers.**

Research will also be conducted to establish effective models of professional development such that the process will not only help teachers gain knowledge and skills, but will also provide a structure and support for continuous improvement in the application of IT in education in schools.

56.	To assist schools in evaluating their own performance in the application of IT in education, we will disseminate the assessment tools developed under the "Overall Study on Reviewing the Progress and Evaluating the Information Technology in Education Projects 1998/2003" for wide adoption. In doing so, we will need to further develop the tools into generic instruments.

57.	To track the effectiveness of our strategy, we will seek resources to conduct regular surveys and longitudinal study where appropriate, so as to monitor and evaluate strategy implementation. Such studies will also provide pointers for policy formulation in future.

58.	We will also commission research and studies in support of the implementation of "Information Literacy" for students and assessment, as well as on ways to benchmark schools' IT in education performance and evaluation.

59.	We will encourage evaluation and research by tertiary institutions or schools. Successes and exemplars will be developed more systematically on –

(a)	*learning paradigms and pedagogies* – including projects to investigate the elements of effective pedagogies, and the environment that is conducive to the emergence of such pedagogies;

(b)	*teaching methodologies* – such as research on various innovative or emerging modes of IT-enriched teaching methodologies;

(c)	*education resources* – including research on factors affecting the usage and effectiveness of education resources;

(d)	*school practices* – case studies of schools will be conducted;

(e)	*curriculum integration* – effective means of integration of IT into the curriculum will be investigated; and

(f) *systems and networks* – including sponsoring projects such as the development of open source or non-proprietary school support and resource management systems, and technologies or software for facilitating management and operation of computers and equipment.

60. Exemplars developed or identified will be more effectively shared among teachers. The following ways may be considered –

(a) putting exemplars on web pages. Ways of facilitating teachers to read the exemplars will be investigated, such as an interactive platform guiding users to identify relevant exemplars and view the contents efficiently;

(b) sharing sessions and seminars; and

(c) putting exemplars in resource banks or repositories developed by various parties e.g. the "Assessment for Learning Resource Bank" being developed by the Curriculum Development Institute.

Ways also need to be found to address teachers' concern on intellectual property rights of self-made teaching materials being put to open and wide disclosure.

Goal 6: *Community-wide Support and Community Building* – The community, in particular parents will be involved and encouraged to motivate children towards appropriate use of IT and drive home messages on cyber ethics.

Home-School Cooperation

61. Home-school cooperation can be facilitated through the use of IT. With IT, schools may keep parents closely informed of students' behaviour and learning progress. Parents will be encouraged to act as supporters and motivators for their children. Schools and Parent-Teacher Associations will be encouraged to collaborate with parents to ensure students understand the ethical, legal and health issues involved in using IT.

Digital Divide

62.   "Digital divide" is a social and economic issue that has to be addressed in a wider context. Under the Digital 21 Strategy, a wide range of measures has been introduced in the community, such as the provision of computers with Internet access at convenient locations for free use by the public, computer recycling for the needy, financial assistance to people with disabilities for purchase of computer facilities for home working, free IT awareness courses for the disadvantaged groups and the general public, etc.

63.   Under the Five-year Strategy, a number of measures have been implemented to enhance students' access to IT facilities, including the provision of laptop computers to secondary school students who do not have computers at home (the "Digital Bridge" project supported by the Quality Education Fund), the provision of an incentive grant to over 1,000 public sector schools to extend the opening hours of computer rooms for use by students after school, and the installation of computers at over 120 community or youth centres. These measures have significantly improved students' access to IT facilities.

64.   As computers are getting into more and more homes, we will focus our efforts in addressing the digital divide problem at the school level. This means that schools will need to help identify students beset by the problem of digital divide, and collaborate with relevant Parent-Teacher Associations or other parties to help bridge the gap. "Computer recycling" is one of the ways. Donation of computers by parents can be pursued.   In the next IT in education strategy, we will continue with the incentive grant for extending the opening hours of school computer facilities, subject to a year by year review of the effectiveness of such grant.

Community-wide Involvement

65.   We will continue to encourage the private sector and NGOs to support IT in education.   The following initiatives may be pursued –

   (a)   a call centre service can be provided by the private sector or NGOs to answer queries and problems encountered by students and teachers;

(b)   IT or related societies can play a role in mobilizing IT professionals to serve as IT advisors to help schools, especially on IT servicing, skill sets required for IT technical staff and training roadmap for the development of such staff; and

(c)   NGOs and private sector can provide advice to schools, share experiences and foster closer ties with schools by organizing an "Adopt a School" campaign. They can also organize seminars and talks for students, e.g. seminars on ethical issues in using the Internet.

SECTION 4
PROPOSALS AND IMPLEMENTATION

✍ Proposed Measures and Implementation Timetable

66.　　　A summary of the measures proposed and their time lines for implementation is set out below.　Subject to resources available, implementation is planned to start in the 2004/05 school year.　Performance measurements will be developed for evaluating the progress and effectiveness of the measures.

Goal and Implementation Measures	Implementation Time Line (school year)		
	04/05	05/06	06/07
1. Empowering Learners with IT			
˙ To update the framework of "Information Literacy" for students based on the Information Technology Learning Targets so that teachers and students have a clearer picture on the learning targets of using IT in education. (paragraph 22(a))	░		
˙ To enhance guidance to schools on the application of IT in education based on successful local cases. (paragraph 22(b))	On-going		
˙ To produce interactive tool kits for schools and teachers on practical ways of using IT. (paragraph 22(c))	░	░	
˙ To develop assessment tools for use by teachers to help them assess students' attainment of the learning targets. (paragraph 23)	░	░	
˙ To reflect schools' efforts in assessing students' IT attainment in the Quality Assurance system. (paragraph 24)	░	░	░
˙ To enhance partnership with non-government organizations and the private sector on programmes to promote the use of IT in learning among students. ˙ (paragraph 26)	On-going		

Goal and Implementation Measures	Implementation Time Line (school year)		
	04/05	05/06	06/07
· To support research and evaluation on pedagogically appropriate e-learning platforms; to help set up such platforms and provide teacher training and enhance courseware. (paragraph 27)			
2. Empowering Teachers with IT			
· To revamp existing training framework for teachers on the use of IT in education. (paragraph 29(a))			
· To develop, support and provide KLA or subject-based training and school-based training as well as professional development courses, including refresher training for teachers. (paragraph 29(b))	On-going		
· To enhance sharing and collaboration among teachers using exemplars emerged and software that has proven effect in enhancing learning and teaching. (paragraph 29(c))	On-going		
· To organize jointly with tertiary educators, the private sector and the school sector regular flagship conferences on IT in education to enhance sharing of information and dissemination of good practices. (paragraph 29(c))			
· To develop, through HKEdCity, an online training platform and more instructional software for teachers; to improve indexing of resources for ease of retrieval and use. (paragraphs 29(d), (e) and (f))	On-going		
· To support incentive schemes for collaboration amongst schools and relevant organizations in harnessing IT in learning and teaching. (paragraph 29(f))	On-going		
· To continue and enhance the "train-the-trainers" scheme. (paragraph 29(g))	On-going		
· To put in place a voluntary certification system by IT organizations and subject associations to recognize competencies and commitment of teachers who have			

Goal and Implementation Measures	Implementation Time Line (school year)		
	04/05	05/06	06/07
received training. (paragraph 30)			
· To continue with the technical support services in schools. (paragraph 32)	On-going		
· To continue to provide maintenance of computer equipment to schools. (paragraph 32)	On-going		
· To allow schools flexibility in designating teachers responsible for coordination of IT across the curriculum as a promotion post in recognition of the key role such teachers play in supporting the implementation of IT in education. (paragraph 32)	On-going		
· To partner with HKEdCity and private vendors on enhancing support to schools, e.g. arrange bulk purchase if there is economy of scale, and issue procurement guidelines. (paragraph 33)	On-going		
3. **Enhancing the Leadership Capacity of Schools for the Knowledge Age**			
· To enhance training on e-Leadership and application of IT in education in continuing professional development courses for school heads. (paragraphs 36, 37 and 38)	On-going		
· To continue with the disbursement of IT grants to school but such grants would be merged and constraints on the use of the grants be reduced in order to enhance schools' flexibility in using the resources. (paragraphs 39 and 40)	On-going		
· To continue to support schools by providing advice through the regional Centres of Excellence network. (paragraph 41)	On-going		
· To assist schools to review and continue to strengthen the capacity of the team of teachers responsible for planning and implementation of IT in schools. (paragraphs 41 and 42)	On-going		

Goal and Implementation Measures	Implementation Time Line (school year)		
	04/05	05/06	06/07
· To further improve the IT infrastructure of schools by – ✍ replacing the basic infrastructure provided under the previous strategy on IT in Education (paragraph 43); and ✍ provision of additional LCD projectors and related systems in schools and/or IT equipment for use by teachers on a matching fund basis and subject to schools' demonstrated needs. (paragraph 44)			
· To encourage innovation and trials of new technology that may enhance teaching and learning. (paragraph 46)	On-going		
· To extend, on a matching fund basis, the scheme on wireless technology to more schools to help remove the physical barrier of learning in classroom and to promote the concept of an e-campus. (paragraph 46)			
· To request and assist schools to formulate school-based IT plans and to put in place a self-evaluation system on the effectiveness of such plans. · (paragraph 47)	On-going		
· To facilitate schools to form partnership with other schools and the private sector to explore efficient ways of utilizing resources. (paragraph 48)	On-going		
4. Digital Resources for Learning			
· HKEdCity to strengthen its role as · an agent for sourcing, editing and · disseminating digital education resources. · (paragraphs 50 and 51)	On-going		
· HKEdCity to improve the indexing of resources in web page in supporting schools' needs. (paragraph 50)	On-going		
· HKEdCity to incrementally assume the role of a market facilitator to enhance public-private collaboration. · (paragraph 50)	On-going		

Goal and Implementation Measures	Implementation Time Line (school year)		
	04/05	05/06	06/07
· HKEdCity to coordinate production of resources by undertaking market survey and research. (paragraph 52)	On-going		
· To launch incentive schemes to encourage publishers to turn textbooks into e-learning materials and provide teachers with supplementary after-sale service in the use of such materials. (paragraph 52)	▓	▓	
· To launch incentive schemes to encourage the private sector to develop quality instructional content and software. (paragraph 53)	▓	▓	
· To encourage users, experts or teachers to review software and rank, where appropriate, materials on the HKEdCity as regards their quality for users' reference. (paragraph 54)	On-going		
· To help "under-achieved" schools to build up intranets or improve the resource repository on their intranets. · (paragraph 55)	On-going		
5. Sharing and Continuing Professional Development			
· To disseminate the assessment tools developed under the "Overall Study on Reviewing the Progress and Evaluating the Information Technology in Education Projects 1998/2003" for wide adoption in schools for purpose of self-evaluation. (paragraph 56)	▓	▓	
· To conduct regular surveys, and longitudinal study where appropriate, to monitor the effectiveness of IT in education implementation. (paragraph 57)	On-going		
· To commission research and studies in support of the implementation of – ✍ information literacy for students and assessment; and ✍ benchmarking school's IT in education performance and evaluation. (paragraph 58)	On-going		

Goal and Implementation Measures	Implementation Time Line (school year)		
	04/05	05/06	06/07
· To identify and develop exemplars for more effective sharing among teachers – ✍ learning paradigms and pedagogies; ✍ teaching methodologies; ✍ education resources; ✍ school practices; ✍ curriculum integration; ✍ systems and networks. (paragraph 59)	On-going		
· To enhance sharing and retrieving of exemplars by interactive platform, sharing sessions and seminars, and posting such exemplars in various resource banks; to address the issue of intellectual property rights of self-made teaching materials. (paragraph 60)	On-going		
6. Community-wide Support and Community Building			
· To put in place programmes for schools and Parent-Teacher Associations to help parents ensure students understand the ethical, legal and health issues involved in using IT. (paragraph 61)	On-going		
· To encourage "computer recycling" and donations to help needy students to bridge the "digital divide". (paragraph 64)	On-going		
· To continue with the incentive grant for extending the opening hours of school computer facilities to help students in need to access computers after school hours. (paragraph 64)	On-going		

Goal and Implementation Measures	Implementation Time Line (school year)		
	04/05	05/06	06/07
˙ To pursue the following collaborative schemes with the private sector and NGOs in support of IT in education – ✍ a call centre service to answer queries and problems encountered by students and teachers; ✍ an "Adopt a School" campaign by the private sector to assist schools' transformation into innovative learning institutions; ✍ forums and events to foster IT culture in schools; ✍ guidance on provision of maintenance, administration and management of computer network; and ✍ guidance to schools on IT security, skill sets required for IT technical staff and training roadmap for the development of technical personnel. (paragraphs 42 and 65)	On-going		

- End -

Information Technology in Education - Way Forward

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