Information Technology for Quality Education

Five-Year Strategy
1998/99 to 2002/03

Consultation Document

Education and Manpower Bureau
June 1998

Foreword

The exponential growth in the use of communication and information technology (IT) in the past decade or so has had a tremendous impact on the society and our daily lives. IT is transforming on a global scale the way that business is conducted in both the public and the private sectors. It is also quickly transforming the way in which education is delivered in schools by breaking down the traditional boundaries of teaching and learning.

In his first Policy Address, the Chief Executive the Hon Tung Chee Hwa said that Hong Kong should aspire to be a leader, not a follower in the information world of tomorrow. Education plays a key part in the pursuit of this important goal. We must equip our students with the knowledge, skills and attitudes they need to meet the challenges of the next century. In this regard, the Chief Executive has pledged in his first Policy Address to formulate a five-year strategy for the application of IT in promoting the effectiveness of teaching and learning.

In this consultation document, we propose a blueprint for the collaboration among the Government and various key players, as well as the strategic approach, to achieve a set of common goals for IT in education. As we are all learners in this new field which is evolving with the fast changes in technology, we seek in this document to bring all relevant issues to the front in order we, as a society, could charge ahead in synergy. We look forward to having your views and suggestions.

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Chapter 1

Our Vision

The Government and the education community as a whole should face up to the fact that the IT era imposes new requirements on our teachers and students. Whilst IT imposes new requirements, it also offers enormous opportunities for improving the quality of teaching and learning. Our vision for the immediate future is, therefore, **to harness the power of IT to help our students get the most out of school education**.

2. This vision presents us with the following objectives :

(a) **to arouse and maintain our students' motivation to learn.** With the use of IT, teaching and learning will gradually migrate to a more innovative and interactive mode. We aim to have teaching and learning in 25% of our curriculum supported by the use of IT in five years' time;

(b) **to broaden our students' horizons, so as to enrich their learning experience and facilitate the development of a creative mind.** In today's world, which resembles more and more of a global village, our students should have a broad knowledge base and be alive to various perspectives in order to be adaptive to changes. This is particularly essential if Hong Kong is to maintain its international competitiveness into the future. IT can provide such exposure for our students by opening up a vast world of learning resources and perspectives to them. The use of IT will also help provide the stimulus for students to develop a creative mind; and

(c) **to encourage independent lifelong learning and instil team spirit**. IT encourages and empowers students to learn at their own pace and to develop habits of self learning, which will benefit them for life. At the same time, IT fosters communication skills and team spirit among students.

3. It will be clear from the above that our objective is not to enable our students to use the computers for its own sake. We think that our young people will, given the support and opportunity, have no difficulty in mastering the basic IT skills

for future studies and for the workplace.

4. Successful application of IT in school education necessitates substantial and sustained investment on the part of the Government. But resources alone will not get us where we want to be. To realise the benefits of IT in education, there has to be a **paradigm shift** in the way school education is conducted - from a largely textbook-based teacher-centred approach to a more interactive and learner-centred approach. Teachers will need to assume the role of a "facilitator" rather than an "instructor" to guide the students to play a more active role in learning. A change of the mind set and culture among teachers, parents and students is key to our strategy. We will also need to mobilise the involvement and participation of the private sector and the entire community in our strategy.

Five-Year Strategy

5. With the measures announced in 1997 (set out in Chapter 2), we have been making a start in the promotion of IT in education. We are providing exposure to IT for all students and teachers, and have started addressing issues such as curriculum development and network infrastructure. We now need to come up with a more structured blueprint to enable us to, within the three overarching goals set out in paragraph 2, achieve the most within the next five years.

6. We envisage focusing on the following missions in the 1998/99 to 2002/03 school years :

- helping our teachers to settle in their new role as a "facilitator" and become comfortable and habitual IT users as soon as possible;
- incorporating IT elements in the school curriculum and enhancing provision of educational software in a more structured framework;
- progressively enhancing the provision of IT facilities for schools in line with their readiness, and working with schools to overcome physical constraints in the adaptation to IT-based teaching and learning; and
- building up a network infrastructure to facilitate sharing of educational resources and communications within the education sector, and between the education sector and the community.

7. The key components of our five-year strategy are therefore:

- Teacher Enablement

- Curriculum and Software
- Hardware Provision
- Network Infrastructure

These will be elaborated in Chapter 3.

Chapter 2

Where We Stand Now

8. We have in the past two years or so taken some steps to promote the use of IT in teaching and learning. In early 1997, the Government announced the following new initiatives:

- **connecting all secondary schools to the Internet**. Through the liaison between the Government and Internet service providers, all secondary schools have been provided with a free Internet account since the 1996/97 school year;

- **providing 15 computers for each primary school and training for over 15 000 primary school teachers on use of IT**. The computers have been installed in schools starting from May 1998, and the installation will be completed by the end of 1998. Basic IT training for teachers has started since June 1998. More training is being planned for provision from September/October 1998;

- **introducing a Computer Awareness Programme in primary schools**. The Programme will enable primary school pupils to acquire basic computer knowledge and operation skills, and to appreciate the proper use of computers. The Programme consists of eight modules, which will be incorporated in the school curriculum and/or through extra-curricular activities. It is now being piloted in eight primary schools and will be extended to all primary schools in the 1998/99 school year;

- **supporting computer-assisted learning programmes in primary schools.** CD-ROM titles on languages, mathematics and other subjects will be provided to primary schools along with the computers and other peripherals;

- **an annual recurrent grant of $14,000 for each primary school** to purchase consumables, educational software packages and to pay for other charges, starting from the 1998/99 school year; and

- **establishing in each of the 46 prevocational and secondary technical schools an Information Technology Learning Centre (ITLC) and a computer laboratory in each of the 27 prevocational**

schools. These facilities are intended to support the new technical curriculum, which will be implemented from the 2000/01 school year. The ITLCs will be installed by April 1999 and the computer laboratories by end 1999.

The implementation of the measures above requires a capital cost of around $300 million and a recurrent cost of $28 million per year.

9. In order to make an early start to carry out the missions identified in paragraph 6 above, the Chief Executive has also announced in the 1997 Policy Address to implement another set of new measures to further enhance IT in education. In this connection, we are pursuing the following:

- **enhancing provision of IT equipment for schools.** On average a primary school will have 40 computers and a secondary school 82 computers. The additional equipment will be provided to schools from late 1998 to early 2000;

- **providing over 30 000 IT training places for teachers**. Training will be provided at three levels over the next two years. The Education Department (ED) is currently planning the courses;

- **introducing a Pilot Scheme in ten primary and ten secondary schools** to establish best practices for IT application in teaching and learning. Schools reacted enthusiastically to the Pilot Scheme. 22 primary and 47 secondary schools applied to join the scheme from which 20 schools have been selected. The Pilot Scheme will last for two years and commence in the 1998/99 school year.;

- **establishing an Information Technology Education Resource Centre (ITERC).** The Centre will provide professional support to teachers in the adoption of an IT-based teaching mode, and technical support to schools on a regional basis. It will have a library to provide relevant resource material for teachers' reference, provide hotline service for teachers and schools, and support teachers in the development of educational software. The Centre is expected to commence operation in September 1998;

- **supporting procurement and development of educational software**. This will be one of the major tasks of the ITERC when established;

- **connecting all schools to the Internet.** In addition to secondary schools which already have access to the Internet since the 1996/97 school year, primary schools will also have such access as soon as they get the

computers;

- **making preparation for an education-specific Intranet**. We will commission a consultancy study on the appropriateness and feasibility of setting up an Intranet for multi-dimensional communication and sharing of information within the education sector. The consultancy study is expected to be completed by the end of 1998;

- **increasing the annual recurrent grant to $69,000 or $76,000, depending on the size of the school,** for schools to purchase consumables, educational software packages and to pay for other charges, such as Internet subscription fee, starting from the 1998/99 school year; and

- **establishing a multi-media learning centre in some 100 secondary schools** to promote more extensive application of IT in teaching and learning across the curriculum in these schools. Priority will be given to those schools which use Chinese as the medium of instruction to support biliteracy and trilingualism through a better environment for the learning of the English language. ED is currently evaluating some 300 applications from schools. We aim to establish the centre in the selected schools in the 1998/99 and 1999/2000 school years.

The implementation of the measures above requires an additional capital cost of about $2,580 million and additional recurrent cost of $233 million per year.

Concerns of the School Sector

10. As the new measures in IT in education started to roll out on the ground earlier this year, we have become keenly aware of concerns that :

(a) these measures need to flow from a holistic design; and

(b) computer hardware should be provided to schools with due regard to their readiness and physical constraints.

11. On (a) above, the Chief Executive's 1997 Policy Address has set out succinctly the overall objective of IT in education :

> "We will launch a five-year IT education strategy to promote the use of IT to enhance teaching and learning. The main tasks are to equip our teachers with the necessary IT skills, to apply computer assisted teaching and learning across the curriculum; and to place

students in an environment where they can use this technology as part of their daily activities and grow up to use it creatively."

Policy Address by the Chief Executive on 8 October 1997

It was within this context that the measures in paragraph 9 above were announced and they represented the first steps we are taking towards the ultimate scenario envisioned in this document. We could not have afforded to wait another year before making a start.

12. On (b) above, we are cognizant of the physical constraints in schools built many years ago . But, we would not accept any inequitable allocation of IT equipment to these schools as it would widen the gap of "haves" and "have-nots". The present arrangement for the delivery of computer and related equipment are intended to allow for flexibility. ED has been consulting the schools on the number of computers required, configuration, site preparation and delivery timetable. We will continue such communication to ensure smooth implementation on the ground. We have also been refitting existing schools and have reviewed school designs to ensure that our schools are able to keep up with new developments in the use of IT. Given the preferences of individual schools and allowing time for the procurement process, the provision of computer hardware will be spaced out over the next two school years. The exact number of computers and peripherals to be installed in a school can be more or less than the average number of 40 or 82, depending on the school's readiness and physical constraints. The overriding consideration is that the equipment be fully utilised.

13. We envisage that, by the 1999/2000 school year :

- all primary schools will have on average 40 computers to allow teaching and learning through IT at least in the subjects of Chinese, English, Mathematics and General Studies. The Computer Awareness Programme will be implemented at Primary three and above. All primary schools will also have access to the Internet. Ten primary schools will be participating in the Pilot Scheme;

- all secondary schools will have on average 82 computers for the teaching of various subjects, and upgrading the facilities for the teaching of computer subjects. About 100 of them will have a multi-media learning centre and ten of them will be participating in the Pilot Scheme;

- about two-thirds of our teachers will have gone through basic training in computer operation and about one-third in computer-assisted

teaching; and

- at least one teacher from every school has attended/is attending advanced level IT training with a view to becoming his/her school's in-house-adviser on use of IT in teaching and learning.

Chapter 3

Strategy and Key Components

14. Any proposals in respect of the key components of our strategy are not meant to be interpreted without flexibility. Our guiding philosophy is that it is incumbent on the Government to provide a threshold level of hardware (to schools), training (for teachers) and any necessary infrastructural support, whilst providing avenues for those schools which are more advanced in terms of IT-readiness, teacher capability and physical conditions to acquire more resources and support. An appropriate source of extra resources for more enhanced IT schemes in schools on a pilot basis would be the Quality Education Fund (QEF)[Note 1]. In the true spirit of school-based management, we will encourage schools to devise their own IT plans and to set the pace for the provision of IT facilities/training which best suit their individual needs.

I. Teacher Enablement

15. We think the most important component in this strategy is the willingness and ability of teachers to teach through IT. This task heralds a cultural change for teachers who are only familiar with the textbook-based approach of teaching, and for those who have had no exposure to computing so far, an IT literacy challenge altogether. It is of utmost importance that our teachers are convinced of the benefits of IT for education and become comfortable IT users as soon as possible. We look forward to suggestions on how the teaching profession as a whole should be assisted to make the paradigm shift outlined in paragraph 4 above.

16. On the other hand, we do not think teachers need to be computer experts at all, since most educational software and computer-aided teaching system are user-friendly nowadays. **Their professional skill as a teacher will never be replaced by IT; IT will only serve to enhance it.** Even when IT is used in teaching and learning, guidance from teachers is important. For instance, although some students may be

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Note 1: *The $5 billion QEF has been set up since March 1998 to finance bottom-up initiatives promoting quality and innovation in education at all levels. It is open to applications from schools and education bodies.*

very adept with computers, they need their teachers' guidance to search the right materials and to adopt the correct approach, so that they will not go astray amidst the many distractions on the network.

IT training for teachers

17. We already have been making plans to provide training for serving teachers during the current and next school years under the announced measures. Such training will take various forms - training in computer operation and use of various operating systems / software provided by hardware / software vendors, training in use of IT in teaching provided by tertiary and technical institutes etc. In parallel, teacher education institutions have been strengthening the IT content, in terms of using IT as a teaching tool, in their initial teacher education programmes.

18. On top of the IT training programmes that we are planning, we see the need to provide more training for teachers in the next four years, at the following levels:

- *Basic level*

  18-hour training in general computer operation and basic skills to operate readily available educational software. It can be provided by hardware / software vendors with input from the education sector in course design. It will be provided to all teachers who need it;

- *"Comfortable" level*

  30-hour intermediate level training in use of IT in classroom teaching and lesson preparation. This can be organised by tertiary institutions or other organisations with relevant experience;

- *"Competent" level*

  another 30-hour more in-depth training on top of the intermediate level training. Teachers will be trained in computer networking, shooting of simple hardware and software problems, more advanced use of authorware for lesson preparation etc. Such training will be provided by tertiary institutions or other organisations with relevant experience; and

- *"Creative" level*

  120-hour intensive training in computer operation and computer-assisted teaching. Teachers who have gone through such training are expected to become advisers to their colleagues on matters relating to use of IT in

teaching activities, to promote computer-assisted teaching and learning in the schools, and to develop IT plans or teaching software for their schools. We envisage the training to be fairly intensive and the teachers concerned may have to be partially relieved of their teaching duties during the training period.

19. The fast-changing nature of IT and IT in education requires us to provide opportunities for teachers to update their skills continually. In this regard, we propose to :

- include IT elements in the general refresher courses and curriculum-related retraining provided by ED and the tertiary institutions; and

- commission tertiary and other institutions to develop self-learning / self-access learning tools for teachers.

We would also welcome any efforts by the universities and technical institutes to come up with innovative modes of training for teachers.

Facilities for teachers

20. Practice should accompany training for our teachers to get up to speed with use of IT as soon as possible. In this regard, it is for consideration whether a one-off subsidy to teachers to purchase their own notebook computers should be provided. This would not only provide the incentive for some teachers to overcome their resistance to using computers facilitating an early switch to an IT-based working mode, but will also facilitate their preparation of teaching materials, teaching in classrooms and working at home. Again, the QEF could be a possible source of funds.

Professional support for teachers

21. As mentioned in Chapter 2, the ITERC to be set up later this year will provide professional support to teachers in the adoption of IT as a teaching tool. The Centre should also emerge to be a focus point and exchange place for ideas and views of the school sector, tertiary sector and private sector.

22. To enable schools to develop and implement school-based IT plans in the longer run, it is conceivable that schools would also require an IT co-ordinator to take charge of all IT-related teaching and learning activities, to tailor general software to meet the needs of their teachers and students, as well as to supervise the maintenance of the school's IT systems. We will keep in view the need for IT co-ordinators in the light of implementation of the measures already announced and subject to the schools' readiness and development in use of IT.

Long term targets

23. To ensure our teachers make good use of IT in teaching, it is for consideration whether we should -

- require all prospective teachers to meet certain benchmarks in the application of IT in teaching from a certain school year; and

- seek to achieve the following targets by the 2002/03 school year:

  – at least 75% teachers are "comfortable" IT users who have completed training up to intermediate level

  – at least 25% teachers are "competent" IT users who have completed more in-depth intermediate IT training

  – up to two teachers from each school are trained at "creative" level.

We welcome views from the teaching profession, the IT industry and teacher education institutions on whether, how, and when the IT benchmarks should be developed.

II. Curriculum and Software

Curriculum

24. As the Chief Executive announced in his 1997 Policy Address, we aim to have 25% of the school curriculum taught through IT in five years' time. This target has been drawn up taking account of the nature of our school curriculum, experience of IT in education projects of other countries, readiness of our teachers, and resource implications. We do not consider this target to be over-ambitious (schools in some developed countries and even some schools in Hong Kong have already reached this level). We are also not suggesting that this 25% target must be gradually enhanced beyond the next five years as not all subjects are best taught with the help of IT. We welcome the community's view on this.

25. To achieve the 25% target by the 2002/03 school year, we will have to ensure that IT elements are suitably incorporated in the curriculum in time and that adequate quality software and material are available to teachers. In this regard, the Curriculum Development Council (CDC) endorsed in end 1997 that IT should play an important role in the school curriculum. It has requested the subject committees to explore use of IT in their respective subjects and include IT elements in the context of

the regular syllabus reviews. We expect the incorporation of IT elements to liven up some syllabuses, rather than to make them heavier for students and teachers, in other words restructuring rather than mere addition. We will ask CDC to consider setting a progressive timetable for the review.

26. An overall review was made recently on the syllabuses of computer subjects in secondary schools. The objective was to develop a set of computer syllabuses for the 21st Century. Subsequently, four draft syllabuses for computer subjects revised in the light of comments received, were issued. Given the rapidly changing requirements brought about by technological development, we see a need to continually revise the syllabuses. CDC will also incorporate IT elements in the new technical curriculum for prevocational and secondary technical schools.

Software

27. In building up a stock of software for schools, we see the need for collaboration among the tertiary sector, school sector and private sector. In this regard, the ITERC will be tasked to:

- explore and promote more creative application of existing software in teaching and learning;
- liaise with overseas software publishers or educational bodies to identify educational software appropriate for local schools;
- source the appropriate authorware to facilitate production of tailor-made teaching software by teachers;
- seek to negotiate with educational software publishers worldwide to offer their products, where appropriate, at a concessionary rate to our teachers and students; and
- explore the possibility of converting locally available education materials into electronic form.

28. As regards development of local curriculum-specific educational software, we hope that when there is a clear plan on how the school curriculum will be progressively adapted to achieve the 25% curriculum target, the textbook market will respond favourably. However, we recognise that the development of such software may be limited by the relatively small size of the local market. We would value any suggestions on what can be done to overcome this constraint. Depending on the situation, we will consider providing incentives for publishers and software developers to produce curriculum-specific teaching software. The incentives could

take various forms, such as reimbursement of part of the production cost, or financial awards for experienced teachers who provide professional advice to the publishers.

29. Tertiary institutions and individual teachers, who may work in collaboration with software developers, may apply for resource from QEF for the development of quality educational software, in particular school-based software.

Other support for teachers

30. ED will encourage and assist teachers to develop innovative school-based IT curriculum catering for the specific needs of their students under the School-based Curriculum Project Scheme. It will also promote more frequent application of IT during classroom and extra-curricular activities through seminars, workshops, school visits and inspectors etc. In this regard, the Department will widely disseminate as appropriate best practices emerged from the Pilot Scheme in ten primary and ten secondary schools to all other schools.

III. Hardware Provision

31. New technological developments on the horizon may drastically alter the way in which hardware should be provided. In consultation with technical departments and experts in the field, we shall closely keep in view new technological developments, and review the facilities provided for schools to ensure that our students benefit from the latest technological advancement, and that hardware is provided in the most cost-effective manner. In view of these variables, we are therefore not proposing a fixed target in respect of computer-to-student ratio, an element which characterises similar strategies of many other economies. However, schools which have action plans for a higher level of IT application and which require equipment and facilities over and above the standard provision, for example, may apply for resources from the QEF.

32. We should always try to strike a balance between hardware provision and the need to ensure that our students are not overly engrossed in communication on computers to the neglect of human interaction. Here, school authorities have a role to play in ensuring that their students' balanced development should not be compromised by the sheer wish to increase penetration of technology, given the increasing ease with which schools will be able to acquire additional resources for more hardware.

33. We also propose to give schools more flexibility in the procurement of IT facilities to meet their specific needs. This would shorten the procurement procedure, and help address the issue of IT facilities having increasingly shorter life

cycles. As recommended in Education Commission Report No. 7 (ECR7), schools should in the long run be given an aggregate Block Grant, with which they could enjoy maximum flexibility in the use of all resources available to them. Expenditure on IT facilities could be included in the Block Grant. Several school sponsors have already indicated interest in this idea. We will also streamline the central procurement process to make it more efficient.

Configuration of IT facilities

34. Schools can decide for themselves how to place the IT facilities within the school to achieve the best results. For schools which feel they need some guidance in this respect, we suggest that IT facilities should be provided in:

- all classrooms and most special rooms to enable teachers to teach through IT;
- staff rooms for teachers to prepare teaching materials;
- computer rooms for practical classes of computer, business and technological subjects;
- computer-assisted learning rooms for students to learn across the curriculum with hands-on experience with computers; and
- the library to enable students to do research, study or simply find satisfaction in discovering knowledge through the electronic media, such as CD-ROM and the Internet.

Technical support for schools and teachers

35. We are aware that, as we provide more IT facilities for schools, there should be sufficient technical support to keep the facilities in a good working order, and to help teachers and students overcome difficulties such as mechanical breakdown or malfunctioning, especially during the transitional period. The additional IT facilities to be provided to schools in the next two years will be accompanied by technical support by the ITERC on a regional basis. The computer suppliers will also provide Helpdesk service to teachers and schools. However, we are alive to the concerns expressed by many principals and teachers about technical support. We will closely monitor the situation, and review the best way to provide technical support for teachers and schools. Enhancement could take the form of centrally arranged maintenance service, provision for schools to arrange maintenance service on their own, school-based technicians, or strengthening the region-based technical support provided by the ITERC. We will bear in mind that additional

technical support is particularly essential for primary schools where the teachers are generally less IT-prepared than their counterparts in secondary schools.

IV. Network Infrastructure

36. We need a sound network infrastructure for teachers and students to share information, and to tap into the wealth of knowledge which is already, or will be, in various networks worldwide. Networking also provides a more effective and timely communication mode, which brings teachers and students, schools and parents, and the school sector and the community as a whole, much closer to one another than ever before. As teachers become more attuned to using IT to teach, on-line sharing of teaching materials would be a crucial support item for them and it would be beneficial to their professional development. In this regard, good efforts are already being made in some quarters. A case in point is *TeleNex*, a network financed by the Language Fund which provides on-line support and advice for all teachers of English. Students would also be able to learn on their own more effectively as a wide range of self-learning packages become accessible over the network.

37. Under the measures already announced, we will link up the computer room(s), computer-assisted learning room(s) and the library in a school. As the first step, we will consider upgrading or expanding the Local Area Network (LAN) in schools. We have also reviewed our school designs to ensure they are "network-ready".

"Intranet"

38. As mentioned in Chapter 2, we will commission a consultancy study on the appropriateness and feasibility of establishing an Intranet dedicated for education purposes. It should facilitate sharing of electronic teaching materials available elsewhere in the world, in particular the cyberworld, as well as facilitate collaboration and discussion among teachers. It would also be the front engine for schools/teachers to communicate more effectively with parents and other sectors of the community. We expect the consultancy study to come up with recommendations regarding overseas practices, physical infrastructure, as well as division of responsibilities among parties concerned, amongst other things. In parallel, we are working on a pilot scheme on networking in 30 schools

39. In considering any physical infrastructure of the education-specific Intranet, we will take in to account of any communication infrastructure planned for the community (for example a territory-wide broadband network) so as to ensure efficiency and cost-effectiveness. We will closely liaise with the newly established Information Technology and Broadcasting Bureau (ITBB) in this regard.

40. We will also consider the following options regarding networking :

- to provide teachers with access to the Internet for them to tap into world-wide knowledge and best practices in use of IT in education; and

- to provide all teachers and all students above a certain academic level with individual e-mail accounts to facilitate communication among teachers, students, schools and parents.

Chapter 4

Implementation

Institutional framework

41. In the new frontier of IT in education, the Government is also on a steep learning curve. We are dealing with a rapidly advancing technology and a large number of players will be involved in this strategy, notably the Government (in particular, the Education and Manpower Bureau (EMB), ED, and ITBB), teaching profession, parents, the tertiary sector and the IT industry. An institutional framework is needed to advise the Government on the fine-tuning of any agreed strategy in the light of advances in technology and other new developments, and on the implementation of the strategy. It could take the form of an advisory committee comprising representatives from the Government, the school sector, the tertiary sector and the IT and communications industry to ensure that the views of all relevant sectors are heard and properly considered. One option is to make use of the existing education-related advisory bodies, in particular, the Education Commission (EC) and/or the Board of Education (BoE). We could keep both the EC and BoE informed periodically of progress, or the former can advise on future direction and interface between the school and tertiary sectors while the latter on specific areas for improvement in the use of IT in schools. Another option is to establish a separate advisory committee under the purview of EMB/ED.

42. It is particularly important that the institutional framework will foster closer links between tertiary institutions and schools and will enable the expertise and best practices already existing in the tertiary sector to be channelled and disseminated to the school sector. We note that a number of projects have been initiated by the universities to strengthen use of IT in schools (like the "School Net" project), and we look forward to even more participation from the universities in promoting IT application in schools in future. We see potential for a lot of synergy between the two sectors, and will make every effort to facilitate the process.

Implementation Approach

43. Following public consultation on our five-year strategy, we will formulate, in the light of comments received, an implementation plan including a timetable and targets to be achieved in the next five years. However, this strategy is not meant to be implemented in a top-down manner or adhered to without flexibility. Quite the contrary, as pointed out in paragraph 14 above, schools should formulate their own IT plans tailored to their specific needs, in the spirit of school-based management.

44. For the same reason, we are now carrying out the Pilot Scheme to find out what could be the best practices and strategies for schools in Hong Kong. Under this Scheme, ten primary and ten secondary schools which are more advanced in terms of IT readiness, will be provided with an enhanced level of hardware facilities and support so that they may pilot innovative ways to promote IT in education. We need to be guided by the result of this Scheme before proceeding further with this strategy. Where appropriate, the successful practices of these "demonstration schools" will be broadly disseminated to other schools, and form a basis on which the subsequent stages of this strategy can be developed.

Evaluation

45. In view of the considerable investment in promoting use of IT in schools, it is important that its effect on the overall quality of teaching and learning be evaluated. However, the difficulty in such evaluation should not be under-estimated. We welcome any views or comments on how such evaluation can be best considered. As one of the indicators, students' computing skills do to a certain extent reflect how well they are able to learn or self-learn with IT. We therefore propose setting attainment targets for students at key learning stages, although we have commented before that developing students' computing skills is not a central objective of this strategy. The attainment targets would also help teachers design assignments for their students.

46. Apart from skills in computer operation, we should also seek to instil in our students proper attitudes and values regarding use of IT, for instance respect for intellectual property rights. We propose the following attainment targets for students at the key-learning stages of Primary 3, Primary 6, Secondary 3, Secondary 5 and Secondary 7 -

Level	Students should be able to:
Level 1 (up to Primary 3)	– operate computers and multi-media educational software – communicate and handle information with simple IT tools in writing and other learning activities
Level 2 (up to Primary 6)	– use a number of software packages, such as simple word-processing and graphical packages for communication and learning purposes – select and determine information from a

	variety of sources, such as electronic encyclopaedia on CD-ROM and the Internet
Level 3 (up to Secondary 3)	– use common IT software tools in information processing, such as - * word-processing packages * spreadsheets in calculation and charting * database information management * Internet tools for communication and information retrieval
Level 4 (up to Secondary 5)	– understand the functions of a range of IT systems, such as microcomputers and their peripherals – understand the features of common IT software tools and work competently and effectively with these tools – reflect critically on their own and others' use of IT
Level 5 (up to Secondary 7)	– integrate use of and select appropriate IT software tools to analyse and present information to fulfil specific purposes, such as multi-media presentation – become frequent and sophisticated IT users in future studies and work.

Concluding remarks

47. This strategy will only be successful with community-wide involvement. A child's education extends far beyond the classroom. We would like to see our students thriving in an IT-rich environment not only in schools, but also where they socialise and play. In order that our policy achieve maximum effect, it is important to ensure that our students have maximum exposure to IT both during and after school hours. This is particularly crucial in the Hong Kong context because, we estimate that at present only less than half of our students have a computer at home. An isolated school-centred policy would run the risk of widening the existing gap between the "haves" and "have-nots" in terms of access to IT. This strategy should therefore be seen as forming part of a larger, co-ordinated and community-wide plan for the promotion of IT, which should involve the application of IT in community facilities

like libraries, children and youth centres, and community halls/centres. We will work closely with ITBB in this regard.

Chapter 5

Summary of Proposals

Vision

- Harness the power of IT to help our students get the most out of school education (para. 1).

- Three strategic objectives (para. 2):

  – to arouse and maintain students' motivation to learn;

  – to broaden our students' horizons, so as to enrich their learning experience and facilitate the development of a creative mind; and

  – to encourage independent lifelong learning and instil team spirit.

- To achieve the objectives above, apart from substantial and sustained Government investment, there has to be a paradigm shift in school education - from a largely textbook-based teacher-centred approach to a more interactive and learner-centred approach. Participation of the private sector and the community is also important (para. 4).

Where We Stand Now

- A number of measures were already announced in 1997 (paras. 8 & 9):

  ◊ connecting all schools to the Internet;

  ◊ providing, on average, 82 computers for each secondary school and 40 computers for each primary school;

  ◊ providing over 45 000 IT training places for teachers;

  ◊ introducing a Computer Awareness Programme and computer-assisted learning programmes in primary schools;

  ◊ introducing a Pilot Scheme in ten primary and ten secondary schools;

- ◊ establishing an Information Technology Education Resource Centre (ITERC) by September 1998;
- ◊ supporting procurement and development of educational software;
- ◊ making preparation for an education-specific Intranet;
- ◊ providing an annual IT recurrent grant of $69,000 or $76,000, depending on the size of the schools;
- ◊ establishing a multi-media learning centre in some 100 secondary schools; and
- ◊ establishing an Information Technology Learning Centre in each prevocational/secondary technical school, and a computer laboratory in each prevocational school.

Five-year Strategy

Missions for the 1998/99 to 2002/03 school years (para. 6)

- Help our teachers to settle in their new role as a "facilitator" and become comfortable and habitual IT users as soon as possible.
- Incorporate IT elements in the school curriculum and enhance provision of educational software in a more structured framework.
- Progressively increase IT facilities for schools in line with their readiness, and working with schools to overcome any physical constraints.
- Build up a network infrastructure to facilitate sharing of educational resources and communications within the education sector, and between the education sector and the community.

Key components of five-year strategy

Teacher Enablement

- ◊ Teachers need not be computer experts; their professional skills as a teacher will never be replaced by IT; IT will only serve to enhance it (para. 16).
- ◊ Provide more IT training for teachers at four different ("basic", "comfortable", "competent" and "creative") levels (paras. 17 & 18).
- ◊ Provide teachers with opportunities to continually upgrade their skills

through refresher courses, curriculum-related retraining and self-learning packages (para. 19).

- ◊ Consider providing a one-off subsidy for teachers for them to purchase their own notebook computers (para. 20).
- ◊ Provide professional support to teachers in the adoption of IT as a teaching tool through the ITERC (para. 21).
- ◊ Keep in view the need for IT-coordinators for schools (para. 22).
- ◊ Consider setting the following targets (para. 23):
  - requiring all prospective teachers to meet certain benchmarks in applying IT in teaching from a school year; and
  - by the 2002/03 school year:
    - at least 75% teachers are "comfortable" IT users
    - at least 25% teachers are "competent" IT users
    - up to two teachers from each school are trained at "creative" level

Curriculum and Software

Curriculum

- ◊ Have 25% of the school curriculum taught through IT in five years time (para. 24).
- ◊ Set a timetable for reviewing the syllabuses of various subjects with a view to including IT elements in them, where appropriate, to achieve the 25% curriculum target (para. 25).
- ◊ Continually revise the syllabuses of computer subjects for secondary schools, and incorporate IT elements in the new technical curriculum for prevocational and secondary technical schools, to keep up with technological developments (para.26).

Software

- ◊ Through the ITERC -
  - explore and promote more creative application of existing software;
  - liaise with overseas software publishers or educational bodies to

identify educational software appropriate for our schools;

- source the appropriate authorware to facilitate production of tailor-made teaching software by teachers;
- seek to negotiate with software publishers worldwide to offer their products, where appropriate, at a concessionary rate to our teachers and students; and
- explore the possibility of converting locally available education materials into electronic form (para. 27).

◊ Take the following measures to encourage development of local curriculum-specific software:

- facilitate favourable response from the textbook market through setting a clear plan on how the school curriculum will be progressively adapted to achieve the 25% curriculum target (paras. 25 & 28);
- consider providing incentives for publishers and software developers (para. 28); and
- encourage tertiary institutions and/or teachers to collaborate with software developers and apply for resources from the Quality Education Fund (QEF) (para. 29).

Other support for teachers

◊ Encourage and assist teachers to develop innovative school-based IT curriculum projects under the School-based Curriculum Project Scheme (para. 30).

◊ Disseminate as appropriate best practices emerged from the Pilot Scheme (para. 30).

Hardware Provision

◊ Continually review IT facilities provided for schools in the light of readiness of schools, latest developments in technology and cost-effectiveness. In view of these variables, we are not proposing a fixed target in respect of computer-to-student ratio in every school. However, schools which have action plans for a higher level of IT application may apply for more facilities from the QEF (para. 31).

◊ Ensure that our students are not overly engrossed in communication on computers to the neglect of human interaction. School authorities have

a particular role to play in this regard (para. 32).

- ◊ Provide schools with more flexibility in the procurement and configuration of IT equipment to better meet their specific needs (paras. 33 & 34).
- ◊ Consider strengthening technical support for schools, which may be in the form of centrally arranged maintenance service, provision for schools to arrange their own maintenance service, school-based technicians or enhanced regional service by the ITERC (para. 35).

Network Infrastructure

- ◊ Provide a sound network infrastructure to facilitate communication and sharing of information within the education sector, and to enable teachers and students to tap into the wealth of knowledge in various networks world-wide (para. 36).
- ◊ Consider upgrading or expanding the Local Area Network in schools (para. 37).
- ◊ Commission a consultancy study on the appropriateness and feasibility of an education-specific Intranet (para. 38).
- ◊ Carry out a pilot scheme on networking in 30 schools (para. 38).
- ◊ Consider network infrastructure for the school sector in consultation with the Information Technology and Broadcasting Bureau, taking into account of any communication infrastructure planned for the community (para. 39).
- ◊ Consider providing (para. 40):
  - − all teachers with access to Internet and individual e-mail accounts; and
  - − all students above a certain level with individual e-mail accounts.

Implementation

- Set up an advisory committee comprising representatives from the Government, the school sector, tertiary sector and IT industry to provide a steer for the strategy and to oversee its implementation. (para. 41 & 42).

- Formulate an implementation plan in the light of comments received during the public consultation (para. 43).

- Strategy not meant to be implemented in a top-down manner or adhered to without flexibility. Schools should formulate their own IT plans tailoring to their specific needs, in the spirit of school-based management. (paras. 43 & 44).

- Consider setting attainments targets for students at Primary 3, Primary 6, Secondary 3, Secondary 5 and Secondary 7 levels, as one of the indicators to reflect how well they are able to learn or self-learn with IT (paras. 45 & 46).

We invite your suggestions and comments on this Five-year Strategy on Information Technology for Quality Education. Based on the broad principles outlined in this document and any comments received, we will work out a prioritised implementation plan for the next five years. Please send your comments to the following address before 31 August 1998 -

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