Information Technology Learning Targets

A guideline for schools
to organize teaching and learning activities
to develop our students' capability in using IT

PREPARED BY
THE CURRICULUM DEVELOPMENT COUNCIL
RECOMMENDED FOR USE IN SCHOOLS BY
THE EDUCATION DEPARTMENT
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We should help our students to develop an understanding of the pervasive impact of IT on the society and their daily lives, higher order thinking skills, as well as abilities to seek, evaluate, organize and present information.

(para. 1.2, Information Technology for Learning in a New Era
Five-Year Strategy 1998/99 - 2002/03)

Contents

Membership of the IT Learning Targets Working Group

The membership from 1 May 1998 to 31 January 2000 was as follows:

Chairman   Mr NG Hok-ling

Members   Dr CHAN Fun-ting

               Mr CHAN Mei-wing

               Mr HO Chi-ming

               Mr HO Lok-tin

               Mr LO Wai-pui

               Mr NG Sui-kou

               Principal Inspector (Cultural & Technical)
               Curriculum Development Institute, Education Department
               (Mr LEUNG Shiu-keung, from 1 April 1999 to 11 July 1999)
               Principal Curriculum Development Officer (IT in Curriculum)
               Curriculum Development Institute, Education Department
               (Mr J. SHIN, from 12 July 1999)

               Senior Curriculum Officer (Commercial Subjects)
               Curriculum Development Institute, Education Department
               (Mr CHAU Wai-kau)

               Senior Inspector (Computer Education)
               Curriculum Development Institute, Education Department
               (Mr CHAN Hau-wing, until 14 May 1998)
               (Mr CHAN Hing-lam, from 15 May 1998)

Senior Inspector (Technical Subjects)
Curriculum Development Institute, Education Department
(Mr FUNG Lap-ming)

Inspector (Computer Education)
Advisory Inspectorate Division, Education Department
(Ms MAK Yee-chi)

Inspector (General Studies)
Curriculum Development Institute, Education Department
(Mr YEUNG Man-shing)

Inspector (Information Technology)
Curriculum Development Institute, Education Department
(Mr IP Wing-tong, from 1 September 1998)

Secretary   Inspector (Computer Education)
Curriculum Development Institute, Education Department
(Mr CHENG Wing-cheung, until 21 July 1998)
(Mr IP Wing-tong, from 22 July 1998 to 31 August 1998)
(Ms LAM Wing-yee, from 1 September 1998 to 11 July 1999)
Curriculum Development Officer (IT in Curriculum)
(Mr LEUNG King-man, from 12 July 1999)
(Mrs CHENG CHOW Yee-seung, from 12 July 1999)

Membership of the Ad hoc Committee on the Development of IT Learning Targets under the Technology Education KLA Committee

The membership since 1 February 2000 has been as follows:

Convenor   Principal Curriculum Development Officer (IT in Curriculum)
Curriculum Development Institute, Education Department
(Mr J. SHIN)

Members   Mr NG Hok-ling

Dr CHAN Fun-ting

Mr HO Chi-ming

Mr NG Sui-kou

Mr WONG Kwong-wai, Raymond

Inspector (Computer Education)
Advisory Inspectorate Division, Education Department
(Mr Yan Po-wa)

Senior Curriculum Development Officer (IT in Curriculum)
Curriculum Development Institute, Education Department
(Mr IP Tang-ping)

Curriculum Development Officer (IT in Curriculum)
Curriculum Development Institute, Education Department
(Mr LEUNG King-man)

Secretary   Curriculum Development Officer (IT in Curriculum)
Curriculum Development Institute, Education Department
(Mrs CHENG CHOW Yee-seung)

Co-opt Members

Curriculum Development Officer (IT in Curriculum)
Curriculum Development Institute, Education Department
(Mr IP Wing-tong)

Curriculum Development Officer (IT in Curriculum)
Curriculum Development Institute, Education Department
(Mrs CHAN L.C. Theresa)

Preamble

Technological development has been advancing at unpredictably fast speed. Today, we are talking about doing business on the network, communicating with friends using electronic mails and conducting global projects with people across the border. Everything seems to be at our fingertips with access to the Internet. Information Technology (IT) changes our life styles. Now, we are living in a digital and boundless global village. Facing the challenges in the 21st century, the Government of Hong Kong Special Administrative Region has initiated various important IT-related projects. To enable our youngsters to keep in pace with the changing needs of the information age, the IT in Education project was started in 1997.

In September 1997, the Curriculum Development Council began to investigate the different approaches to integrate IT into the school curriculum, including:
- the development of IT-related subjects and learning programmes to enhance students' IT knowledge and skills;
- the promotion of the use of IT across the school curriculum to empower teachers with the strength of using IT, and to enable students to apply IT in learning; and
- the use of IT as a means of educational technology to enhance teaching and learning in the classroom.

With the release of the document "Information Technology for Learning in a New Era Five-Year Strategy 1998/99-2002/03" by the Education and Manpower Bureau in November 1998, the vision and mission on promoting and implementing IT in Education in Hong Kong were clearer. One of the prime concerns was to set learning targets for students at different key learning stages to improve their learning abilities with the support of IT. A working group was formed in the Curriculum Development Institute to develop the "Information Technology Learning Targets" which outline the essential IT knowledge, skills and attitudes that students should acquire at various stages of schooling.

In November 1999, the consultation document of the "Information Technology Learning Targets" was issued for public consultation. After two months' consultation, 41 comments have been received. The respondents have raised

their concern about various issues. In view of this, a number of informal meetings have been held by the working group to discuss these comments.   A summary of the discussion and suggestions on the different issues has been included in Appendix IV.   The recommendations and suggestions have then been incorporated, wherever appropriate, into this document.   Due to the restructuring of the Curriculum Development Council, an ad hoc committee was set up under the Technology Education KLA Committee in February 2000 to further develop and finalize the document.

The "Information Technology Learning Targets", together with the document "Information Technology for Learning in a New Era Five-Year Strategy 1998/99-2002/03", serves as a guideline for schools to organize teaching and learning activities to develop IT capabilities of our students.   Through these learning activities, our students will then become habitual IT users in accomplishing learning tasks in schools and job-related tasks in their future workplace.   These will also help develop in our students the attitude and capability for independent lifelong learning.

Chapter Introduction

This document describes the IT learning targets at various stages of schooling, implementation methods, assessments and other related issues. The IT learning targets are designed according to students' cognitive development at five stages from Primary 1 to Secondary 7. We have also made reference to technological development and social needs in Hong Kong in deciding details of the IT learning targets.

In the "Report on Review of 9-year Compulsory Education", it is recommended that *there should be strong emphasis on the use and development of information technology in our curriculum.* In the document "Information Technology for Learning in a New Era Five-Year Strategy 1998/99 - 2002/03", it is stated that *we should help our students to develop an understanding of the pervasive impact of IT on the society and their daily lives, higher order thinking skills, as well as abilities to seek, evaluate, organize and present information.* It is a general consensus that after completing the universal basic education, students are expected to be able to apply IT in their learning and in addressing different issues in their daily lives. In order to ensure that all students can receive the essential IT training in the 9 years of universal basic education, schools have the obligation to provide ample opportunities for students to develop their IT capabilities. Regardless of the differences in their background and abilities, all students should be provided with equal access to IT resources.

At senior secondary education level, regardless of their subject combinations, students should continue to have the opportunity to use IT facilities in schools and to receive appropriate IT training.

At each stage, we have suggested various resources and teaching strategies to achieve the targets. This will serve as a reference for teachers in designing school-based IT learning activities. Schools are recommended to develop their own IT in Education plan and to implement the learning targets according to the needs of their students and depending on the resources of the schools.

Chapter 2   Aim

The aim of IT learning targets is to equip our students with the capability in using IT to process information effectively in this information-explosion era. Using technology as a means, our students should actively search for relevant information to address various issues raised in learning and in their daily lives. Therefore, in designing the learning targets, the capability of "learning how to learn" is one of the crucial elements to be considered.

In designing the IT learning targets, we have stratified the years of schooling into five stages. In actual implementation, the IT learning targets can be completed within the following time frame:

> ***Universal Basic Education***
> Stage I   : Primary 1 to Primary 3
> Stage II : Primary 4 to Primary 6
> Stage III : Secondary 1 to Secondary 3
>
> ***Senior Secondary Education***
> Stage IV : Secondary 4 to Secondary 5
> Stage V : Secondary 6 to Secondary 7

Upon completion of Primary 3, Primary 6, Secondary 3, Secondary 5 and Secondary 7, the majority of students are expected to have reached an IT competence up to the respective stages.

The attainment targets in the document "Information Technology for Learning in the New Era Five-Year Strategy 1998/99 to 2002/03" serve as a starting point in developing the IT learning targets. (Details of the attainment targets can be found in Appendix I.) The term "attainment targets" is interpreted as the minimum standard of students' IT skills to be achieved at each stage.

Mastering IT skills is not the only objective for using IT in education. Acquiring an understanding of the knowledge of IT, applying IT skills in information processing and developing a proper attitude towards IT usage are equally important. Therefore, the learning targets at each stage are further elaborated into knowledge, skills and attitudes.

Chapter 3   Five Stages of IT Learning Targets

In this chapter, the stage targets, the learning targets which focus on the development of IT knowledge, skills and attitudes at different stages of schooling, are described.   Appendix II is a summary of the targets.   Details of the learning targets are illustrated in the following paragraphs.

3.1 Stage I

Stage I spans from Primary 1 to Primary 3.   At this stage, we wish to develop our students' curiosity and interest in learning with IT.   Our students are encouraged to be adventurous with IT and try IT tools through interesting learning activities so that they will become familiarized with common computer operations and realize the use of common applications of IT in daily life.

Stage Targets

After completing Primary 3, students should know how to operate simple IT tools, such as computers, simple peripheral devices and multimedia resources. They should be aware that IT tools are commonly used in daily life. In the learning process, they are expected to demonstrate an interest in using IT.

> *Knowledge*
> Students should recognize the IT tools available in schools and the functions of these tools.   They should be able to name common input and output devices and discuss some examples in using IT in daily life.

> *Skills*
> Students should be able to operate the computer systems installed in schools and use a handwriting recognition device to input Chinese characters.   They should use IT tools to handle simple tasks such as word processing and drawing. They should start communicating and handling information in learning activities with simple IT tools.   With the support of teachers, they are able to make use of multimedia resources to assist their learning.

Attitudes

Students should develop interest and positive attitudes in using IT to support learning. They should act appropriately in using IT, such as properly switching on/off the equipment. They should work cooperatively with their peers in classroom.

3.2 Stage II

Stage II spans from Primary 4 to Primary 6. At this stage, students are expected to make use of IT tools in learning activities. Students should have the opportunities to get access to information via computer networks with the support of teachers. Students should develop communication and information processing skills.

Stage Targets

After completing Primary 6, students should be able to use IT tools to support their own learning. They should get access to information via computer networks to facilitate their learning. Students should develop simple techniques in information processing. They should be able to browse and search information on the Internet. They should develop proper interpersonal and communication skills to facilitate cooperative learning. In the learning process, they should demonstrate concern about various issues involved in IT usage.

Knowledge

Students should know how to use IT tools to express themselves. To serve the purpose, they should be able to name some common applications of IT, using appropriate and accurate terminology. They should know the importance of IT in these applications.

Skills

Students should start using a variety of software packages for word-processing, calculation, graphic manipulation and other learning activities. Their achievement should be reflected in their presentation through the use of IT tools selected by their teachers. Apart from using a handwriting recognition device to input Chinese characters, students are expected to

be able to input Chinese characters via keyboard by using a Chinese input method available in the computers they use.   With the support of teachers, they should get access to information via computer networks and other media.   They should be able to process information using IT tools.

Attitudes
Students should be aware of the intellectual property rights and copyright in using information from others and realize privacy issues possibly involved in accessing information via computer networks.   In accessing information on electronic networks, they should beware of indecent elements or inaccurate information on the networks and other media. They must recognize the need for protecting themselves in using the networks.   As they have more chances to engage in group projects, they should develop a positive attitude and willingness to share perspectives with peers.

3.3 Stage III

Stage III spans from Secondary 1 to Secondary 3.   At this stage, we wish our students to improve their effectiveness in applying IT tools in learning and develop the ability to verify the accuracy and reliability of information.

Stage Targets
After completing Secondary 3, students should be able to use a wide range of IT tools in learning, and develop capability to process and present information. They should develop an inquisitive mind and an interest in learning new IT tools and techniques.   They should demonstrate the awareness and acquire the basic skills to verify and evaluate the accuracy and reliability of information. In the process, they should work collaboratively with their peers in project assignments.   In applying IT in information processing, they should be aware of the importance of keeping confidential of sensitive or personal data and behave ethically in using the information.

Knowledge

Students should know how to use IT tools sensibly and appropriately. They should understand the usage of various IT tools and resources in information processing and in supporting learning. In many cases, they should identify the applications of IT in daily life and explain the significance of IT applications.   They should be aware of the impact of IT on the society and understand the legal and ethical issues related to using IT.   They should also know how to protect themselves when getting access to information and communicating through the Internet.   To develop their capability in handling information in Chinese, they need to have some basic ideas on Chinese character processing, such as characteristics of Chinese input methods, internal codes for Chinese characters, need for customized Chinese characters, etc.

Skills

Students should treat the use of IT as an integral part of their learning process.   They should use appropriate IT tools to facilitate learning such as producing lively, creative and information-rich project reports, using appropriate Chinese input method to input Chinese characters.   The choice of IT tools depends on the needs and abilities of students.   By making use of appropriate tools, students should create good quality presentation for project assignments.   As a result, they should be able to use IT tools and strategies to process information and present their ideas. Besides, students can communicate with others via electronic mail.   In processing information, they should gradually build up the ability to verify and evaluate the accuracy and reliability of information.

Attitudes

Students should demonstrate interest in emerging IT tools, techniques and usage of these tools and be concerned about their impact on the society. They should realize the importance of accurate and reliable information. When using IT, they should be aware of the legal, social and ethical responsibilities involved.   Students should participate actively and work cooperatively with their peers in project assignments.

3.4 Stage IV

Stage IV spans from Secondary 4 to Secondary 5.   At this stage, we wish our students to be able to select and use appropriate IT tools to solve problems in daily life.   They are encouraged to take the initiative to learn, to think and to create actively, and to share information.

Stage Targets

After completing Secondary 5, students should have acquired the necessary skills in selecting and using IT tools to support their further studies and life-long learning.   They should demonstrate the ability to understand and analyze information.   They should be able to use IT tools, such as web publishing tools, to share information on the Internet.   In order to cope with the technological development, students should reflect on their own and others' use of IT, and learn from experiences.   They should be responsible in using information.

Knowledge

Students should be able to identify, understand and compare the functions of various IT tools.   This capability enables them to choose appropriate IT tools accordingly.   They should be aware of the social implications of improper use of information and recognize the legal responsibility involved.

Skills

Students should be able to make use of common application software packages to improve their productivity.   They should be able to compare the effectiveness of various ways, including the use of different IT tools, to solve a given problem.   They should use and analyze information. In order to share information with others, they should be able to produce creative multimedia presentations.

Attitudes

Students should be responsible in using information and should have an initiative for self-enrichment to cope with the technological development. This requires their self-motivation for improvement. In the learning process, students should demonstrate a willingness to share information on the Internet.   They should have a critical mind in using information.

3.5 Stage V

Stage V spans from Secondary 6 to Secondary 7. At this stage, we wish our students to nurture a spirit of self-motivation and self-learning with emerging technology. They should become proficient in selecting and integrating the use of a variety of IT tools to address different issues in learning and in daily life.

Stage Targets

After completing secondary 7, students should have become frequent and sophisticated IT users in future studies and at work. They should be able to generalize the experiences of using IT and be able to select appropriate IT tools for specific purposes. They should also be able to evaluate critically the usefulness of emerging IT tools.

Knowledge

Students should be able to analyze the functions of a variety of IT tools. They should understand the positive and negative impact of the widespread use of IT in the society, the benefits and limitations of IT applications, especially the effect of IT in their respective fields of study. As new technologies emerge, they should be able to identify the capabilities and limitations of emerging IT tools and evaluate the effectiveness of applying these tools in solving problems.

Skills

Students should acquire comprehensive skills in integrating different tools to fulfil specific purposes. They should select and apply appropriate IT tools in different aspects of study, such as collecting and analyzing information, problem solving, as well as decision making. They should be competent in using appropriate IT tools and identifying suitable strategies to verify and evaluate the accuracy, relevance, reliability, comprehensiveness, and bias of information.

Attitudes

Students should actively explore the usage of emerging IT tools. They should advocate the legal, social and ethical responsibilities among peers, family, and community regarding the use of information and IT tools.

Chapter 4   Supporting Resources for Implementing IT in Education

Schools will need different IT resources for conducting teaching and learning activities in achieving the IT learning targets.   There are choices of resources for achieving the same targets.   Schools are advised to use IT-related grants to make selection according to their specific needs and based on the pedagogical benefits of the resources.   The IT resources mentioned in this section represent the currently available technology that fits the prescribed requirements.   As new technology emerges, the school curriculum should be reviewed accordingly to suit the social and technological needs.   Hence, new products available in the market should be considered to help achieve the targets.

Stage I

The resources at this stage focus on familiarizing students with computers and computer operations.   In daily operations, different input and output devices, such as keyboard, mouse, scanner, CD-ROM drive, handwriting recognition device, printer and speakers should be provided.   Simple Computer Assisted Learning packages, word processor, drawing and printing tools are needed.

Stage II

The resources at this stage should be selected to enhance students' communication skills.   Apart from a handwriting recognition device, other Chinese input methods, such as phonetic-based, stroke-based or radical-based method, are necessary to allow inputting Chinese characters through the keyboard.   Application software packages, such as word processing, spreadsheet and graphics, are also required for different purposes.   A web browser is commonly used for browsing and retrieving information.   Filtering software may also be installed by schools if deemed necessary.   Customization, such as large-button toolbars, may help students to use the software with ease.

Stage III

The resources at this stage should be selected to develop students' skills in using different tools to produce creative presentations in project assignments. Presentation tools and photo/video capture tools to handle multimedia data such

as sound, graphics and video are needed.

Stage IV

The resources selected at this stage should facilitate students to work with their peers and organize information. Commonly used application software and publishing tools should be provided.

Stage V

Appropriate IT resources including emerging IT tools should be introduced as far as possible to facilitate students to develop lifelong learning skills and to provide them with opportunities for career-related experiences.

Chapter 5   Implementation

Implementation of the IT learning targets in schools is the process of empowering students with IT capabilities.   During the process, students should gradually develop their competence in applying IT in learning.   Students will become sophisticated IT users in future studies and at work.

5.1 General Considerations

The use of IT in teaching and learning must be accompanied by corresponding changes in the school curriculum.   To bring about the changes, we need long-term and short-term schedules.   As mentioned in "Information Technology for Learning in a New Era Five-Year Strategy 1998/99 to 2002/03", paragraph 5.3, the existing curriculum will be revised to enhance the level of awareness and use of IT.   Moreover, the holistic review of the school curriculum, currently conducted by the Curriculum Development Council and the Curriculum Development Institute, emphasises on the development of generic elements, including information technology, for lifelong learning.   Thus, in the long term, IT will comprehensively be integrated into the school curriculum.   In the short term, we need to design learning programmes to equip students with the related IT capabilities.

There are different approaches to conduct the learning programmes.   Operating a new IT subject is an option.   However, from the experiences of many countries, teaching IT as an isolated discipline is not an effective way to encourage the use of IT in learning.   This cannot provide a meaningful environment for students to learn and apply the techniques in context.   To a certain extent, we need to integrate IT elements into different key learning areas and encourage students to use IT to enhance their learning.   The success of this integration depends on a number of factors, including the nature of the subject contents and the readiness of teachers.

Currently, many subjects are under review. New IT-related topics are introduced in a variety of subjects.   A modular Computer Awareness Programme is designed to help primary students to achieve the IT learning targets at Stage I and II. At Stage III, the revised Computer Literacy subject also covers most of the learning targets.   Schools may refer to Appendix III.   As

each subject covers part of the learning targets, completion of any one of the subjects may not fully accomplish all the targets. In order to ensure that IT knowledge, skills and attitudes are all being developed, we suggest the complementary use of various modes of curriculum delivery to achieve the learning targets. For example, the awareness of intellectual property rights and the appropriate attitude in using the Internet can be developed by means of civic education programmes, formal lessons in the curriculum, seminars, etc. Therefore, schools should tailor their own curricula to ensure that all targets are achieved. To ensure successful implementation of the IT learning targets in schools, a good coordination among different key learning areas is required.

Other than the above considerations, at the early stage of implementing IT in education, students at Stage II or above may not have prior learning experiences in IT. Schools should arrange appropriate IT learning programmes to cater for their needs.

5.2 Modes of Operation

There are different modes to implement the IT learning targets in schools. Here, we suggest some modes of operation for schools' reference. Schools may adopt various approaches according to their unique culture. No matter what approaches are adopted, students of different backgrounds and abilities should have equal opportunities to receive appropriate IT training.

Inter-disciplinary coordination: Schools are encouraged to identify the learning targets which may be achieved in subject areas where the application of IT is appropriate. However, repetition of effort should be avoided, for example, students may learn how to search information on the Internet in Library lessons or in other lessons. Coordination among subjects is therefore important; otherwise, teachers may teach the same type of skills in different occasions.

Term-based courses/Regular IT lessons: For skills that can hardly be integrated into subjects, there may be a need to allocate teaching periods to conduct discrete IT lessons. Schools may organize term-based courses to help achieve the targets. Schools may also organize regular IT lessons instead. Curriculum adaptation for the new arrangement is encouraged.

Extra-curricular Activities: Schools may operate remedial and/or enrichment IT courses for students in the form of extra-curricular activities. These courses should not exert pressure on the regular teaching schedule.

5.3 Implementation at Different Stages

In the school curriculum, IT-related topics and learning programmes are key components for achieving the IT learning targets. These include the modular Computer Awareness Programme for primary schools, the computer subjects and the new business and technological subjects. In some cases, IT elements have been incorporated in specific subject syllabuses. Schools may refer to the curriculum documents of the different subjects and learning programmes when deciding their own ways of implementing the IT learning targets.

Apart from the above, a variety of IT-related resources are also available from different subject sections and displayed at Information Technology Education Resource Centre (ITERC). Teachers are encouraged to visit the centre.

In planning teaching and learning activities, we suggest the following ways to attain the IT learning targets:

At Stage I, currently, some modules in the Computer Awareness Programme are being developed according to the learning targets at this stage. These modules can be implemented in various modes, either integrating it into normal school lessons or treating it as extra-curricular activities. One important consideration for implementation is to cater for the cognitive development of students.

At Stage II, contents of the modular Computer Awareness Programme will address all the targets in this stage. There is also a topic in General Studies at Primary 5 covering information technology. In this topic, students are expected to know different methods of transmitting messages, different ways in storing information, the social impact of IT applications and the proper attitudes in using IT.

At Stage III, completion of the revised modular Computer Literacy course for

Secondary 1 to 3 will cover most of the targets. Currently, over 90% of the secondary schools are offering Computer Literacy as a subject in their timetable. As the syllabus includes topics closely related to the IT learning targets, we recommend the remaining secondary schools to operate this subject in one way or the other.

At Stage IV, we expect the students to develop their IT competence through using and applying IT in various subjects. Depending on the availability of facilities, schools may choose to offer these IT-related subjects such as Computer Studies and Information Technology as electives for students. For students who do not take these subjects, they should be offered ample opportunities in using IT tools in their learning in other subjects and thus they will have a chance to further develop their IT competence.

At Stage V, we expect the students to have developed the initiatives in using IT tools irrespective of their areas of specialization. Most of the training will be self-motivated and in the form of self-study. Support will come from the subject teachers concerned. After all, students are expected to explore and discover appropriate uses of IT in their areas of specialization independently. Schools may refer to the syllabuses of Computer Applications and other subjects to help these higher form students to acquire the appropriate IT skills.

As in the consultative document "A Holistic Review of the Hong Kong School Curriculum : Proposed Reforms", it was written that we should 'develop among senior secondary students a solid foundation in science & technology for empowering them to cope with a dynamically changing environment and to make informed judgements in technological society'. We anticipate to have more concrete suggestions on IT implementation in the senior forms. For example, it has been proposed that the senior form computer subjects would be re-organized. Under the re-organized framework, the Information Technology subject for all students in Secondary 4 would help them achieve the learning targets in Stage IV. The provision of optional modules like Media Production, Web Authoring, etc. in Secondary 5 can cater for the needs of more IT inclined students. In addition, the modules like Integrated Application Packages and Application Programming, Computer Systems, etc. offered in Secondary 6 can help students acquire the necessary IT competence in Stage V.

With the above implementation strategies, the IT learning targets at different stages could be fully accomplished.

Chapter 6   Assessment

To ensure effective teaching and learning, there is always a need to assess what students have achieved. In addition, assessment can serve as an indicator to measure the quality and effectiveness of the learning programmes.

With the introduction of IT and new modes of teaching and learning, more collaborative project assignments are expected in schools so that students can actively participate in retrieving, analyzing and organizing information. Thus, various modes of assessment should be used to evaluate the process and product of these projects.

The assessment of students' achievements in applying IT in learning and in information processing should cover their IT knowledge, skills as well as attitudes, and be conducted in contexts. Since we encourage schools to integrate IT into the curriculum of different key learning areas, the assessment of students' IT competence should focus on whether they can apply their IT capabilities to enhance their learning in different key learning areas. Formative assessment, such as classroom observation, homework and project assignments, can be used. These performance-based assessments provide important information to facilitate continual reflection and feedback on teaching and learning for further progress.

As the public is very concerned about IT attainments students needed to meet the challenges of the information age, it is essential to develop a dynamic but standardized assessment system to find out students' levels of IT competence at different stages. This assessment system should not only facilitate students to make progress in IT usage, but also help the Government to work on any fine-tuning of the implementation strategy of IT in education. We suggest that the mechanism should be territory-wide and low-stake. Arrangements like web-based testing, teacher assessment, portfolio assessment, etc. could be considered. These suggestions include school-based and standardized assessments. In fact, when schools start to implement the IT Learning Targets in September 2000, school-based assessment results from assignments and classroom observation in different key learning areas, which should become components of the assessment system, can contribute to students' profile in IT competence. The

Curriculum Development Institute should develop exemplars on how to administer classroom observation or project assignments for teachers' reference. On the other hand, the development of standardized assessment system should also commence. We anticipate to introduce a formative nature, web-based assessment system which is backed up by a critical mass of test items in the 2001-2002 academic year. With the fast changing technological developments, the test items and assessment technology need to be reviewed regularly. This helps students to monitor their own learning and keep abreast of the latest developments in Information Technology. It has to be noted that the manpower and resources involved in the review of test items and assessment tools should be geared to the development of students' lifelong learning skills as stipulated in the aims of education.

In view of the above, students' levels of IT competence could be judged by drawing upon results from both school-based and standardized assessments. The Curriculum Development Institute should disseminate good practices, including practical procedures for recording and rewarding students' IT achievements, among schools.

Since assessment results can reflect on students' IT competence, they can be used as one of the references for evaluating the effectiveness of IT implementation in schools. In addition, other information, such as resource utilization and appropriate use of IT in teaching and learning, should be considered in the evaluation process.

Appendix　Attainment Targets

In Annex E of the "Information Technology for Learning in a New Era Five-Year Strategy 1998/99 to 2002/03", the following attainment targets for students at the key learning stages of Primary 3, Primary 6, Secondary 3, Secondary 5 and Secondary 7 are enclosed for illustration purposes:

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

Appendix II   *Summary of IT Learning Targets*

STAGE	STAGE TARGETS	Knowledge	Skills	Attitude
I (P.1 to P.3)	◆ Know how to operate computers and related devices; ◆ Aware that IT are commonly used in daily life; ◆ Demonstrate an interest in using IT as learning tools.	⇨ Name common IT tools available in schools; ⇨ Be aware of the functions of these IT tools; ⇨ Name some examples of using IT in daily life.	⇨ Operate computers in schools; ⇨ Input Chinese characters with a handwriting recognition device. ⇨ Use multimedia resources to support learning with the help of teachers; ⇨ Communicate and handle information with IT tools in learning activities.	⇨ Develop interest and positive attitude in using IT; ⇨ Work cooperatively with peers in classrooms; ⇨ Act appropriately in using IT.
II (P.4 to P.6)	◆ Use IT tools to support learning; ◆ Access information via computer networks; ◆ Develop simple techniques in information processing; ◆ Develop communication skills to facilitate cooperative learning; ◆ Demonstrate concern about various issues involved in IT usage.	⇨ Name some common applications of IT using appropriate and accurate terminology; ⇨ Be aware of issues related to using IT in information processing.	⇨ Use a number of software packages for word-processing, calculation, image-processing, and other learning activities; ⇨ Input Chinese characters with a handwriting recognition device and with the aid of a Chinese input method; ⇨ Access information via computer networks and other media; ⇨ Process information using IT tools.	⇨ Be aware of intellectual property rights, copyright and privacy; ⇨ Beware of indecent elements in computer networks and other media; ⇨ Recognize the need for protecting oneself in using the Internet; ⇨ Willing to share perspectives with peers.
III (S.1 to S.3)	◆ Use IT tools in information processing and learning; ◆ Develop the capability to process and present information; ◆ Demonstrate the ability to verify and evaluate the accuracy and reliability of information; ◆ Work collaboratively with peers in project assignments; ◆ Behave ethically in applying IT in information processing	⇨ Understand the usage of various IT tools and resources in information processing and learning; ⇨ Identify the applications of IT in daily life; ⇨ Understand legal and ethical issues related to using IT; ⇨ Be aware of the impact of IT on the society; ⇨ Know how to protect oneself in using Internet; ⇨ Have a basic idea on Chinese computing.	⇨ Use appropriate IT tools to facilitate learning; ⇨ Use IT tools and strategies for processing and presenting information; ⇨ Communicate with others via electronic mail; ⇨ Verify and evaluate the accuracy and reliability of information.	⇨ Demonstrate interest in emerging IT tools and their usage; ⇨ Realize the importance of accurate and reliable information; ⇨ Beware of the legal, social and ethical responsibility in using IT; ⇨ Participate actively in project assignments.
IV (S.4 to S.5)	◆ Develop the ability to select and use appropriate IT tools to support further study and lifelong learning; ◆ Demonstrate the ability to understand and analyze information; ◆ Share information on the Internet; ◆ Reflect on the use of IT by oneself and others; ◆ Demonstrate a will to be responsible in using information.	⇨ Understand and compare the functions of a variety of IT tools; ⇨ Know the social implication of improper use of information; ⇨ Recognize legal responsibility in using information.	⇨ Improve self productivity; ⇨ Compare the effectiveness of various ways, including the use of IT tools, to solve a given problem; ⇨ Use and analyze information; ⇨ Produce multimedia presentation.	⇨ Be responsible in using information ⇨ Demonstrate an initiative to cope with the technological development; ⇨ Be willing to share information with different people in different places on the Internet; ⇨ Have a critical mind in using information.
V (S.6 to S.7)	◆ Become frequent and sophisticated IT users in future studies and at work; ◆ Generalize the experiences of using IT and employ appropriate IT tools for specific purposes; ◆ Evaluate critically the usefulness of emerging IT tools.	⇨ Understand the positive and negative impact of widespread use of IT and the effect of IT in specific fields of study. ⇨ Identify the capabilities and limitations of emerging IT tools and evaluate the effectiveness of applying these tools.	⇨ Integrate the uses of a wide range of IT tools to fulfil specific purposes; ⇨ Select and apply appropriate IT tools in different aspects of study, such as collecting and analyzing information, problem solving, and decision making.	⇨ Actively explore the usage of emerging IT tools; ⇨ Advocate legal, social and ethical responsibility regarding the use of information and IT tools.

Appendix	# Summary of IT-related Syllabuses and Learning Programmes

Modular Computer Awareness Programme

The first three modules of the Computer Awareness Programme are designed in line with the IT Learning Targets for Stage I whereas the other five modules address the IT Learning Targets of Stage II. These modules are not arranged in sequence within the stage and can be used flexibly. Generally, schools may allocate special periods for the Computer Awareness Programme and / or preferably integrate it into the appropriate learning areas. The learning activities suggested in the Programme make use of IT tools and resources currently available in primary schools. For more able students, enrichment units / modules are suggested to cater for their needs. It is hoped that the proposed learning objectives and activities can help schools to design their own school-based IT learning programmes. The titles of the modules are listed below:-

- ✧ Joy to the Computer World
- ✧ Drawing with a Computer
- ✧ Writing with a Computer
- ✧ Using the Internet
- ✧ Word Processing
- ✧ Calculation and Charting with Spreadsheet
- ✧ Using E-mail
- ✧ Learning to control a Computer through Logo

Computer Awareness Programme (Module 1)
- Joy to the Computer World

Learning Objectives:

- • Recognize the needs and uses of IT in daily life;
- • Understand the basic functions of input, output and storage devices such as monitor, keyboard, mouse, speaker, disk drive, CD drive, scanner and printer;
- • Acquire intuitively the ideas of how computer works;
- • Acquire mouse skills such as move, click, double click and drag & drop;
- • Operate computer systems in Windows environment and get familiar with the menu bar, cursor, icon, etc.;
- • Observe the DOs and DON'Ts in using the computer;
- • Aware of future development of IT.
- * Know the use of the right button of the mouse.

<div align="right">• Core   * Enrichment</div>

Examples of Activities:
- Discuss and design an agreement in using the computers.
- Collect daily life examples on how computers work for us.
- View animation to understand the computer system.
- Use multimedia tools such as CD drive to listen to music and see films etc.
- Use the 'sound recorder' to record and play recorded conversation.
- Understand how computers work through stories or metaphors.
- Practise mouse skills through playing computer games.
- Through stories or metaphors, understand how to use computer properly so as to maintain the normal operations of computers and to take care of the user's health in using computers.
- Explore the future applications of IT in various places such as at home, at hospital, at school, etc.
- Collect information on the development of IT and predict the future IT community.
- Visit the Science Museum or IT-related exhibitions.

Computer Awareness Programme (Module 2)
- Drawing with a Computer

Learning Objectives:

- Draw pictures with freehand drawing and eraser tools of Paintbrush;
- Use common drawing tools such as cut, copy and paste, fill color and spray color;
- Learn how to edit, save and print a picture file;
- Handle text in pictures.
* Browse relevant websites or CD-ROMs provided by teachers;
* Learn image-handling skills such as rotation, twisting, shearing, etc.

<div align="right">• Core   * Enrichment</div>

Example of Activities:
- Design a T-shirt -with freehand drawing.
- Build up patterns by using different shape objects.
- Design and print an invitation card, birthday or Christmas card.
- Collect items that have logos and design pupils' own logo with words.
- Design and print a poster.
- Browse world-famous drawings and paintings from websites or CD-ROMs provided by teachers.

Computer Awareness Programme (Module 3)
- Writing with a computer

Learning Objectives:

- Familiarize with the keyboard layout and acquire the keyboard skills;
- Input Chinese characters with the aid of a handwriting recognition device;
- Use the features of word processing software, such as delete, insert, align, underline, print preview, etc., to write, edit and print text documents;
- Save documents on disk and retrieve existing documents from disk.
* Polish the appearance of documents by using more formatting features.

· Core   * Enrichment

Example of Activities:
- Acquire keyboard skills through playing computer games such as letter hunting games.
- Write a short message to a classmate to invite him/her to a birthday party by using a handwriting recognition device.

Computer Awareness Programme (Module 4)
- Using the Internet

Learning Objectives:

- Know briefly what Internet and electronic mail are and some of their usage;
- Connect to the Internet and browse information using a browser;
- Use of bookmark;
- Search relevant information on a particular topic;
- Download and print information;
- Raise the awareness of legal issues and develop positive ethical behaviour when using the Internet.
* Search information by using search engines;
* Know the function of newsgroup.

                                                   • Core   * Enrichment

Example of Activities:

- Browse the Internet using URL provided by teachers.
- Browse the Internet through hyperlinks set by websites.
- Browse the Internet by topics.
- Search, download and print information on a particular topic.
- Carry out projects, e.g. Water supply in Hong Kong by selecting relevant information from the Internet. Students may present their findings orally or by a written report.
- Discuss the legal, social and ethical issues of IT in class.

Computer Awareness Programme (Module 5)
- Word Processing

Learning Objectives:

- Learn to use the features of word processing software such as font styles, text colour, emphasizing tools, tabs, indentation, spell-check, embedding clip-arts, adjusting paper orientation, etc.;
- Know about different Chinese input methods and able to input Chinese characters through the keyboard;
* Insert other objects such as special characters into a document;
* Use table format;
* Prepare more attractive text documents by using more formatting and artistic tools such as WordArt.

　　　　　　　　　　　　　　　　　　　　・ Core　　　　　* Enrichment

Example of Activities:
- Write a notice to be posted in the computer room to remind classmates that eating and drinking are not allowed.
- Write an advertisement and post it on the class notice board.
- Write a short presentation on an interesting topic.
- Design a poster for a charity activity such as donation or voluntary work.

Computer Awareness Programme (Module 6)
- Calculation and Charting with Spreadsheet

Learning Objectives:

- Recognize the needs of using spreadsheet in daily life;
- Present numerical data in table form;
- Handle simple calculation such as sum and average;
- Use simple formulae for calculation;
- Present numerical data using pie charts, line charts and bar charts.
* Change the appearance of worksheets;
* Present numerical data in different formats;
* Polish the appearance of graph. Learners may use title and legends, depending on the requirements of the graph;
* Use simple sorting features.

                     · Core   * Enrichment

Examples of Activities:
- Collect examples on the use of spreadsheet in daily life.
- Produce a table to record the weather of a week (may include rainfall, humidity, the highest and lowest temperature), or personal data of the class (may include weight, height, age and sex). Find the maximum, minimum, total and average of the data collected.
- Calculate the sum and the average score of different Houses/Classes on Sports Day.
- Use various charts to present the scores of Inter-class competitions.

Computer Awareness Programme (Module 7)
- Using E-mail

Learning Objectives:

* Understand e-mail;
* Create, send, read, reply, forward and print a mail;
* Manipulate e-mail with attachment;
* Send an e-mail to a group of recipients. Learners may use address book or mailing list;
* Save and delete an e-mail;
* Develop correct attitudes in communicating via e-mail;
* Know other means of telecommunication such as online chatting and video conferencing.

<div align="right">* Enrichment</div>

Example of Activities:
- Send a mail to say 'Hello' to your classmate and ask him/her to suggest an activity after lesson.
- Read, print and forward the mail your classmate just sent to you to another classmate and send a reply back to your classmate.
- Invite students to join a birthday party using e-mail.
- Send an e-mail to a classmate with an attachment.
- Send an e-mail to some classmates and save all received replies.

Computer Awareness Programme (Module 8)
– -Learning to control a Computer through Logo

Learning Objectives:

* Develop logical thinking skills and problem-solving skills through Logo;
* Understand the concepts of computer instruction and programming through Logo;
* Know how to control the "turtle" to draw simple figures.
* Able to use the REPEAT command and Logo procedures to draw simple shapes such as triangle, square, rectangle and polygon;
* Able to draw some simple regular shapes such as a star.

* Enrichment

Example of Activities:
- Draw circles, rectangles and polygons of different sizes.
- Draw a chessboard.
- Create patterns that cannot be easily drawn by using other graphical software packages such as paintbrush.
- Try to draw interesting figures by using the REPEAT command with various combinations of FD, RT and LT commands.
- Control the roamer (the robotic turtle that can walk and draw on the floor) to go through a maze on the floor.

General Studies (P.1 - P.6)

The syllabus of General Studies has been implemented since 1996.

IT-Related Topics

At Primary 5, a unit on "Information Technology" aims to enable students to:

- know different methods of transmitting messages;
- know different ways of storing information;
- understand the impact of IT in our daily lives; and
- develop a proper attitude in using IT.

At Primary 6, a unit on "Developing a Global Perspective" aims to enable students to:

- understand the impact of technology on our lives;
- recognize the responsibilities that individuals should take when using technology.

Computer Literacy (S.1 - S.3)

This revised syllabus was implemented in September 1999, starting from S.1. The syllabus adopts a modular approach (including basic and enrichment modules) which covers three major areas of study, namely Computer Systems, Information Technology and Programming. For the Programming section, there are alternative sets of modules. After completing the course, students would be able to:
- understand common computing terminology;
- understand the basic principles of operations for computer systems;
- acquire fundamental knowledge about computer applications;
- make use of common application software packages to carry out simple tasks;
- understand the basic features of a programming language;
- write simple computer programs;
- beware of social issues related to computer applications;
- appreciate the advancement brought about by the widespread use of computers in society.

Appendix	# Summary of Discussion and Suggestions on Issues for Consideration

In the process of working out this document, the following issues on the IT learning targets have been raised from the community. All comments collected during the consultation period and suggestions from all sources have been seriously considered and thoroughly discussed. They represented different points of view. In the light of these, we have finalized and refined this document by incorporating recommendations and suggestion, wherever appropriate. All the discussion and suggestions on different issues were summarized as below:

1. Chinese Input Method

➢ An input method should be taken as a tool to achieve the purpose of keying in Chinese characters. Any method which helps achieve this should be acceptable.

➢ It is not necessary to have a standardized Chinese input method for our students as new technology is emerging all the time.

➢ The emergence of different input methods is to cater for the needs of different students. Schools are encouraged to provide different types of input methods for keying in of Chinese characters. It is not advisable to have a standardized method for all students.

➢ The following points can be considered in the selection of input method:

 ◆ User-friendliness;

 ◆ Efficiency;

 ◆ Availability - whether it comes with the Operating System.

2. Contents on the Internet

➢ Freedom of speech should be allowed.

➢ An education specific intranet may not be resourceful enough.

➢ It is recommended that educating students on the appropriate selection of information and the proper attitude in using the Internet is more important.

➢ The whole-person approach should be adopted in teaching.

➢ Depending on their own needs and culture, schools should make their own decision on the filtering of contents on the Internet. If schools feel it deemed necessary, filtering software could be installed.

3. Choice of IT Tools

➢ A list of recommended IT tools and software to accomplish the IT learning targets would not be provided as by default the computer has got some software packages.

➢ The modular Computer Awareness Programme for primary schools, the computer subjects and the new business and technological subjects are the key components for achieving the IT learning targets.

➢ The basic requirement for the IT tools is whether they can help achieve the targets.   As new technology emerges, the curriculum should be updated to suit the social and technological needs.   Hence, appropriate software packages should be selected to achieve the purpose.

4. Attitudes of Using IT Tools

➢ Training to improve the awareness of intellectual property right among students can be done by means of civic education programmes, formal lessons in the curriculum, seminars, school visits by ED staff, multi-media, teachers' good practices, seminars, workshops and sharing sessions.

➢ Comments and suggestions concerning IT attitudes should be incorporated into the syllabus of different key learning areas in the curriculum.

➢ Resources on IT attitudes should be developed.

5. Assessment

➢ The IT learning targets aim at enhancing teaching and learning through the use of IT.

➢ A systematic way to assess students' IT competence is necessary but formative assessment rather than high-stake examination is preferred. The following methods have been suggested:
  ◆   A territory-wide low-stake assessment;
  ◆   Core competency tests on the web;
  ◆   Teacher Assessment Scheme;
  ◆   Internal assessments which have no time limit and students can work at their own pace;
  ◆   Assessments like HK Attainment Tests;
  ◆   Incorporating the assessment of IT competencies in different key learning areas; and
  ◆   Portfolio.

➢ To facilitate students to make progress in IT usage and feedback on teaching and learning throughout the stages of schooling, a standardized

system is necessary.

➢ Assessment is necessary to ensure the smooth transition from one stage to another and to identify different levels of abilities to cater for learner differences.

➢ The assessment mechanism, whether it is centralized or school-based, needs to be further explored.

➢ School-based formative assessment can be used to assess students' IT competence before the arrangements of the standardized system can be made.

➢ A feasibility study and pilot tests on the appropriate assessment system have to be conducted.

6. The Stratification of Learning Targets into Different Stages

➢ In the document "Information Technology for Learning in a New Era Five-Year Strategy", students in normal schools have been used as the norm. It is not advisable to highlight the students with special educational needs (SEN). This would allow more flexibility and go in line with the trend of inclusion of students with SEN.

➢ It was commented that there should be a preparatory and 3 stages instead of 5 stages as in the IT Learning Targets.

➢ There are different rationales for the different ways of stratification. Yet the contents in each stage should fit in with students' cognitive development.

➢ As the IT Learning Targets stem from the document "Information Technology for Learning in a New Era", it is better to match with the same way of stratifying the years of schooling into 5 stages.

➢ The modular Computer Awareness Programme will be implemented from Primary 3 onwards. Primary 1 and 2 can be considered to be the preparatory stage.

7. Contents of the IT Learning Targets

➢ It was difficult to prepare students for IT at work by introducing IT tools of the latest trend as new technology is emerging every now and then. Hence, generic skills transferable to workplace and conducive to lifelong learning should be emphasized in the document. It is more important to improve students' learning abilities through the use of IT.

➢ The AS Computer subject is under revision to incorporate more application such as using Visual Basic for Application or creating

Homepages.

- The teaching of LOGO and PASCAL in the secondary would be further considered. However, LOGO would be included as one of 8 modules in the modular Computer Awareness Programme. The module would be taught as an enrichment module rather than a requirement to achieve the learning targets. Even though LOGO is not preferred for the learning of programming language, it is a good tool to teach procedural language and to enhance students' logical thinking as well as problem-solving skills. Moreover, it is easy to manage and learn. It can also be integrated into the primary mathematics key learning area.

- It was commented that too much emphasis has been placed on the mastery of IT knowledge and skills in the IT Learning Targets. Yet it was stated very clearly in the "Information Technology Learning Targets" that 'acquiring an understanding of the knowledge of IT, applying IT skills in information processing and developing a proper attitude towards IT usage are equally important'. Moreover, the modular Computer Awareness Programme are task-oriented and aim at enabling students to acquire integrated skills to improve on their learning.

- There was a comment that it would be difficult to require students in Stage I to name some common IT tools. However, it should be noted that being able to name some common IT tools available in schools is the first step in the acquisition of knowledge.

- The teaching of e-mail would be taken as an enrichment module in the Primary but mandatory in Stage III (Secondary). Primary schools are free to decide on the teaching of e-mail according to resource support and student readiness. They must beware of the purposes of learning e-mail and how it can help improve teaching and learning. For example, the using of e-mail as a means of communication and interaction with others goes in line with the teaching and learning of languages. However, verbal communication is very much emphasized in the primary.

8. Relationship between IT Learning Targets and the Hong Kong School Curriculum

- The IT Learning Targets should go in line with the Holistic Review of the Hong Kong School Curriculum and match with the aims of education such as developing students' lifelong learning.

9. Implementation

➢ Generic elements related to IT should comprehensively be integrated into the school curriculum.

➢ Through the acquisition and use of IT skills, students should improve on their learning in different key learning areas.

➢ The Computer subject should not be the only way to achieve the IT learning targets.   The operation of a new IT subject also contradicts with the current trend of integrating IT into the curriculum of different key learning areas.

➢ It was suggested that the 'Guidelines for Using Information Technology' should be published.   However, as new technology is emerging all the time, these guidelines may not help teachers to keep abreast of the latest developments in information technology.   Moreover, the IT learning targets should be reviewed and revised accordingly to suit the social and technological needs.   Thus, on-going support should be provided by the Education Department during the implementation.

10. Review of IT Learning Targets

➢ The IT learning targets, like other curriculum issues, should be reviewed regularly if necessary.

11. Teacher Training

➢ Subject-related IT training courses for teachers should be organized.

12. IT Syllabus

➢ It was suggested that an IT syllabus should be prepared for schools. However, as IT should not be taken as a single subject, not one single syllabus or textbook can be compiled.