University of Leicester School of Education

Evaluating Teachers' Training in ICT in Hong Kong SAR:

The Perceptions of Teachers and IT Co-ordinators

of Secondary Schools

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ABSTRACT

With the implementation of Hong Kong's IT in Education initiative as a 'Five-Year Strategy' in 1998, more than HK\$530 million has been invested in the ICT in-service teacher training course to help more than 40,000 school teachers achieve different levels of IT competency. The effectiveness of these courses and the justification of the amount of money spent were the main concerns of the government and the public. This research project aims to evaluate the effectiveness of the in-service teacher training scheme referred to as 'Teacher Enablement' in the 'Five-Year Strategy' mainly through a questionnaire survey of 227 teachers and IT co-ordinators of nine secondary schools under the same sponsoring body. In addition, more qualitative information was sought from eight respondents from seven sampled schools in the form of interviewing. The results of the survey show that these schools have mostly fulfilled the government's requirements to have a fixed proportion of teachers qualified in each level of IT competency. In course popularity, teacher training courses of the basic level of IT competency were more welcomed by the respondents than those of other levels. School-based teacher training was found to be better received by the teachers than other types of course provision. However, the integration of ICT into the school curriculum and the use of ICT in the classroom setting was considered to be unsatisfactory. There was further evidence that many teachers had not achieved the paradigm shift for using computers in the classroom. Therefore, Hong Kong's IT in Education initiative can be assessed as successful in terms of quantity but not of quality.

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LIST OF ABBREVIATIONS

AERA	American Educational Research Association
AIT	Advanced Level of Information Technology Competency
APA	American Psychological Association
ASCD	Association for Supervision and Curriculum Development
ATM	Automatic Teller Machine
BERA	British Educational Research Association
BIT	Basic Level of Information Technology Competency
CEO	Chief Executive Officer
CERI	The Centre for Educational Research and Innovation
ECR7	Education Commission Report No. 7
EMB	Education and Manpower Bureau
ICT	Information and Communication Technology
IIT	Intermediate Level of Information Technology Competency
INSET	In-service education and training
IT	Information Technology
ITC	Information Technology Co-ordinator
ITSD	Information Technology Services Department
LEA	Local Education Authorities
M.Ed.	Master of Education
NCES	National Centre for Education Statistics
NEA	National Education Association
NGfL	National Grids for Learning
NOF	New Opportunities Fund
OECD	Organization for Economic Co-operation Development
OTA	Office of the Telecommunications Authority
PPS	Payment by phone services
SAR	Special Administrative Region
SD	Standard Deviation
SETTT	Strategy in Educational Technologies and Training for Teachers
SITES	Second International Information Technology in Education
SMI	School Management Initiatives
SNA	SchoolNet Africa
TRIST	TUEI Related In-Service Training Scheme (England and Wales)
UIT	Upper Intermediate Level of Information Technology Competency
UK	United Kingdoms of Britain

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CHAPTER 1 INTRODUCTION

The Hong Kong Special Administrative Region (SAR) is a fascinating and a highly competitive society. Information and communication technology (ICT) has touched and directed every walk of life, such as business, science, politics and even education. Examples of the 'smart card' system for transport fares, automatic teller machines (ATM) for handling banking accounts and the 'payment by phone services' (PPS) for settling payments all indicate the infiltration of ICT into the daily lives of Hong Kong citizens. No doubt like other prosperous cities in the world, Hong Kong SAR is destined to be an e-society with everything being processed through ICT.

The Special Administrative Region (SAR) came into being after the reunification of Hong Kong into China in July 1997. The new government saw cultivating a work force with strong expertise in ICT as essential to maintaining Hong Kong's status as a highly competitive financial centre in South-East Asia. While other nearby developing districts and countries were striving for economic growth after the Asian financial crisis and global economic depression started in September 1997, Hong Kong decided to invest in the future by providing the new generation with effective and sound education in information technology. A well-planned education system and a team of competent teaching professionals were seen to be essential in fostering a high-quality basic education system and producing ICT specialists.

However, the education system of Hong Kong has long been criticized as

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teacher-centred rather than student-centred (Visiting Panel, 1982) with teachers spending most of the time lecturing (Morris, 1984, p. 44) and students recording information. It has also been criticized as conservative, with many teachers being textbook-dependent and examination-oriented and reluctant to change their teaching approach. It is generally accepted that teachers hold the key role in innovation and are the main gatekeepers of educational change. In order to increase ICT competence amongst the workforce, teachers would need to be highly competent in ICT themselves. Many teachers regard the training as a difficult area in which they have to develop another expertise. The primary purpose of this study is to explore teachers' perception of teacher training in ICT under the new policy of Hong Kong's IT in Education. Clarifying their worries about teacher training in ICT will provide important information for officers-in-charge and policy makers who are intent on improving provision in this area of the curriculum.

1.1 CHANGES FACED BY HONG KONG TEACHERS SINCE THE 1970S

In the '70s, Hong Kong put emphasis on mass education with the aim of providing general basic education for all appropriate age groups of the population. There were few major changes in the education system in Hong Kong until 1978 when nine years of free and compulsory basic education was introduced to children between the age of 6 and 15 (Information Services Department, 1999, p. 141). This was regarded as a change of 'quantity' in education as it aimed to accommodate all the children within an age group to receive education regardless of their intelligence and social and economic background. Rapid and frequent changes started in 1984 when the Education Commission was established to 'consolidate advice on the education system as a whole in the light of the needs of the community' (Education Commission, 1984, p. 1). Since the formation of the Commission, seven reports in addition to the *Reform Proposal for the Education System in Hong Kong*, have been published in response to different aspects of education policy with the target of improving the existing education system.

In the '80s there was a shift from 'quantity' to 'quality' with an aim of improving the quality of education in Hong Kong. This shift was most obvious in the last report of Education Commission, ECR7, which was drafted specifically to enhance the quality education (Education Commission, 1997). Nearly all the changes that have taken place within the last two decades have been initiated by the Education Commission. The initiatives which were mostly directed at both serving and aspiring teachers include: the Activity Approach implemented in 1986; the School Management Initiatives proposed in 1991; the School Administration and Management System (SAMS) initiated in 1994; the Target Oriented Curriculum of 1994. Subsequent to the return of Hong Kong's sovereignty to China in 1997, the Hong Kong government has been implementing a series of educational reforms. These include the project of Information Technology (IT) in Education proposed in 1997; the benchmarking assessment for teachers of English Language and Putonghua started in 2001; and most recently the large-scale education reforms in curriculum, school years and assessment. These education reforms have affected different stakeholders in education, especially the serving teachers.

1.2 THE IMPORTANCE OF ICT IN EDUCATION

In Hong Kong, ICT in education received very little attention until the mid 1990's when the last British governor, Chris Patten, proposed a tremendous increase both in the size of tertiary education and in expenditure on information technology for basic education. Before that, much of the concern had been placed on computers rather than information and communication technologies (ICT). Though ICT does not fully equate with computers, ICT puts a strong emphasis on the use of computers (Liu, 1999, p. 22). The use of computers in education can be divided into the following four categories:

- a) A calculating tool or part of education technology;
- b) A taught subject in tertiary education and then secondary curriculum;
- c) An aid in school management; and
- d) A learning tool across the curriculum.

Today, ICT in education can generally be viewed as the combination of existing educational technologies with advanced computing technologies in education (Liu, 1999, p. 3). Recent technologies used in education may range from the radio invented in 1919 to the most powerful PC computer of this century (Fung, 2001, p. 1068) including those technologies involving overhead projectors and electronic mail suggested by Erhmann (1999, p. 3) and Fung (2001, pp. 1068-9).

In Hong Kong, the emphasis of the role of ICT in education has been placed on learning and on using the computer as a learning tool since the first batch of computers were introduced into the secondary schools in September 1982. An account of how computer was taught and used in education illuminates the development of teaching with computers in Hong Kong's secondary schools.

1.2.1 Computing Offered as a Subject

Though the government strongly recommends that students from Primary 1 to Secondary 7, regardless of the streaming, should have the opportunity to "use IT facilities in schools and to receive appropriate IT training" (Education Department, 2000, p. 1), only junior and senior secondary students are provided with formal curriculum subjects to learn ICT. Options are open to the headteachers to allocate special periods for computer awareness programme or to integrate it into various subjects as there is no formal subject in the primary schools for ICT training (ibid, p. 20).

1.2.1.1 Tertiary Education

Computer science was first offered as a major discipline in the undergraduate studies of some universities in western countries in the mid 1970's. New programming languages with data processing techniques and information systems were invented and introduced into the core curriculum of computer science studies. In Hong Kong, The Chinese University of Hong Kong was the first tertiary institute to offer degree programme in computer science, early in 1968, though the Department of Computer Science was not formed until 1973. In 1980 the Hong Kong Polytechnic (now The Hong Kong Polytechnic University) offered courses as mixed-mode studies to give students more flexibility in acquiring knowledge and skills in computer application.

1.2.1.2 Secondary Curriculum

In 1982 the Education Department ran a pilot scheme to offer computer studies for secondary form four students by providing extra resources for 30 secondary schools in the public sector. Another 20 schools joined the pilot scheme without government funding, using their own budgets (Fung, 1983, p. 14). Unfortunately the pilot scheme did not plan for changes in computing technology and the students learning was limited to Logo programming throughout the three years' junior secondary education. In 1992, the Education Department introduced computer studies as an advanced level subject and computer application as an advanced supplementary level subject for the sixth form matriculation examination.

1.2.2 Computers Across Curriculum

An almost universal trend of the last two decades has been to introduce ICT as an integral part of learning for students. Singapore is a good example of successfully integrating ICT into school subjects in the basic education system.

Though Hong Kong still has computer studies or computer literacy as independent subjects in the senior and junior secondary curriculum respectively, the move to use the computer as a tool across the curriculum began to gain ground when the project of IT in Education was implemented in 1998. This is generally regarded as the best way forward but the search for exemplars and good practices in using ICT to enhance teaching and learning is crucial. The Education Department and some professional bodies in computer education are trying to show the potential of ICT in promoting learning effectiveness among students. Cases of using ICT in designing the school-based curriculum in primary and secondary schools and improving teaching pedagogy in certain subjects have been presented by teachers in some seminars or workshops for their counterparts. Two sets of booklets enclosed with compact discs were published and distributed by the Education Department in September 1998 and October 1999 on the good use of ICT in teaching and learning in various schools. Exemplars in these two booklets have frequently been quoted as reference materials in teaching and learning for school teachers. Readers of these books could benefit from the kick-off experience in IT infrastructure or the courseware enclosed as a demonstration of teaching various subjects using ICT.

The uses of computers in education outlined above need the commitment of teachers if they are to be successfully implemented in the curriculum. If teachers are not equipped with general knowledge and skills of ICT, how can students make use of ICT in learning effectively and efficiently? Collins *et al.*, therefore, regard both teacher development and teacher attitude as important parts of "effective IT use" in education (Collins *et al.*, 1997, p. 100). The teacher training, which is also a part of in-service teacher education and/or professional

development, must be effective in supporting teachers to implement effective ICT in education.

1.3 TEACHER TRAINING IN ICT IN HONG KONG

There is no standard and universal training provision for teachers in ICT. The training differs in different countries and in different systems of teacher education. In some systems, training in ICT is part of the subject knowledge acquired during teachers' undergraduate studies or initial teacher training; in other systems most ICT training is part of continuing professional education. In the past, the situation in Hong Kong followed the same pattern with little standardization between the different sectors.

1.3.1 Tertiary Institutions

Since no graduates majored in computer science prior to the 1970s (the first bachelor degree majoring in computer science was offered by The Chinese University of Hong Kong in 1978), most of the lecturers or professors teaching computer who graduated before this date had their majors either in mathematics or engineering-related disciplines. There was no pre-service training for them if they were employed immediately after obtaining the master's or doctorate degree. Some lecturers had their on-the-job training in computer operation after they had started teaching. There was also a shortage of supply of computer teachers in the tertiary sector because nearly all the computer graduates at that time preferred working in the commercial field rather than in education. In many cases these factors led to inadequate provision of ICT skills for students by tertiary institutions. Thus the quality of graduates from the computer majors was getting lower in those days, affecting the efficacies of the new teachers.

1.3.2 Secondary Schools

Unlike the case of the university lecturers, computer teachers in secondary schools obtain their formal training in their undergraduate studies or in-service training in their postgraduate studies in education after they graduate. A computer teacher has many opportunities for on-the-job professional training. Like other subjects, there are frequent seminars and workshops provided by the Education Department as launching seminars or experience sharing sessions on new syllabuses, amendments of new topics and even teaching of certain difficult topics. Since the introduction of the computer studies in secondary curriculum in 1982, the Hong Kong Teachers Centre and the Information Technology Educational Resources Centre of the Education Department, non-government professional bodies, teacher unions and tertiary institutions have been organizing lots of sharing sessions, seminars, workshops and conferences to update the knowledge and teaching methods of computer teachers at different levels. Speakers and instructors have been invited from some local universities or some computer training centers. Enthusiastic teachers from pilot schools have also been invited for experience sharing since 1998.

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1.3.3 Primary Schools

Neither pre-service nor in-service ICT training for primary school teachers were provided in the past. Formal training for this group of teachers was established only after a concrete strategy on promoting ICT in education was drawn up by the government of Hong Kong in 1998. There was no difference between the training, in terms of requirements and targets, of secondary school teachers and that of their primary counterparts since the 'school' in the policy of IT in Education, referred to both primary and secondary school in the public sector. This was later confirmed by the 'Information Technology Learning Targets' published in 2000, where the key learning stages covered from primary one to secondary seven. It was obvious that secondary teachers received more training opportunities than the primary teachers as there was no computer subject in the primary formal curriculum so far.

Ever since the implementation of the IT strategy by the government in 1998, both local and overseas tertiary institutions have started offering ICT-related courses up to the masters' level. These courses are not standardized and the provision is different in different institutions. The courses are offered on both a full-time and part-time basis for both primary and secondary school teachers to attend. These provide teachers with opportunities in both pre-service and in-service formal teacher training in ICT.

1.4 THE FIVE-YEAR STRATEGY FOR PROMOTING ICT IN SCHOOLS

Unlike Singapore, the Hong Kong SAR government did not give any pioneer direction to the planning and development of ICT in supporting teaching and learning until 1997. Starting from 1982, Hong Kong offered computer studies as a taught subject in the secondary school curriculum. In contrast, Singapore's Ministry of Education integrated ICT into the curriculum of all subjects in April 1997 as a kind of supporting service since the implementation of its Master Plan in technology (http://www1.moe.edu.sg/iteducation/). The latter, after years of practice has proved to be more effective in teaching and learning when the students' learning effectiveness and performance in the same public examination of the two districts were compared. In 1997, the government of Hong Kong SAR pledged a five-year strategy to promote 'the application of IT in enhancing the effectiveness of teaching and learning' (EMB, 1998, p. i). It implies that, in addition to the existing pre-service and in-service teacher training courses, teachers will have to spend extra time receiving training in familiarizing themselves with ICT and its uses in teaching and learning. A set of learning targets, relating to information technology, have been prepared by the Curriculum Development Institute of the former Education Department as a supporting document to the implementation of integrating ICT into the curriculum. This is known as the Information Technology Learning Targets published in the year 2000.

1.4.1 The Five-Year Strategy for ICT in Education

A series of initiatives was announced in integrating ICT into teaching and learning from the *Information Technology for Learning in a New Era: Five-Year Strategy 1998/99 to 2002/03* published by the Education and Manpower Bureau in November 1998. A total budget including a one-off grant of HK\$3,214 millions (approximately £230 million) for infrastructure, networking, hardware and software, and an annual recurring grant of HK\$294.5 million (£21 million) on consumables and implementation were passed by the Legislative Council.

1.4.1.1 Teacher Training

The 'Five-Year Strategy' outlined the ICT planning and development for Hong Kong for the five years from 1998 to 2003. In the chapter on 'Teacher Enablement', the Strategy set down the target that all serving teachers would reach the 'basic' level of IT competency by 2000/2001, about 75% would reach the 'comfortable' level, about 25% the 'competent' level and one to two teachers of each school the 'creative' level (EMB, 1998, p. 13). The four levels were later on renamed as BIT (basic level of IT competency), IIT (intermediate level of IT competency), UIT (upper intermediate level of IT competency) and AIT (advanced level of IT competency). The training which was to be in-service teacher training took various forms – training in computer operation and the use of various operating system/software provided by computer vendors, training through computer assisted teaching packages, and maintaining computer networks. Courses could be provided by universities, post-secondary tertiary institutes, teacher education institutes and computer firms, which were approved as central vendors. Some of these courses, usually at basic level, could also be provided by school teachers themselves as school-based training courses. Their purpose was to strengthen teachers' ICT subject knowledge and skills in using ICT as a teaching tool.

Following the same vein, both Hong Kong Institute of Education and the faculties/schools of education of some of the local universities have played a very important role in providing corresponding initial teacher training courses in ICT.

1.4.1.2 IT Co-ordinators

The most important form of support to the schools was the provision of information technology co-ordinators (ITCs) in schools. One hundred and twenty and 130 IT co-ordinators were approved in 1999 and 2000 respectively making a total of 250 IT co-ordinators. It was widely recognized that 250 ITC's was insufficient to serve the 1200 primary and secondary schools in the public sector. The IT co-ordinators were to be employed on a two-year contract basis. Some schools appointed one of their existing teachers to be their IT co-ordinators and employed a supply teacher to replace his/her post while other schools recruited a new person to fill the new post. The IT co-ordinator was supposed to be an important post to facilitate the implementation of the project of IT in Education by assisting both teachers and students in using ICT.

1.5 RATIONALE AND PURPOSE OF STUDY

In view of the future development of ICT in education, for such a tremendous project to be successful, the whole team of teachers, whether with high or low competency in ICT, should share the same vision and mission with the policy makers in promoting ICT in education. This research project seeks to explore the views of teachers and IT co-ordinators for both the provision and policy of the new ICT in-service teacher training.

1.5.1 Rationale for Studying Secondary School Teachers and IT Co-ordinators

Though more than HK\$2,880 million (approximately £206 million) has been invested in the infra-structure, hardware and software, but not including technical support and teacher training (EMB, 1998, p. 5), a preliminary study which reviewed the progress of and evaluated Hong Kong's IT in Education initiative, revealed that the "understandings and strategies are not in line with the aims and vision (especially on paradigm shifts)" expressed by the government (Law *et al.*, 2001, p. 165). It could be asked: Is it because of the difficulty of involving some teachers in participating in change?

"Teachers are central to the successful integration of the new technologies into primary and secondary education" (Byron, 1977, p. 6). Teachers' perception of the value of the ICT in-service training courses under the provision of the 'Five-Year Strategy' will, therefore, affect the success of the IT in Education initiative directly. And, since the effectiveness use of ICT depends largely on teachers' own initiative and commitment, these will form a driving force for teachers to seek for development in ICT in both teaching and learning. They are also expected to help integrate IT elements into different subjects and "encourage students to use IT to enhance their learning" according to the IT learning targets published by the Education Department of Hong Kong (Education Department, 2000, p. 11). The document also attributes the success of the integration to two factors: nature of the subject content and the readiness of teachers (ibid.). In a nutshell, using teachers as the subject of studying and evaluating the teachers' training in ICT is, therefore, appropriate and well justified.

Apart from teachers' opinions, the research will also focus on the views of the 250 IT co-ordinators, whose posts were created under the 'Five-Year Strategy'. They were expected to play a very important role in helping the school teachers to use ICT to enhance the effectiveness of teaching and learning. They were also to fulfill the following tasks in their schools:

- develop and roll-out a school-based IT plan;
- take charge of all IT-related activities in school;
- tailor software to meet the specific needs of teachers and students; and
- supervise the maintenance of the schools' IT system. (EMB, 1998, p. 31)

It has been heard that some principals might even demand more than the tasks listed above from their IT co-ordinators. The reason can be explained by the principals' lack of IT knowledge. Compared with the terms and conditions of the teachers, IT co-ordinators were employed on a less advantageous position: a

two-year contract with their pay scale starting from the first point of the teacher's pay scale. The post had no guarantee of continuity and there was no promotional prospect. Although the Quality Education Fund provided sponsorship to make up one IT co-ordinator for each school, the post was still short-term work. After reviewing the policy, the government decided from September 2002 onward to provide all the schools with a sum of money equivalent to the first year salary of an IT co-ordinator to continue IT support to teachers. The provision is, however, subject to change. This means that whether the IT co-ordinators can continue their service after the school year of 2002/03 depends very much on their principals and on their performance and ability of integrating ICT into the school curriculum. Some of them may possess professional qualifications and even practical commercial experience in ICT. There will be a 'brain drain' problem, or loss of experts in this field if their contracts cannot be renewed after August 2003.

As mentioned before, teachers are considered as the main gatekeepers of educational change. They may be anxious at facing the new changes in education while the IT co-ordinators may be concerned about the continuity of their future career. Therefore, it is very important to understand both their views and concerns on the issue and rectification of any concerns is important if the aims of the IT project are to be achieved.

It is hoped that this study may provide useful information and guiding principles in formulating future policy and practice about ICT implementation and the design of teachers' training programmes in ICT.

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1.5.2 Aim and Objectives

The aim of this research project is to identify the perception of teachers and IT co-ordinators about Hong Kong's ICT in-service teacher training scheme provided under the 'Five-Year Strategy'. Teachers' views will be sought about the concept, provision and outcomes of their training in ICT under the provision of IT in Education.

- 1. The concept part of this model is of two-fold: one is about the teachers' opinions on the concept of teacher professional development and the other is their views on the policy of the new ICT in-service teacher training. This includes the proposed four levels of IT competency, namely, basic (BIT), intermediate (IIT), upper intermediate (UIT) and advanced (AIT) level, and the percentage of teachers required by the plan to complete each level by the 2002/03 school year.
- 2. The provision part of this model is about teachers' evaluation of the training courses of Hong Kong's ICT in-service teacher training in terms of the quality of curriculum (curriculum design and curriculum content in terms of skills and knowledge), pedagogy (trainers' instructions, teaching aid and mode of delivery) and learning effectiveness.
- 3. The outcome part of this model is about the teachers' perception of the effectiveness of the training courses including the learning outcomes which can be measured by whether the courses can equip them with the knowledge, skills and attitudes of ICT and whether they can transfer that knowledge to

their classroom teaching. Their comments on the teacher training part of Hong Kong's IT in Education initiative will be taken into account for the outcomes too.

1.5.2.1 Research Questions

In order to clarify the aims and rationale, the objectives of this study have been broken down to six research questions which were then put under the three categories stated in the 'Concept-Provision-Outcome' model which emerges by grouping the various models from the literature.

CONCEPT

- 1. What do the secondary school teachers and IT co-ordinators understand about the aims and meanings of professional development based on their experience in ICT in-service teacher training?
- 2. What are the views of teachers and IT co-ordinators in secondary schools about the 'Five-Year Strategy' of IT in Education?

PROVISION

3. Is the curriculum design and planning of Hong Kong's ICT in-service teacher training courses appropriate and are the courses likely to bring

about improvement in teaching and learning?

4. Which group of course providers is mostly preferred at each level of the new ICT teacher training courses?

OUTCOME

- 5. What outcomes do teachers and IT co-ordinators in Hong Kong expect from the new ICT in-service teacher training courses?
- 6. Does the teacher training in ICT result in any change for the teachers?

1.6 PLAN OF THE THESIS

The following is a brief layout of the presentation of this research project.

Chapter 1 has provided an introduction to the development of ICT in Hong Kong schools and the role of teacher education in this development. It has outlined the Hong Kong SAR's five-year strategy for promoting ICT in schools and indicated the part to be played by teacher training in this strategy. The rationale and purpose of study have been discussed and the main research questions outlined.

Chapter 2 presents a theoretical framework for professional development and records the different formats of professional training programmes in general.

Literature about professional development in ICT, especially in the field of teacher training and the changes in the roles of teachers facing new challenges in ICT, are reviewed in a local and international context.

Chapter 3 outlines the research design and includes discussions of the methodology used, the instruments for data collection and the research techniques for data analysis. A rationale is given for why a certain research design is adopted with supporting evidence. In addition to the ethical issues, the construction of the questionnaire and the interview schedule and the conducting of pilot studies are discussed.

Chapter 4 is the main data analysis chapter reporting on all the relevant data obtained from the questionnaire survey. The interview data were reported and used to supplement the research question. The main results are presented using the model of 'Concept-Provision-Outcome'.

Chapter 5 contains a discussion of the results of the analysis. The significance of the data is discussed in relation to the aims of the five-year IT teacher training initiative and compared with recent findings in the literature. Conclusions are reached about the effectiveness of the initiative in terms of its concept, provision and outcomes.

Chapter 6 is a short summary of the main findings of the research with recommendation about an appropriate direction for future research. Limitations of the study are also included too.

References and appendices for verifying the sources of data are included at the end.

CHAPTER 2 LITERATURE REVIEW

This chapter reviews the literature on teacher training in information and communication technology (ICT). It considers the theoretical framework, content, forms of implementation and methods of evaluating professional development. Lastly it examines the literature on teachers' paradigm shift in response to new initiatives in teacher education in order to answer the question of what paradigm shift looks for in ICT.

The review starts by focussing firstly on the theoretical framework of 'professional development', which includes its definitions and models and its relationship with other terms with similar meanings such as staff development, in-service teacher education and teacher training.

Secondly, under content and implementation, the review proceeds to the history and training modes of professional development programmes. The present situation in teacher training in ICT especially in Hong Kong becomes the main theme of this part.

In the third part, the review concentrates on the evaluation of teachers' professional development as well as different modes of professional learning and the recent research done in the evaluation of the recent Hong Kong's 'IT in Education' initiative implemented since November 1998. Moreover, the effectiveness of teacher training programmes in ICT, both in the international and local context, will be discussed at national, school and classroom level.

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The last part is a discussion of the hope for teachers' paradigm shift in relation to the new teacher training initiative. This focuses mainly on the impact of professional development in ICT on the changing roles of teachers. The impact can be expressed either in teachers' use of new technologies or the change in their teaching styles as evidence of a paradigm shift in their teaching. The concept of managing changes in professional development will also be considered under this heading.

2.1 PROFESSIONAL DEVELOPMENT: THEORETICAL FRAMEWORK

The term 'teacher training' implies professional development at an individual teacher's level and shares some common ground with the term staff development. There are a number of terms that have a similar meaning to 'professional development' but different researchers may use these terms in very specific ways. The terms with similar meaning to professional development include staff development, teacher development, teacher education, teacher training and in-service education and training of teachers (INSET). 'INSET' is sometimes used in parallel with 'professional development' and 'staff development' or may be used as an umbrella term to include others previously mentioned. Other specialists may hold completely different opinions in that professional development may mean a kind of staff development to embrace all the training from the process of recruitment through selection and appraisal till retirement during the life cycle of one's career path (Middlewood and Lumby, 1998, p. 61).

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2.1.1 Meanings and Definition of Professional Development

The term 'professional development' is open to many definitions and interpretations. First of all, it means literally a process through which certain employees become more professional. The term professional development is made up of two words, 'profession' and 'development'. The definitions of the term provided by any researchers must be related to one or other of the two words.

The word 'profession' implies many things. Hoy and Miskel in summing up other writers' views conclude that "a profession is characterized by technical competence acquired through long periods of training" (Hoy and Miskel, 1991, p. 144) and suggest that, being a professional, one must be objective, impersonal and impartial; and that technical autonomy must be counted as his/her minimum characteristic (ibid., p. 142). Besides, professional development also suggests, as mentioned by Dean (1991, p. 5), that the bearer of the term 'profession' must:

1. have a long training involving theory as a background to practice;

- 2. have its own code for the member; and
- 3. have high degree of autonomy.

Someone who is a professional must have a substantial background of knowledge and skill acquired during the initial training (ibid.). It has been debated whether teaching is a profession or not, since not all the criteria for traditional professions such as physicians, lawyers or accountants can be applied to teachers. Eraut (1997) in discussing the professionalism of teachers regards teaching as one of "the less powerful professions", and that any "reasonably educated people" can do the job without any additional experience (p. 39). Therefore, the term 'professional development' tends not to be as popular as 'staff development' among teachers and terms like teacher development, teacher education, teacher professional development and even teacher training are therefore more common.

Secondly, the term 'development' as in biology simply means growth and change which further means a series of changes that are irreversible (Underhill, 1986, p. 1). Development in education, according to Head and Taylor, may mean different things and 'take many forms' as teachers respond to the inner desire "that motivates them to learn in higher education" (Head and Taylor, 1997, p. 5). Main has identified three types of development: instructional development, organizational development and personal development (Main, 1985, p. 8) of which the personal and organizational development are the two important approaches in making up the definition of professional development in education.

Moreover, definitions of 'professional development' actually vary according to perceptions about what is intended in such 'development' activities (O'Neill, 1994, p. 287).

A clear definition of 'professional development' is scarcely found in education. It is extremely difficult to define the term particularly when it is used to mean continuous professional development. The most appropriate definition in this context is given by Huges, though he uses the term 'teacher's professional development' instead of professional development, by stating that:
It is a complex process in which teachers improve and develop their instructional skills, and their curriculum development, implementation and evaluation skills. It allows teachers to develop a wide range of beliefs and attitudes that support effective teaching practices, by various means and in a variety of contexts (Huges, 1991, p. 54).

2.1.1.1 Individual versus Organizational Development

Definitions of professional development can be divided into two kinds: macroscopic (organizational growth) and microscopic (personal or individual) development (Dean, 1991, p. 5).

Some researchers in defining professional development include both individual development and organizational development (examples are Williams, 1982; Conners, 1991 and Bellanca, 1995), while others use the term for individual development only (Griffin, 1983, p. 2; Hoyle, 1982, p. 164; Huges, 1991, p. 54; Kirk, 1988, p. 16; and Cawood and Gibbon, 1981.).

Bellanca, who obviously pointed out that his definition was not from individual's perspective, views professional development as:

a planned, comprehensive and systemic programme designed by the system to improve all school personnel's ability to design, implement and assess productive change in each individual and in the school organization (Bellanca, 1995, p. 6).

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He is supported by Williams (1982) who considers professional development to be a "process by which individuals, groups and organizations learn to be more effective and efficient" (quoted in Dean, 1991, p. 5).

Similarly, Huges (1991) thinks professional development is the responsibility of individuals and systems but that it aims to promote individual staff development when he considers professional development as "the sum of all activities, both formal and informal, carried out by individual or system to promote staff growth and renewal" (p. 54).

Likewise, Griffin (1983) accepts professional development as a system attempt "to alter the professional practices, beliefs and understandings" of teachers (p. 2) while Burke, being a representative of the group of educators favouring organizational development, accepts teachers as professionals and encourages them to be aware of the characteristics that "make schools an effective place for students to learn" (Burke, 1993, p. 75) which contrasts sharply with the claim that professional development is making "teachers become more professional" (Dean, 1991, p. 5).

2.1.1.2 Focussing on Knowledge and Skills

Professional development can also be perceived as a process for developing an individual's knowledge and skills for practice and changes (Hoyle, 1982, p. 164). An example is given by Bellanca (1995) who defines professional development as "individual's election to expand his or her repertoire of knowledge and skill" (pp. 5-6). Kirk also recognizes that a teacher needs professional enrichment, not only for enriching and acquiring skills but also for keeping abreast of developments in pedagogy and knowledge (Kirk, 1988, p. 16; ibid., p. 45). This is also the interpretation of Too (1987, p. 11) that the meaning for professional development includes the upgrading of knowledge and skills, and even more than that such as the fostering of personal and interpersonal growth (Lee, 1993, p. 122).

Dean (1991) considers the influence of professional development at the school level where it can result in an improvement in the experience of pupils and everyone in the school as well as the teachers specifically concerned (p. 8). Therefore, the definition of professional development offered by school or college may be different from the traditional one and inevitably reflects their interpretations of how it can be effectively carried out and managed (O'Neill, 1994, p. 288). Lastly, after summarizing the views of the researchers above, a new working definition, based on Huges' work (1991, p. 54), for professional development is made up for this research project:

A complex process with broad career implications and personal development outcomes through which teachers become more professional through continually developing their knowledge and skills for instruction, curriculum development and evaluation; and through which teachers alter their professional practices, beliefs and understanding in order to design, implement and assess productive changes in the school organization and their own and others teaching practices.

2.1.2 Models of Professional Development

As mentioned by Craft (1996), professional development must be of a high quality if teachers are to update their knowledge and skills so that pedagogy is improved (p. 5). Numerous frameworks and models relating to professional development have been proposed by researchers and educationists but not all of them are appropriate and relevant for individual teachers who wish to assess the effectiveness of their plans and programmes.

Looking at professional development from more than one perspective is conducive to the understanding of the term. Craft (1996) looks at models of professional development and INSET provision from a number of angles, including purposes; location; methods; length; and levels of impact (p. 11). Among the great deal of materials examined by specialists such as Craft, only the purposes, the location and the needs for professional development will be considered and discussed in the process of forming a new model below.

2.1.2.1 Purposes

Bolam (1987) identifies five main purposes of professional development which he terms 'continuing education'. He places these on a continuum from staff/group performance to person education (pp. 27-9). Bolam's model (ibid., p. 28) focusses upon system versus individual priorities and he also admits that professional development can serve both the individual and the system. Fullan argues that personal development and school development are intrinsically linked and that professional development depends not only on individuals' personal learning but also on the learning of groups of teachers and administrators in relation to the improvement of the school. (Fullan 1991, p. 315).

Joyce and Showers (1988) suggest three general purposes of professional development: enhancement of academic knowledge, school improvement, and preparing teachers for changes regarding curriculum and technology (pp. 6-7).

2.1.2.1.1 Teaching and Learning

The UK Teacher Training Agency suggested that the main purpose of professional development is to improve teaching and learning (TTA, 1997). Many sources focus on teachers' mastery of teaching pedagogies to deepen their knowledge of curricular content as the main purpose of professional development (Bellanca, 1995, p. 11). This includes both improving current performance and remedying existing weaknesses (ACFHE/APTI, 1973, p. 2). In Hong Kong, Too (1987) has done a survey of 19 principals and 83 teachers in a group of Anglican schools on their staff development needs in a research project as part of her M.Ed. dissertation. She found that both principals and teachers agreed that the purpose of staff development was to update professional knowledge and teaching skills (p. ix) and observed that:

Principals and teachers agree strongly on the aim of staff development to create opportunities for updating professional knowledge and teaching skills (Too,

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1987, p. 73).

Joyce and Showers (1988) focus on students' improved learning as the main purpose of professional development (p. 6). They devote their whole book to the relationship between students' achievement and staff development. They agree with Hewton (1988) that the primary aim of professional development is "to increase the quality of pupil learning" (p. 90) through the development of teachers' potential while other aims are regarded as 'subsidiary aims' (ibid.). O'Neill (1994) also asserts that professional development should contribute to the improvement of the quality of students' learning experience (p. 288). After all, they are not quite far away from improving teaching and learning as suggested by the Teacher Training Agency previously (TTA, 1997).

2.1.2.1.2 Efficient Management and School Improvement

Another way of looking at the purpose of professional development is in terms of the effective management and continuous improvement of schools. From the angle of the education authority in the UK, the DES Circular 6/86 explained the purpose of promoting professional development in teachers as "to encourage more effective management of the teaching force and to encourage training in selected areas" (DES, 1986). This is very different from the purpose of promoting teachers' personal professional development.

Both Schmuck (1980) and Holly and Southworth (1989) agree that effective professional development can encourage individuals and groups to engage in problem solving within the school or college environment which can lead to school improvement. Dean suggests that the aims of the professional development programme should bear some relationship to the overall aims of the school (Dean, 1991, p. 2). Moreover, Too (1987) observed that the current emphasis on professional development in secondary schools in Hong Kong include both school improvement and personal development (p. 9).

2.1.2.1.3 Preparing Teachers for Changes

Some professional development programmes are designed to empower teachers to develop new understandings and new tools that can inform policy and practice. Bellanca (1995) reported that the main purpose of professional development in some American districts was to motivate and inspire teachers "to introduce ideas that will keep other educators informed about new developments" in the field of education (p. 11). The aims of professional development interpreted by the report of Association of Colleges of Further and Higher Educational and the Association of Principals of Technical Institutions included the preparation of staff for future changes. The development programme:

- 1. prepares staff for changing duties and responsibilities and encourages them to use new methods and techniques in their present posts; and
- 2. prepares teachers for advancement either in their own college or in the education service generally. (ACFHE/APTI, 1973, p. 2)

Hong also observed that in Hong Kong most of the staff development

activities are "ultimately tied to changes" and serve the purpose of introducing change in schools (Hong, 1987, p. 4). Similarly, Too after conducting research in a group of teachers working in the schools, belonging to the same sponsoring body, identified eight aims of staff development of which "coping with new initiatives" was ranked the highest (Too, 1987, p. 73).

2.1.2.2 Location

Location is defined as the position or place where different ways of professional development are organized. The different approaches the professional development to be organized contain at least the following two dichotomies relating to their location: course-led versus technology-led, and off-site against school-focussed professional development. They are not mutually exclusive but sometimes may interrelate with each other.

2.1.2.2.1 Course-led versus Technology-led Professional Development

Craft observed that the professional development has traditionally been dominated by a course-led model of how teachers learn in college, or teachers' centres or professional development centres (Craft, 1996, p. 7). Over the last decade a number of strategies have been developed to increase the impact of the course-led professional development. Within the scope of the course-led professional development, Lewis identified two models of in-service training: the Deficit Model and the Skills Model (Lewis, 1989, p. 3). The Deficit Model. Under this model, training courses are provided to teachers when the authority thinks that teachers lack certain skills. It is a kind of remedy for the inadequacy of teachers. These kinds of technology-led courses, according to Lewis (1989, p. 3), can meet the teachers' immediate needs in ICT. No further training is needed until another level of achievement is called (Neil, 1986). The problem with this model is that teachers have the feeling that the courses have 'deskilled' them by reducing them to the novice stage (Lewis, 1989, p. 3). Lewis found that where the deficit model underpinned the courses, the authorities did not provide any back-up in the school. Teachers, on returning to their schools found no facilities and no time to reflect on what they learned, let alone implement any new ideas in teaching.

The Skills Model. In the Skills Model, the emphasis is to acknowledge the teachers as experts who possess knowledge and skills and encourage them to develop new skills. Lewis found that where this model underpinned the courses, teachers who are the expert practitioners were encouraged to use the technology in the classroom and then return in order to discuss the educational outcomes (Lewis, 1989, p. 3). The advantage of this approach is that teachers act as the evaluators of the innovation and this encourages their commitment to use the new technology. Professional development courses adopting this model, however, need to be longer than courses normally provided by teacher training institutes.

Lewis claimed that the second model is more effective than the first as it

includes the elements of "sharing professional experience" among individuals (Lewis, 2001, p. 3).

Constructivist Model. Cifuentes (1997) proposed a constructivist model for professional development, which included five technology-led techniques to facilitate expansion of pre-service teachers' method beyond lecturing (Figure 1). The techniques were:

- (a) diversification of modelled teaching methods;
- (b) exposure to change theory as it applies to technology integration and school restructuring;
- (c) design of student-centred interdisciplinary units;
- (d) project-based learning and
- (e) meeting with master school teachers who describe and demonstrate effective teaching methods. (Cifuentes, 1997, p. 69)





2.1.2.2.2 Off-site versus School-focussed Professional Development

Providing off-site courses was the most traditional way to organize staff development in the past. The content of off-site courses has become more school-focussed over the years and an additional development has been the emergence of school-based professional development where the professional development is located in the school rather than off-site. Most off-site courses take place in institutions of higher education. An unusual form of off-site professional development in the UK is teacher placement in the local workplace (Craft, 1996, p. 14). Other forms include cluster or cross-school developmental work (ibid.).

School-focussed professional development was described by Perry (1977) at an OECD/CERI international workshop as the teaching strategies employed by the partnership of trainers and teachers to "meet the identified needs of a school and to raise the standards of teaching and learning in the classroom" (quoted in Dean, 1991, p. 6). According to the main purpose stated in DES 6/86, school-focussed professional development should be more systematic and well-planned to fulfill the needs of the teaching force rather than those of individual teacher with an approach on effective management (DES, 1986). Most writers have emphasized different aspects of this definition. Hewton noted that school focussed professional development implied that schools negotiated with the outside agencies to meet those demands after their needs were identified (Hewton, 1988, p. 8).

Hewton also argued that the two primary aims specifically designed for

school-focussed staff development, were first to benefit the pupils who attend school in order to learn and second to benefit those who facilitate that learning (Hewton, 1988, p. 38). He suggested the following model in terms of need basis (Figure 2).



Figure 2. The school-focussed staff development cycle (O'Sullivan et al., 1997, p.185)

The features of school-focussed professional development suggested by Roland Morant (1981) also reflect the same phenomenon as it:

1. serves the school's institutional needs and, therefore, educational needs;

2. is intended for teachers actually serving at the school;

3. is initiated and planned by members of the school staff;

4. is led and executed by members of the school staff;

5. utilizes the school's physical resources; and

6. takes place on school premises (adapted from Dean, 1991, p. 6).

In proposing his concept of school-focussed in-service education and training, Henderson distinguishes between the course-based model and the school-based model. The course- based model (described above) refers to the taking of teachers out of their schools and instructing them in groups (Henderson, 1979, pp. 17-8). The drawback, as reported by Henderson, is the mismatch between the needs of teachers and the content of the courses (ibid., p. 18). The problem can be solved by using the school-based model where the training is located within the schools and in which training can be closely matched with individual needs.

There has been a move towards an emphasis upon the school as the basic unit for INSET and an increase in school-based staff development. A number of disadvantages of the school-based model have been identified by Gough and James who criticize an over-emphasis on school-based INSET and warn it may neglect professional development (Gough and James, 1990, p. 21). Hewton in his book, *School Focussed Staff Development*, also echoes the same danger that "schools might concentrate on what they perceived to be their own internal problems and overlook changing external circumstances" (Hewton, 1988, p. 7).

2.1.2.3 Needs Approach

Professional development must, according to Joyce, fulfill three types of needs arising from (a) social need for an efficient and humane educational system capable of adaptation to evolving social needs; (b) the need to find ways of helping educational staff to improve the wider personal, social and academic potential of the young people in the neighbourhood; and (c) the need to develop and encourage the teacher's desire to live a satisfying and stimulating personal life, which in turns help his students to develop their desire and confidence (Joyce, 1980, p. 20). These needs may be summarized as the needs of society, the needs of students and the needs of teachers.

Faced with educational reforms, demands for higher standards in teaching and learning and calls for improving quality in pedagogy, teachers in both East and West have a need to update and improve themselves (Craft, 1996, p. 5). McMahon, however, found that teachers would judge the quality of the professional development activities in terms of the "appropriateness of their needs and level of knowledge and skills" (McMahon, 1999, p. 108).

Kirk (1988) in considering the two contrasting perspectives of INSET also stresses the needs and aspiration of individual teacher and those of institutions (p. 47). Hewton also agrees that staff development is concerned with "both the needs of individuals and those of the organization as a whole" (Hewton, 1988, p. 9). He reported some disturbing cases in his *School-Focussed Staff Development: Guidelines for Policy Makers* in which whole days were devoted to nothing further than identifying needs and agreeing on action in the future (ibid., p. 21). The model in Figure 2 which shows a cycle work flow of six stages by O'Sullivan *et al.* (1997, p. 184) and is much more comprehensive. Middlewood and Lumby (1998, p. 83) suggest a slightly different model in identifying the needs and priorities of staff development, with three levels: those needs for development existing in individual, subunit and institution. (Middlewood and Lumby, 1998, p. 83). The subunit refers to faculties, departments or divisions found between school or college level and individual level (Bush, 1995, p. 4). Middlewood reminds the managers to consider whether support staff belongs to this 'subunit' system when their needs are concerned (Middlewood, 1997, p. 188).

Following this review materials examined by professional development specialists, a new model is proposed so that teachers and IT co-ordinators can measure the effectiveness of their intended plans and activities. This model of professional development should:

- be in terms of effective management and school improvement with the purposes of improving teaching and learning, and preparing teachers for changes at any time and in any place;
- 2. contain the course-led approach which should preferably employ the skills model of training, either school focussed or off-sited; and
- provide training which must be teacher-centred and be capable of matching their own needs and levels of knowledge and skills.

2.1.3 The Terminology of Professional Development

This section aims to review the different concepts and words used to describe professional development. Terms particularly concerned with 'professional development' found in the Education Commission Report No. 5 include professional qualification (para. 1.14, p. 5), professional training (para. 5.21, p. 62), professional knowledge and skills (para. 5.23, p. 62), professional competence (para. 5.21, p. 62) and professional guidance (para. 2.6, p. 13) (Education Commission, 1992). All of them contain the consideration of both the improvement of practice arising from professional activities and the moving towards 'higher' levels of professional attitude (Pang, 1992, p. 113).

The terms 'staff development', 'professional development' and 'in-service education and training' (INSET), however, are used interchangeably in the literature. Examples are given by O'Neill (1994, p. 285); Brown and Earley (1990, p. 4); and Dean (1991, p. 5). All three writers define INSET as professional development activities engaged in by teachers to enhance their knowledge, skills and attitudes in order to educate children more effectively.

Other synonyms include teacher education, teacher training, professional training or teacher professional development, continuous professional development and so on.

2.1.3.1 INSET, Staff Development and Professional Development

Kirk believes that INSET refers to the wide range of activities and programmes which are intended to "feed the teacher's capacity to change" made available for teachers beyond the stage of initial training (Kirk, 1988, p. 45). Most of the teacher educators would accept that professional development and staff development are included in INSET (such as Nicholson *et al.*, 1976) except Hewton who insists that the term staff development should open up to a "wider range of activities" than those implied by INSET (Hewton, 1988, p. 9). He also argues that INSET is normally accompanied by the words "of teachers" and that "it is the teacher who is being educated or trained" (ibid.).

In Designing Professional Development for Change: A System Approach Bellanca constructs a model to distinguish professional development from traditional staff development and in-service teacher training of which staff development was considered as the effort to correct teaching deficiencies through classroom instruction and management while INSET was taken as awareness programme to inform teachers of the most updated new ideas in the field of education (Bellanca, 1995, p. 6). What make this three-circle model interesting are the common areas of the three terms and between any two terms. For example, the overlapping area among the three terms would lead to new ideas on what and how to teach, which reflects Bellanca's expectation on the new paradigm shift of the curriculum development (Figure 3). As observed from the figure, no formal follow-up time can be scheduled upon the combination of in-service teacher training and staff development (ibid.). Similarly, time must be released when INSET is combined with the professional development. Between staff development and professional development there is 'Multi-day organizational needs' which is very important to both teachers and schools.

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Defining Terms





Each of the three kinds of development has its own distinct characteristics such that professional development is viewed from the school system's point of view while the other two are from the individual's point of view (Bellanca, 1995, p. 6). Therefore, the programmes designed for professional development will be more systemic, comprehensive and well planned and assessed while those of staff development are more individualistic. From this perspective, staff development can be taken as "the effort to correct teaching deficiencies by providing opportunities" for teachers to learn new teaching methods while INSET programmes are usually of short duration and serve "to inform teachers about new ideas in the field of education" with any available topic or speaker (ibid.). Bellanca also adds that differences among the three terms can stem from four factors, namely, (a) who makes the continuing education decisions, (b) how these decisions align with the district's agenda for constructive change, (c) responsibility and accountability issues, and (d) the notion of learning for change (ibid., p. 9).

2.1.3.2 Teacher Training versus Teacher Education and Development

A few authors adopt the name of 'teacher training' to stand for any staff improvement programmes. Examples are given by Shaw (1992) who perceives teacher training as a continuum:

"Personal experience as a school pupil \rightarrow Initial training as a teacher \rightarrow Probationary or induction period \rightarrow Staff development \rightarrow Appraisal \rightarrow Further staff development" (p. 16)

It is a continuous process beginning with the teacher's own education, carrying on through initial training and continuing through a teacher's professional life (ibid., p. 113).

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Some writers have described the continuous process above as 'teacher development' or 'teacher education' rather than 'teacher training'.

In tertiary institutions such as universities and colleges, staff or professional development has mostly been concerned with educational development which means the development of teaching and learning (Webb, 1996, p. 1). Davis tries to compare the teacher training and teacher development and his results are summarized by Head and Taylor (Table 1). In addition, Head and Taylor (1997) define the teacher development as a "continuous process of transforming human potential into human performance, (and) a process that is never finished" (p. vii). They also found some key characteristics of teacher development such as:

- 1. It is about dealing with the needs and wants of the individual teachers in ways that suit that individual.
- 2. Much of the teacher development is seen as relating to new experiences, new challenges and the opportunity for teachers to broaden their repertoire and take on new responsibilities and challenges.
- Teacher development is also about language development, counselling skills, assertiveness training, confidence-building, computing, meditation, culture broadening – almost everything.
- 4. Teacher development has to be 'bottom-up'. (adapted from Rossner, 1992, p. 4)

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Table 1. Differences between teacher training and teacher development

(Adapted from Paul Davis in an unpublished paper: What is TD and is it really different to teacher training) (Head and Taylor, 1997, p. 9)

2.1.3.3 Differences between In-service Training and In-service Education

Eraut (1972) conducted a need analysis on the definitions of in-service teacher training and in-service teacher development (p. 1). His views are summarized on a comparison table (Table 2) in which target, method and perspectives were compared.

Wills Rotzschol & mich	in-service training	in-service education
Target	teacher as employee	teacher as professional
Method	told what to do and how to do it	supported to solving and answering questions
Perspectives	provide external identified solution to problems	encouraged to analyze the problem
Need analysis	Extrinsic	intrinsic
Conductor	not by practitioners	in the context of self-generated priorities
Nature of need analysis	providing response to training need	generate a range of professional response to a problem

Table 2: Differences between in-service training and in-service education

(Adapted from Eraut, 1972, p. 1)

Head and Taylor (1997, p. 9) see the teacher training and teacher development as two complementary components in which 'training' emphasizes classroom skills and techniques and is confined to providing solutions to problems experienced by teachers while 'development' is concerned with the learning atmosphere which is created through teacher-students relationship (ibid.). For Head and Taylor, teacher training has little to do with development; or, if it does, the effect is all too often 'coincidental'.

Kirk also feels that professional development is neither imposed nor spontaneously generated, and it must be institutionally activated and needs institutional support (Kirk, 1988, p. 50). However, as a word of reminder, Day *et al.* (1985) warn that development cannot be forced because "it is the teacher who develops (active) and not the teacher who is developed (passive)" and therefore development should be better on the basis of encouragement rather than authority, with the teacher's role being consultative (Middlewood, 1997, p. 198). Therefore, a collaborative culture must be developed for the success of professional development among teachers within any school.

2.2 PROFESSIONAL DEVELOPMENT : CONTENT AND IMPLEMENTATION

School personnel responsible for staff development may have options for the content, location, format, incentive, and rationale of their development (Bellanca, 1995, p. 5). In the USA, many schools or school districts may rely on some sort of professional development days as their opportunity for in-service teacher training. Bellanca (1995) reports that most of them are moving to the more flexible staff development programmes (p. 5).

2.2.1 History of Professional Development

Meyers (1985) in his paper about a study of professionalisation in France gives an account of the historical perspectives of professional development and argues that professional development is the result of "a series of struggles for power and preferment" (p. 21).

According to the account given by Bellanca, the idea of professional development became fashionable after the Sputnik revolution in the late 1950's

when a new curriculum was introduced in the USA which required teachers to make more preparation than the one 'institute' day provision allowed (Bellanca, 1995, p. 10). Teachers at that time received credits or points for their promotion or salary increase after they had undertaken recognized forms of professional development.

After collecting data from various sources especially Bellanca's work in professional development (Bellanca, 1995, pp. 13-6), the present author tried to infer the main themes of professional development programmes on how children learn and which teaching method helps most at different stages from the mid-seventies to the 1990s (Table 3). Though most of the data were obtained from the education field of the USA, it is worthwhile as a good piece of evidence to reflect on the trend of teacher professional development in those three decades.

Table 3. A listing of all the themes of professional development programmes since mid-seventies (adapted from Bellanca, 1995, pp. 13-6)

Year	Theme	References
Mid-seventies	Accountability	
	Motivation and instruction; Direct instruction	Madeline Hunter (1984)
	Classroom management	Carol Evertson (1994)
	Student motivations	Raymond Wlodkowski (1985)
	Teachers Expectation and Student Achievement project (TESA)	Sam Kerman (1979)
	4MAT Learning Styles	Bernice McCarthy (1985)
	Concerns Based Adoption Model	(no author listed)
Early Eighties	Co-operative learning approaches and its conceptual models	Robert Slavin (1991); Roger and David Johnson (1986)
	Higher level thinking	(propelled by ASCD)
	Instrumental Enrichment programme	Feuerstein (1980)
	School as a Home for the Mind; PDK's Impact; NCREL's Strategic Thinking; MCCREL's Tactics for Thinking; IRI's Patterns for Thinking	Costa (1991)
Mid Eighties	Peer coaching	Joyce and Showers (1988)
	Cognitive coaching	Costa and Garmstons (1985)
	School change	Sarason (1990); Senge (1990); Fullan (1991)
From Nineties on	Constructivism;	Jean Piaget (1972);
	Behavioristic and humanistic theories of	Lev Vygotsky (1978);
	learning	Reuven Feuerstein (1980)
	Multiple Intelligence	Howard Gardner (1983)
	School change and leadership	Michael Fullan (1991)

In the USA, there are 'institute days' in some states for the schools to carry out their professional development every year "to keep teachers one step ahead" of their students and provide teachers with continuing education in the form of in-service training (Bellanca, 1995, p. 5).

On the other hand, all schools in the UK are required to have five 'professional training days' under the Teachers' Pay and Condition Act of 1987. These days are sometimes called 'Baker's Day' or B-days for short (Gough and James, 1990, p. 20). The history can be dated back to the rights derived from the Education Reform Act 1988 enforced to establish a national curriculum plan or to formulate a total school development plan. The staff development or the in-service training and education for teachers (INSET) was derived from the same source, the Staff Development Programme (ibid. p. 13).

2.2.2 Modes of Training in Professional Development Programmes

Rosenberg and King-Sears (1993) proposed that the professional development programmes for teachers need to firstly go beyond the traditional didactic methods or discussion formats and secondly ensure that there are adequate opportunities for teachers to practise new skills (p. 213). On the other hand, Dean (1991) in research looking into the development need for teachers noticed that they need to acquire appropriate background knowledge and skills involved in the pastoral care of pupils and the administrative tasks of the classroom as well as management (p. 11). It is impossible to fulfill all these needs with one or two types of activities.

For the implementation, instead of one day, one-shot in-service training and a series of professional developmental activities, there are also other choices for teacher training for school teachers in different districts of the USA. Today, many states provide one to four institute days, which are student-free for teachers to learn about the new educational trends and reforms (Bellanca, 1995, p. 11). Within the training programmes, teachers are sometimes provided with theories and skills for changing their instructional and pedagogical behaviour, which they are expected to duplicate in the classroom (ibid, p. 16). Some of these programmes are sponsored by textbook publishers who often provide teaching aids for teachers to replicate teaching methods in the classroom again (ibid.). Some teachers may attend classes at the local universities, participate in some training programmes, take a study trip to other countries, complete an individual programme through Internet or engage in curriculum projects (ibid., p. 11). All these activities are common all over the world, especially in those advanced countries with high technological development such as using computers and on-line courses for supporting staff development. The skills they can obtain include peer collaboration, observation, administrative conferencing, model teaching by administrators, parents meeting and financial support (ibid., p. 29). Some of these activities are found in Hong Kong to date.

According to Bruce Joyce, a comprehensive professional development programme should fulfill three functions. It should:

- 1. provide adequate system of in-service for all teachers;
- 2. provide support for the schools that will enable them to fulfill their programmes;

and

3. create a context in which teachers are enabled to develop their potential (Joyce, 1980 quoted in Dean, 1991, p. 7).

2.2.3 Course Activities of Training Programmes

Dean has proposed a number of possible school-based in-service training activities for use as part of the teacher training for achieving professional development in school. Selected items are listed in Table 4. Details can be referred to Dean (1991, pp. 92-101). Pang from his experience of being a teacher professional developer noted that a number of these activities would require the principal's support (Pang, 1992, p. 119).

Table 4. Possible school-based in-service training activities in school (Dean, 1991)

Action learning
Active learning
Assertive training
Brainstorming
Broadcast material
Buzz groups
Case studies
Critical incident analysis
Delphi (collecting, sharing and discussion views systematically)
Discussion leadership
Group problem-solving
Goldfish bowl activities (using observers)
Ideas collection (using circulating overhead transparencies)
Information circuit
Information exchange
In-tray activities
Making presentation
Micro-teaching
Nominal group technique (NGT) (getting opinions from group members
systematically)
Problem-solving interviews
Quality circles (identify, analyze and solve work problem in groups)
Role-play
Self-development
Team building activities

Based on the above training strategies, there are many possible ways of organizing training courses/sessions within the staff development programme. They can be designed to use different formats and presented as suggested by O'Sullivan *et al.*:

• external short courses;

- in-school short courses organized by the staff development co-ordinator, other staff, headteacher, external agency, etc.;
- external or internal one-day (or less), one-off conferences/seminars/workshops;
- contracted training/consultancy programmes;
- attendance for a degree/certificate/diploma or other award-bearing programmes;
- job enrichment schemes;
- job rotation;
- private study or sabbaticals;
- open learning methods or flexistudy;
- correspondence courses/distance learning/distance materials;
- case studies and 'incidents';
- film, television, video sessions;
- lectures;
- discussions held by 'experts'
- coaching/on-the-job training;
- junior/assistant/pupil training;
- special briefs/assignments, often with fixed timescales;
- written reports;
- research projects;
- evaluation schemes;
- internal and external secondments;
- problem-solving and decision-making exercises;
- industrial or commercial links/joint ventures/secondments;
- simulations and games;
- role play; and
- self-help staff development meetings ('quality circles').
 (O'Sullivan *et al.*, 1997, pp. 186-7)

In addition to the modes of professional learning suggested by the above researchers, visits paid to different schools remind Hewton of a wide range of other forms of activities which are categorized as:

specific programmes;

- small-scale investigations;
- \succ mutual support;
- planned task experience;
- \triangleright communications;
- reviews and appraisal;
- out of school activities such as visits and exchanges and external courses.
 (Hewton, 1988, pp. 20-1)

Some schools also organize courses or workshops on a specific theme or problem such as classroom observation, time-tabling and word-processing or on topics like information technology, library skills, teaching methods in Physics, classroom management, career advice for pupils, etc. (ibid., p. 21).

In order that the relevant information can reach the teacher's or staff development officer's hand, several approaches have been adopted such as printed materials in the form of newsletters or pamphlets; advice-giving on the telephone or through correspondence; organized conferences or one-day sessions gathering with speakers; courses/events which occur more than once with tutors/speakers/experts involved; consultancy providing problem-solving advice; workshop – normally 'active learning' sessions and problem-oriented.

2.2.4 Informal Ways of Teacher Updating

Moreover, there is literature recording how teachers are kept updated with staff development informally. They include:

- 1. A staff development notice board.
- 2. Close liaison with librarian.
- 3. Good relationships with the senior management team, heads of year and house. ...
- 4. Close liaison with the person in charge of the school's resources. ...
- 5. A regular in-house staff development bulletin. ...
- 6. A representative in each subject/year who is designated to receive the relevant, and publicize staff development, materials.
- 7. A record of all staff interest so that they can receive the relevant information. ...
- 8. A staff development feature in any school news-sheet, governor's report or broadsheet to parents.
- 9. Ensuring that staff who have attended courses and conferences are given feedback.
- 10. Ensuring that staff development progress reports feature regularly as an item in staff meetings. (O'Sullivan *et al.*, 1997, pp. 182-3)

2.2.5 Alternatives to Professional Development Activities

Not all professional development is the result of attendance at a course or involvement in a programme. Alan Maley used a series of short sketches to show the range of activities associated with different professional development needs:

1. The individual teacher decides to set aside 30 minutes 'quiet time' daily for personal actions;

- 2. A teacher agrees to try out a good practical idea from a teacher's magazine with his colleagues;.
- 3. Ten teachers decide to meet once a month to discuss a book or some articles;
- 4. Eight teachers decide to meet once to talk over a problem;
- 5. An individual teacher takes a course which she thinks may give new insight or an idea for her teaching;
- 6. A teacher wants to improve his qualification and enroll in a M.Ed. course;
- 7. A teacher decides to review a recent book; and
- 8. Two teachers decide to implement ideas they have acquired from learner independence and set up a small action research (adapted from Maley, 1990, p. 67).

Another type of professional development activity suggested by George and Ray (1979) is through professional reading. They attempted to explain why that was neglected by looking at the time teachers spend on reading, the principal's influence and discussion time and the availability of reading materials from research (quoted in Brown, 1993, p. 67). The conclusion they derived showed that professional reading increases with the amount of teacher education and experience (ibid.).

2.3 TEACHER TRAINING IN INFORMATION AND COMMUNICATION TECHNOLOGY

In order for Hong Kong's IT in Education initiative to succeed and that the objectives of the government's policy can be achieved, teacher training in ICT must be provided for both aspiring and serving teachers. The provision of teacher training courses in ICT, especially for the in-service teachers, is subject to different models and discussions proposed by different researchers in this field.

Cuban (1993) has highlighted three goals behind the introduction of ICT in education. They were quoted by Akerlind and Trevitte as:

- to keep the education system at the forefront of technological development and students' skill up-to-date with those expected in the workplace;
- to increase efficiency and productivity in teaching and learning; and
- to enable more self-directed learning, with students as active learners assisted by teachers to construct their own understanding.

(Akerlind and Trevitte, 1999, p. 96)

These goals suggest one strand of the definitions of professional development stated before such as teaching and learning but some are more specific to ICT such as self-directed learning.

Teachers are one of the key elements affecting the successful implementation of the new policy of IT in Education (Liu, 1999, p. 17). Their involvement in the process of a better understanding of the ICT potential is essential in order that "new approaches are built from the grassroot" (Lewis, 2001, pp. 8-9). Bitter and Yohe (1989) observed that teachers take more time in accepting and understanding any innovation than merely acquisition of knowledge and skills (p. 22). However, in many countries such as the USA, teachers rarely receive professional development and support in the available technologies they need to

use in their classroom (Office of Technology Assessment, 1995). Teachers in Hong Kong have complained that the 3-day training was not enough and that the training was insufficient in terms of both their computer knowledge and method of teaching (Leung, 1998, p. 37). Niederhauser (1996) also reported that teachers rarely receive adequate in-service training to use the facilities associated with the software they had purchased (p. 73). He also observed that computers would take over many instructional responsibilities for the teacher in the future. Teachers need specific professional development in that case to develop the basic technology skills and incorporate the use of technology into an integrated curriculum model (ibid., p. 74). Teachers besides need a certain level of technical competence to use technology effectively. They also need to have extensive hands-on working with specific technologies on relevant tasks and gain the confidence to use those technologies in classrooms (ibid., p. 75). After receiving relevant training, teachers can learn how to choose, evaluate and use the existing computer-based materials and then learn how to develop their own teaching materials using a programming (authoring) environment such as Toolbox, Director, Hypercard and Visual Basics (Amiri, 2000, p. 78).

2.3.1 Rationale for Teachers Training in ICT

ICT in education is generally viewed as the combination of existing educational technology with advanced computing. According to Van Weert (1996), the use of ICT in educational institutes includes the following 4 processes:

1. learning about ICT

- 2. learning with the aid of ICT
- 3. learning by means of ICT and
- 4. ICT as an aid to school management

which has been mentioned in Chapter 1 (in p. 4). It is, however, important to distinguish between 'ICT in education' and 'education in ICT'. The former focusses on the development and application of information technology to achieve desired educational goals while the latter refers to the systematic teaching and learning of information technology in hardware, software, networks and IT application (Law, 1998, p. 21).

Professional development is the 'critical ingredient' for effective use of technology in the classroom (Web Commission, 2001, p. 7). Training supposedly helps teachers transform lifeless equipment to useful tools. Web-based Education Commission makes a comparison that creating high technology educational tools without training teachers to use them would be as useless as creating a new generation of planes without training pilots to fly them (Web Commission, 2001). Too (1987) found that there is widespread belief that more effective INSET can be achieved if the participating teachers can contribute collaboratively to decisions about INSET policies and programs at all stages -- planning, implementation and follow-up work (p. 32).

More and more different types of training will be necessary and useful if teachers and school administrators are to integrate the advances of technology into the curriculum and into their teaching (Web Commission, 2001). These educational technologies are said to be able to enhance student autonomy in
learning and increase their self - direction in learning (Akerlind and Trevitt, 1999, p. 96). Also, the accessibility of the Internet makes it possible to connect teachers to one another, giving opportunities for mentoring, collaboration, formal and informal online learning. The report of the Web-based Education Commission concludes that teachers can access some high quality online professional development opportunities beyond what the local school or district is able to offer (Web Commission, 2001).

Nowadays, a majority of states in the USA are reported to give enthusiastic support to computer or ICT education to explore alternative methods for applying technology to improve teaching, learning and administration (Hirumi and Grau VI, 1996, p. 15). To make it successful, the most important thing is to show and convince teachers that technology use can improve or has improved the student learning in a number of ways (Hawkes and Good, 2000, p. 8). However, not too much information about successful cases has yet been reported, despite Joyce and Showers' (1988) confidence about such possibility in their book of *Students Achievement through Staff Development* published 16 years ago.

2.3.2 Teacher Training in ICT: International Context

With the advance in the ICT, both memory and speed of today's computers certainly provide a wider possibility for more learning opportunities. Students should be able to explore and obtain information by themselves in their own time and place. However, there is a scarcity of research showing what professional benefits teachers can realize in the use of educational technologies, especially in rural areas (Hawkes and Good, 2000, p. 5). And, some professional journal articles state that it is important for teachers to use application in their teaching and learning, but they do not indicate whether teachers should be able to integrate the applications with instructions (Hirumi and Grau IV, 1996, p. 13).

In the USA, though the Office of Technology urged the schools and districts to devote at least 30% of their technology budget to teacher training and support in 1995 (OTA, 1995), another 6% of \$4.2 million in 1996 on K-12 technology (CEO Forum, 1999) and 17% of public school technology in 1999-2000 (Web Commission, 2001), it is reported in some states, according to a survey carried out by Moe and Boldgett (2000), almost two thirds of their teachers (65%) have never used a computer before being introduced into classroom setting (p. 104). Another recent case reported by the National Education Association (NEA) shows that schools are recommended to devote 40% of their technology budget to teacher training but what training the teachers receive is too little to help them develop real facility in teaching (NEA, 2000). It is further supported by the findings of the Department of Education in the United States that almost two-thirds of all teachers feel they are not all prepared or only somewhat prepared to use the technology in their teaching (NCES, 1999). An increasing number of states (about 42) are now requiring teachers to demonstrate proficiency in technology as one component for receiving certification but only four of them require technology training for re-certification (Trotter, 1999, p. 42).

There is no national information technology (IT) training policy in Canada as education is, according to Owston (1995), a provincial responsibility and there is no natural ministry or office of education. Information technology is integrated into other education courses in this country. Like most of the member countries of Organization for Economic Co-operation Development (OECD) of the United Nation, Canada tends to rely on in-service training as the main means of preparing teachers to use IT as information technology training falls within the framework of the agenda for professional development of teachers (Owston, 1995, p. 14). Now Ontario has two unrelated kinds of professional development: one informal being loosely structured and decentralized, and another formal being highly structured and regulated (ibid.). After all, the computer in the classroom has been viewed as playing a key role in preparing Ontario teachers to use IT over this period by using IT across the curricula (ibid., p.17).

In England, like some other countries in the world, all the secondary school teachers have to receive professional training before they can teach (Liu, 1999, p. 34). When a group of teachers was asked in a survey of National Centre for Education Statistics (NCES) to name the greatest barrier to their use of computers and Internet in the classroom, 82% of them cited lack of 'release time' (the time outside classroom) to "learn, practice, or plan ways to use computers or the Internet" (NCES, 2000, p. 102). This factor outweighed their concern about too few computers (78%) or lack of time in the schedule for students to use computers in class (80%) (ibid.). In Bowles' study only half of the 59 serving teachers in a large upper secondary school felt confident with ICT and the majority of them were unable to support their students in using it (Bowles, 1999, p. 119).

The Web-based Education Commission (2001) also reported that many teachers have been trained on systems not installed in their schools. Many do not receive follow-up support. In the same report, it is disclosed that many teachers are not rewarded or reimbursed for the time they spend in training. About 85% of respondents in Arkatov's (2000) survey were not released from their classes and had to pay their own tuition fees.

2.3.3 Teachers Training in ICT : Hong Kong Context

The first formal in-service teacher training in ICT provided by the Hong Kong government started in 1999 as soon as the strategies for the part of 'Teacher Enablement' in the *Information Technology for Learning in a New Era: Five –Year Strategy 1998/99 to 2002/03* were implemented in November 1998. The pioneering of this project, Hong Kong's IT in Education initiative, was based on the goals of the 1997 Policy Address presented by the Chief Executive of Hong Kong as:

...to promote the use of IT to enhance teaching and learning. The main tasks are to equip our teachers with the necessary IT skills...students...can use this technology as part of their daily activities and grow up to use it creatively." (Tung, 1997)

One year before the publication of the 'Five-Year Strategy', the government invited the Hong Kong Policy Research Institute and the University of Hong Kong to develop a research-based policy proposal on IT in Education. According to their proposal, published in June 1998, the goals for IT in Education for Hong Kong should:

Goal 1 – Enhance linkages between schools and the world based on connectivity.

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Goal 2 – Encourage life-long learning, critical thinking and creativity.

Goal 3 – Promote curriculum renewal and innovative educational practices.

Goal 4 – Promote and support the evolution of schools into innovative learning institutes (Law, 1998, p. 14).

All these four goals were interpreted as four different chapters in the *Information Technology for Learning in a New Era: Five-Year Strategy 1998/99 to 2002/03* published in November the same year of 1998. The prime justification for the investment into the use of IT in Education remains the enhancement of the quality of education throughout these two documents (ibid., p. 29).

One of the tactics to achieve the objectives of the 'Five-Year Strategy' of enhancing teaching and learning at both primary and secondary level proposed by the Chief Executive was to equip teachers with appropriate education and training in ICT (Tung, 1997). While the government has put much emphasis on provision of hardware, the main driving force, which is supposed to be the teachers, must not be neglected. Leung (1998), who carried out a survey on 235 teachers requesting their attitude towards computer and information technology, accused the government of neglecting the teachers attitude towards computers while placing emphasis on the availability of resources and students' ability (p. ii). He added that the attitudes of those front-line teachers are a determining factor to the success of the proposed plan of IT in Education (ibid., p. 2). The Government of Hong Kong, therefore, needs to provide incentives and support to teachers who demonstrate their willingness to integrate IT into school practices (Law, 1998, p. 40). Most of the teachers in Hong Kong, like their counterparts in other places, lack computer knowledge and had little experience in using ICT in their teaching (Law *et al.*, 1999, p. 70). One of the main reasons may be due to lack of training (Liu, 1999, p. 8). They lack both computer knowledge and the skills of using the computer (Leung, 1998, p. 35). Teacher training, as well as provision of appropriate hardware and software, and technical support are essential (Law, 1998, p. 39). Leung (1998) also expressed his concern about teacher training. His survey discovered that nearly all the respondents (97%) wanted to receive additional computer training in teaching software (p. 35). Since each teacher's training needs vary, it is essential to meet individual needs with different training programme or courses with different levels of difficulty (Bowles, 1999, p. i). The policy proposal also criticized the teacher training provision at that time as 'too restrictive' and suggested the training be at three different levels of technical competence (Law, 1998, p. 46) as:

Level 1: mastering basic computer operations;

Level 2: knowing how to use software and produce simple presentations; and Level 3: finally being able to undertake multimedia authoring and provide technical support for IT use in schools.

These proposals were adapted to form the four levels of IT competency as basic level, comfortable level, competent level and creative level in the 'Five-Year Strategy' published in November 1998 (EMB, 1998, p. 11). These four levels were again later renamed as basic level (BIT), intermediate level (IIT), upper intermediate level (UIT) and advanced level (AIT) of IT competency as soon as the assessment scheme had been developed by a group of lecturers from the Hong Kong Institute of Education.

The 'Five-Year Strategy' came up with its ICT training plan for all teachers of schools in the public sector within the first four years after formulation of the policy for IT in Education. According to the targets set by the government, all teachers are required to complete the basic competence level of ICT training by the end of the school year 2000/01; 75% of teachers should reach at least the intermediate level; 25% at upper intermediate level; and one to two teachers are expected to acquire the advanced level by 2002/03 school year (EMB, 1998, p. 13).

2.3.3.1 Information Technology Co-ordinator

The role of the IT co-ordinator has been stated clearly in the 'Five-Year Strategy' as to mainly "take charge of all IT-related teaching and learning activities" of a school (EMB, 1998, p. 14). It is very important to the successful implementation of the policy of IT in Education in Hong Kong.

The concept and implementation of IT co-ordinators is not new. Mellor's role as the IT co-ordinator in the Institute of Education in the University of London has been fully mentioned by Whiteman in his occasional paper. The contribution of this role to staff development includes:

1. identifying in each department who would be able to give help to colleagues who have little experience; 2. fitting information technology (IT) into initial teacher training;

3. persuading tutors to incorporate the ICT elements into their courses; and

4.developing and implementing an ICT policy by identifying elements concerning the use of ICT and providing training in the uses of ICT (Whiteman, 1991, p. 23).

As an IT co-ordinator at Rawlins for more than eight years, Bowles reported in his M.A. thesis that his most important role, besides supporting students' work in a variety of subjects, was to develop a better strategy for ensuring teacher development in the area of IT across many curriculum areas (Bowles, 1999, p. 4). Bowles defined the IT co-ordinator as an experienced teacher responsible for co-ordinating and supporting teachers to move from IT to ICT. The IT facilitator also needs to work with department heads on some of the tasks and with teachers on ways of improving students' network literacy and information skills. Another important function is to use their knowledge to help staff identify ways of applying ICT skills in creative and relevant ways to curriculum areas. They can put teachers in touch with one another and help them share ideas and good practices (Bowles, 1999, p. 122).

The IT co-ordinator in Hong Kong, like the IT facilitator described by Bowles, needs to be a qualified teacher who is prepared to:

develop and roll-out school-based IT plan, take charge of IT related teaching and learning activities in the school, tailor general software to meet the needs of the teachers and students, as well as supervise the maintenance of the school's IT system (EMB, 1998, p. 14). The IT co-ordinator is supposed to help the teachers in all the technical work in operating all of the IT facilities and, most importantly to applying ICT to the school curriculum, including teaching and learning (ibid., p. 15).

2.3.3.2 Problems of ICT Teacher Training in Hong Kong

As part of the 'Five-Year Strategy', Hong Kong's ICT in-service teacher training has been faced with at least two problems both concerned with the allocation of resources. One of them is the uneven distribution of hardware and the other is the changing role of the IT co-ordinator as a kind of professional support to the new IT in Education initiative.

2.3.3.2.1 Uneven Distribution

The strategy requires all teachers to complete the basic level of IT competency (BIT). Yet some school principals are encouraging all their teachers to strive for the benchmark of the intermediate (IIT) and even the upper intermediate level of IT competency (UIT) in order to be qualified to apply for more subsidies for ICT facilities from the Quality Education Fund.

This has resulted in the uneven distribution of resources that the more wealthy schools get more resources than their less well-off counterparts, and that schools with more computers and IT facilities stand in a more advantageous position to train more IT qualified teachers, which entitles them to gain more bonus resources from the government.

One of the great problems in the new ICT teacher training scheme is the uneven distribution of teachers wanting to take up the training. Some teachers feel that it is too great a burden for them to learn and re-learn the ICT knowledge and skills at their age. Another group, about 58.8% wish to receive additional training in teaching software from various sources such as the Education Department, universities or other software training organizations (Leung, 1998, p. 35).

Up to this moment, HK\$30,000 has been arranged for teacher training at various levels. In the year of 1999-2000, a total of 120 IT co-ordinators were placed in schools, with 53 allocated to primary schools, 61 to secondary and 6 to special schools. Another 130 IT co-ordinators were recruited in 2000-2001 for both primary and secondary schools. However, there are about 490 secondary schools in the public sector, making an uneven distribution of resources (Director of Education, 1999). Fortunately, the Quality Education Fund reduced the burden of IT co-ordinator on a 2-year contract basis. However, the result of the review in mid-2002 dissuaded the continuity of these computer experts in the schools, thus discouraging the schools' efforts in applying IT across curricula. Instead, a grant would be disbursed to schools from 2002/2003 to 2003/2004 for them to deploy one additional teacher to sustain schools' efforts in applying IT across their curriculum with the relevant circular memorandum attached (Director of Education, 2002).

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2.3.3.2.2 The Change of IT Co-ordinator

Another great problem for the IT in Education is the change of IT co-ordinator. Being an IT co-ordinator in a high school, Whiteman (1991) highlighted his position as a co-ordinator rather than a provider of courses in that he always involved himself in "drawing up materials looking at the teaching and learning impacts of IT" (p. 26).

In Hong Kong, a review has been carried out in mid-2002 on the system of the IT co-ordinator. The funding arrangements were replaced by a monthly recurrent grant of \$18,000, which is the starting salary of a new teacher. Before that, the status of the new IT co-ordinator post had still not been clearly defined and some schools had appointed experienced teachers as IT co-ordinators. With the reduction in wage and the increasing workload, this is likely to result in the problem of 'brain drain' in the near future. This uncertainty of the IT co-ordinators will surely affect the IT co-ordination work of some schools in the future.

2.4 EVALUATION OF TEACHER PROFESSIONAL DEVELOPMENT

The definition of evaluation, according to Nebesnuick (1990) is "the process of conceiving, obtaining, analyzing and communicating information and forming judgments for the guidance of educational decision-making with regard to specified aspects of education" (quoted in Dean, 1991, p. 181). Kremer-Hayon in 1993 gave a new definition of evaluation of teaching as "the attachment of value to process and outcome of teaching" (Kremer-Hayon, 1993, p. 234). He also describes the term as a subjective process depending on mostly "the personal views and attitudes of the evaluator" (ibid.). Gough and James (1990) assume that evaluation ought to be a component of "every in-service enterprise" (p. 95). Evaluation can be of two types: formative and summative. The following is a good description of formative evaluation:

Evaluation is not something to be left to the end of a programme of professional development. An element of evaluation is required in the beginning in assessing needs...Evaluation of the effects of any particular programme should be planned as the programme is planned and time and resources allowed for it" (Dean, 1991, p. 181).

As stated by Easterby-Smith (1986), evaluation in education in general has five main purposes as:

- 1. improving which aims to demonstrate what has happened;
- 2. improving which seeks to ensure that programmes become better;
- learning which recognized that evaluation cannot be divorced from the processes;
- 4. accountability and
- 5. perception (quoted in Gough and James, 1990, p. 99).

The difference between monitoring and evaluation is that monitoring is short-term and gives an immediate check on the delivery of professional development activities while evaluation is a kind of long-term judgment as to the worthiness of the professional development event or series of events (O'Sullivan, Jones and Reid, 1988 quoted in Dean, 1991, p. 181).

The TRIST Guidelines to LEAs in the UK also suggested that successful in-service education should:

1. have clear objectives;

2. be based on careful identification of teachers' needs and institutional needs;

3. start from teachers' current levels of knowledge and skills;

4. be carefully monitored and evaluated;

5. be clear in cost and ensure value for money; and

6. have the support of the head/principal for follow-up practice after training be part of a continuing process of professional development.

(Manpower Training Commission, 1985)

2.4.1 Evaluation of Teacher Training

A report prepared by Carr *et al.* (2000) about the assessment of pedagogical approaches and education outcome provides a very good evaluative framework for any training course or programme. The framework looks into the following six items:

- Curriculum
- Pedagogy
- Assessment
- Teacher
- Learner
- Learning and social outcomes.

The whole report can be downloaded from the website of Ministry of Education of New Zealand (http://www.minedu.govt.nz/index.cfm?layout=document&documentid=5610&data=1). Alister Jones, one of the co-authors, shared the report in a seminar to a group of secondary school teachers during his visit to Hong Kong on the topic of 'Assessment for Learning'.

In considering whether a certain course is appropriate or not, respondents will look at the following aspects:

1. its appropriateness to the classroom;

2. having hands-on practical elements;

3. providing on-the-spot help; and

4. providing opportunities to work and to share ideas with other teachers

(Williams et al., 2000, p. 318).

Before any type or format of evaluation is performed, it is very important for the professional developer to understand the goals of organizing developmental activities. Part of the assessment will be checking whether these goals are fulfilled or not. There is also consideration of whether the assumptions, aims, priorities and approach should be changed (Dean, 1991, p. 182).

2.4.1.1 Evaluation of Professional Development

The literature indicates that professional development affects teachers both in their way of performance and teaching effectiveness which in turns affects student learning and achievement (Brown, 1993, p. 66). Oldroyd and Hall (1988) note that institutions with good staff development and delegation of responsibilities are more successful (quoted in Dean, 1991, p. 27). They are supported by Dean who gives the following account of schools with professional development as normal practice:

The professional development programme is most likely to be successful in a school where there is an open style of management and trust between colleagues, where it is usual to ask questions and seek answers and where professional development is seen as normal practice which is built into the timetable and overall organization of the school (Dean, 1991, p. 60).

Oldroyd and Hall (1988) have suggested several strands which an evaluation might contain:

- 1. The purpose and possible consequences of the evaluation
- 2. The audience for any summative report
- 3. The key questions
- 4. The methods of collecting evidence
- 5. The sources of the information
- 6. The time available and the deadline (Dean, 1991, p. 182).

A model process for assessing performance and programme of teachers training was developed and pilotted by Phi Delta Kappa's Centre for Professional Development in the USA. It is based on Glasser's (1986) control theory and Costa-Garmston's (1985) model of cognitive coaching. Bellanca (1995) reports on the "responsibility model of performance assessment" which has three phases:

- 1. The individual would form personal performance goals by formulating a learning plan in phase one.
- 2. The individual in phase two joins several colleagues in biweekly meetings to discuss how well the applications are working and what modifications are needed.
- 3. In phase three, the individual invites his/her supervisors and two other people for a final review conference in which the individual exhibits the portfolio, reviews the original plan and uses a rubric to show how well he/she institutes the change, and with what modifications and assistance.

(Adapted from Bellanca, 1995, p. 37)

Besides checking the acquisition of knowledge, skills and attitudes, the presentation of problem solving skills and the school improvement if it can be measured, the effectiveness of professional development can also be assessed by the potential to produce teachers who understand the research, its implication and limitations (Brown, 1993, pp. 66-7).

2.4.1.2 How is Evaluation Carried Out?

There are various methods of evaluation of professional development, namely, questionnaires, interviews, group discussions, action plans and observation (Gough and James, 1990, pp. 99-102). The main reason for carrying out the educational evaluations is to explore how these programmes might have been handled differently in order to make them more effective, as well as their impact on teachers and students (ibid., p. 97). The evaluation can be conducted either by an external agent or by members of staff in which case the process is referred to as self-evaluation.

Self-evaluation is considered to be inseparable from professional development (Kirk, 1988, p. 15) as good teaching must always involve self-scrutiny and the search for more resourceful and imaginary approaches. Development is integral to the professional life of teachers (Kirk, 1988, p. 46). Johnson and Hodge (1981) also suggest that "professional development is not only the development of certain skills and attitudes, but also encompasses the concept of teacher self-evaluation" (Brown, 1993, p. 62).

However, there is no free lunch. More and more schools are reporting their findings that it is increasingly difficult to provide effective in-service training to meet professional development needs. The problems presented by North *et al.* (2000) include high cost of teacher substitution, periodic absence of key staff from normal duties, travel cost and timetable constraints (p. 27). These are the prices which must be paid by schools in order to have a team of high quality teaching professionals.

2.4.2 Evaluation of Teacher Training in ICT

Training alone is unlikely to be effective and conducive to the development of ICT in teaching and learning unless it is considered to be appropriate training. The word 'appropriate', according to Williams *et al.* (2000), must be in terms of skills, knowledge, attitude, relevance to educational goals and priorities, and delivery (p.

Whether a certain training course is useful depends on the following indicators suggested, again, by Williams *et al.*:

- way of delivery or the quality of tutor;
- the pace of development, too fast or too relaxed;
- adequate access to computers during the course and
- too informative or too much jargon.

(Adapted from Williams et al., 2000, p. 317)

Evaluating a course is not an easy task, according to Halbach (1999), since it depends on an appropriate instrument which does not affect the subjects' responses (p. 183). He goes on by saying that:

This evaluation has to be comprehensive, and must feed into all the aspects of the course, it also requires an instrument that allows the evaluators to gain an insight into the students' feeling about the course. This instrument needs to be relatively easy to handle, and must yield enough information given by the students. (Halbach, 1999, p. 183)

The suggested items in evaluating a certain training course may contain:

- 1. the course contents
- 2. the pacing and weighting of the different topics
- 3. the materials and exercise used
- 4. the group dynamics, and the organization of the work during the lessons

- 5. the use of diaries
- 6. students' experience as either learners or teachers.

(ibid., p.185)

Hawkes and Good (2000) also propose a rule in evaluating ICT project outcomes for teaching and teachers. It involves the use of several data collection tools, including teacher survey, classroom observation, teachers' interview and analysis of log files (p. 7). The teacher survey, including the pre-test and post-test survey, asks teachers about their attitude towards the use of computer and proficiency in using computers. Both interviews and the classroom observations were useful in linking teachers' perceptions of their project experience with the outcomes of survey activities (Hawkes and Good, 2000, p. 7). All these can help to determine how teachers believe the usefulness of ICT in helping them advance through the curriculum and address important topics in engaging students (ibid.).

There are two main sources of difficulty no matter how well the training courses are organized. One is the suggestion made by Amiri (2000, p. 78) that ICT is continually changing and expanding. The other is that the computer used in education always lags behind those used in the commercial field by at least five years.

2.4.2.1 Evaluation of IT in Education

Though a considerable amount of effort in terms of money and human resources has been invested into the training of teachers, the results of training has not been very distinguished. With the implementation of ICT in education and every measure to ensure its success since 1999, educators keep criticizing the policy itself by overlooking the importance of the role of the people involved (Liu, 1999, p. 16).

Liu in her dissertation of Master of Education for the University of Hong Kong recorded a survey of teachers in ICT pilot schools for the impact of the use of ICT on teachers. She tried to look at the teachers' attitudes, their computer literacy level and their working habits towards using ICT in teaching and learning. Her findings suggested that teachers from the pilot schools generally held a positive attitude toward using ICT in education and that they were willing to change and adapt to their new working habit of using computers (Liu, 1999, p. 1). The question raised by Liu (1999) towards the teachers that "If they are not literate with ICT, then how can they implement it into their teaching?" is worth considering (p. 2). It is suggested by a report evaluating American web-based education that professional development is the critical ingredient for effective use of technology in the classroom (Web Commission, 2001).

In 1999, a large international comparative study aiming to collect information on the application of information and communication technology across twenty-six countries and regions was conducted in Hong Kong for international comparison (Law *et al.*, 1999, p. i). Questionnaires were sent to school principals and IT co-ordinators on both policy and implementation of the IT in Education. Relevant findings of ICT teacher training from this Second International Information Technology in Education Study (SITES) included the following:

- 1. School principals opined that teachers lack knowledge and skills of ICT-assisted instructional practices (Law *et al.*, 1999, p. 61);
- 2. IT co-ordinators complained about the unsatisfactory quality of available teacher training courses (ibid.);
- 3. The vast majority of teachers thought that they did not have sufficient knowledge for using ICT in education (ibid., p. 70); and
- Most teacher training courses focussed on basic computer operation instead of advanced computer techniques and subject-specific pedagogical applications (ibid., p. 76).

SITES thus implies from the findings that the lack of training opportunities and the low quality of available teacher training seem to be the major obstacles in implementing ICT in education (ibid., p. 62).

Lastly, it has been released that a complete and thorough review on the whole IT in Education initiative has been contracted to the Hong Kong Polytechnic University and is being conducted. A detailed plan of work was being formulated when this thesis was submitted.

2.4.2.2 Evaluation of Hong Kong's ICT In-service Teacher Training

Since its implementation in November 1998, the policy of Hong Kong's IT in Education initiative was for the first time evaluated by Law and her colleagues from the Centre for Information Technology in School and Teacher Education (CITE) of the University of Hong Kong. They conducted a study to review the progress of the IT in Education and produced an interim report on the project from December 2000 to August 2001. They reported that the government has clear focus in the policy of IT in Education. One of their focuses was getting teachers to reach basic levels of IT competency and be able to use the computer facilities in their teaching (Law *et al.*, 2001, p. i). In terms of teacher professional development in ICT they found that:

Most teachers surveyed in the study have participated in some forms of training related to IT techniques. School-based training seems to be the most popular format, particularly in secondary schools. In terms of training format, the most preferred mode was "workshops and demonstrations" and the least preferred mode was "conferences and seminars" (ibid).

Teachers' ICT skills were reported to be improved but most of them had doubted the need for teachers to reach the advanced level. Teachers still perceived their role as knowledge disseminator rather than a facilitator in guiding students in the data world. Therefore, Law *et al.* (2001) concluded that "there is no noticeable paradigm shift in teaching practice" among the teacher population (p. ii). In the report, Law *et al.* recommended the provision of professional development support to help the IT co-ordinators and the subject panel chairmen take on their role in curriculum leadership (ibid., p. iv).

Mau in his M.Ed. dissertation in 2001 tried to find out the essential constitutes for an effective and most welcomed teacher development programme by using a '4 C model' which means looking at the issue through continuous training, course materials, chance for sharing and constructivism of the basic information technology training (Mau, 2001, p. 13). He concluded that:

- Almost all interviewers demand a long-term development programme (ibid., p. 41);
- Course content must relate to the daily work of the participants (ibid., p. 47);
- Sharing serves to remove anxieties; and cultivate chances for further practice, synergy and human interaction (ibid., p. 76); and
- School-based development courses are highly recommended by his informants (p. 85).

There were other qualitative studies conducted by other researchers such as Yeung (2001) on teachers' concern and use of IT for teaching and learning and Mak's (2001) work on the relationship between teacher conceptions of teaching and use of IT in teaching. Yeung found that the teachers' major concern in one secondary school was their heavy workload when teacher training in ICT was considered (Yeung, 2001, p. 85); but it was their IT skills when technical support was considered. Their worry about IT skills arose from the reason that they had not learnt it during teacher training in college (ibid., p. 88).

2.4.3 Effectiveness of Teacher Training Programmes in ICT

As mentioned previously (Section 2.4.1.1 in p. 74), some literature seems to accept that professional development affects both teacher performance and teaching effectiveness which would, in turn, affect student learning and achievement (Brown, 1933, p. 66). This observation implies that the quality of teacher training programmes would probably influence the effectiveness of teaching and learning. The key question this issue leads to is "What should effective learning in ICT look like?". The question can be dealt with through three different levels, namely, the national level, the school level and the classroom level. The rest of this section will give a brief outline on the national system of teachers training programmes in ICT in some countries, then will look at the contribution of ICT training to school improvement and development and lastly, describe the relation between ICT integration and effective teaching and learning by looking at the pedagogical change at classroom level.

2.4.3.1 Teacher Training Programmes at National Level

A survey conducted by the information network EURYDICE in 2003 revealed the current situation of ICT teacher training in 30 countries and their initiatives in ICT including initial and in-service teacher training (SETTT, 2004). Taking England and Wales as an instance, its official ICT teacher training since 1998 has been developed through a project National Grids for Learning (NGfL) which was supported by the New Opportunities Fund (NOF) (DfES, 2002, p.19). The teacher training aims to provide training opportunity to all teachers and school librarians all over UK maintained schools to promote their ICT knowledge and skills (SETTT, 2004). The training through the NOF ICT training programme is based on a set of 'expected outcomes' developed by the Teacher Training Agency (TTA):

- speed and autonomy
- range and capacity
- provisionality and

♦ interactivity (TTA, 1998).

The expected outcomes were summarized in two sections: (a) effective teaching and assessment methods and (b) teachers' knowledge and understanding of, and competence with ICT (SETTT 2004 England, p. 8).

In 2004, a survey carried out by MirandaNet research team to 1000 teachers by visiting 15 schools aimed to evaluate the NOF ICT programme for teachers' training from 1999 to 2003. The MirandaNet report claimed that an amount of \pounds 230 million was allocated from the National Lottery for ICT teacher training since 1999 (Preston, 2004, p. 5). Besides teachers, 20,000 teaching assistants were also found to have received the same kind of training in ICT (ibid., p. 7). The national statistical survey concluded that the training sessions made the teachers feel progress in "learning about ICT" and some said that they had been "enjoyable" (ibid., p. 8). The evaluation also claimed that the "NOF training had increased the ability of the staff to use ICT in the classroom" which was couple by the high level of awareness among the teachers about the using of ICT in teaching, learning and administration (ibid., p. 10).

The Irish style of teacher training in ICT is similar to that of England and Wales. Ireland's report to the Strategy in Educational Technologies and Training for Teachers (SETTT) Steering Committee in 2004 describes the provision of teachers in the use of ICT in the four sources of teacher education for ICT. The project of "Schools' IT2000" initiated by the government aims to promote the use of ICT in education in Ireland. The programme is to help teachers integrate the technology into teaching and learning across the school curriculum (SETTT 2004

Ireland, p. 3). The professional development of teachers has been identified as the prime factor in enabling the effective integration of ICT into schools (ibid.).

The centralized ICT teacher training in France is mainly conducted by several tertiary institutes under the jurisdiction of the education authorities (SETTT 2004 France, p. 7-8). This is quite common for the European countries to have all their ICT teacher training programmes concentrated in several major universities. Spain is one of such examples as the University of Barcelona becomes one of the training centres of the autonomous community of Catalonia (SETTT 2004 Spain, p. 1). Another similar feature is that face-to-face teacher training in ICT remains the most popular type of teacher training though it seems that distance learning or web learning through Internet are gaining ground in other parts of the world (ibid., p. 6).

A recent draft report of a study commissioned by SchoolNet Africa (SNA) on the strategy on developing African teachers in ICT shows that there has been a fair number of initiatives to date to teach African teachers ICT skills. There is also very few African teacher training institutions offering ICT teacher training as there is shortage of fund. These pre-service and in-service training were reported to be mostly "small-scale, regional and non-systematic" as there is lack of coherent government policies with respect to developing teachers' ICT capabilities (Issac-Bardien, 2004, p. 7).

In the Far East, a Smart School system was developed in Malaysia with the objective of "transforming the Malaysian Education System into a highly advanced technological process" (Telekom Smart School, 2004, p.1). The training

programme of this system is designed to equip teachers with knowledge and skills of ICT, enabling them to integrate ICT into the teaching. There are five modules, namely,

Module 1: Basic ICT

Module 2: Intermediate ICT

Module 3: Integrating ICT into the Teaching and Learning

Module 4: Smart School Management System and Teaching and Learning Materials

Module 5: Technical Training for IT Administrators (Telekom Smart School, 2004, Training)

Training modules are used to simplify and improve the teaching and learning process (bin Hassan, 2001, p. 7).

Usually the training for Smart School Teachers and Computer Education is different from that for teachers of other subjects as it follows a more detailed training process about ICT (ibid, p. 5)

The features of the Smart School system encourage independent and critical thinking, creativity and the ability to care all students within a conducive learning environment. However, the idea of Smart School was also shared by the schools of Hempton City in Virginia, USA. The story of Hampton City Schools' Smart School program tells about how to integrate telecomputing successfully into the educational process (Stallard, 1996, p. 97). In brief, Smart Schools in this area are completely 'networked' which means they are connected to one another and to a

variety of outside resources (ibid., p. 98). In a nutshell, the concept of Smart School system refers to the description of the widely use of ICT inside the school campus in both Malaysia and USA.

2.4.3.2 Contribution of ICT Training to School Improvement and Development

The strategic location of ICT in plans to enhance the quality and pace of learning is indicated by the prominence given the topic in works such as Dimmock (2000). There is a clear expectation that the use of new technology has the potential to unlock learning and to enable schools to be transformed in terms of the learning experience. Dimmock (2000) suggested that computer technology which is part of ICT is able to improve the learning environment in a 'learning-centred' school by acting as catalyst for change (p. 168). ICT training, as described by Dimmock, concerns not only the training of procedure and technical operations, but also the linking up with technology, curriculum, teaching methods and materials as viewed from the school's perspective (Dimmock, 2000, p. 170). Besides sharing on his four key principles for using computers in schools, Dimmock emphasizes on the importance of formulating a school technology plan. As for the outcome-based learning at school level, he quoted four examples from schools which integrated ICT into their school curriculum. Hancock (1997) also claims that if a school wants to become an 'Information Age school', it should "focus on improving the connection between curriculum content and school process" such as lengthening class periods, considering multiage grouping, experimenting with problem-based or thematic approaches to instruction, etc. (p.

Besides the above implementations, there are other factors attributing to the effective teaching and learning such as school management and leadership which has been mentioned in the report of "Learning to Use ICT in Classrooms: Teachers' and Trainers' Perspectives" (Preston, 2004). Successful elements in the school management of the NOF programme involved the use of INSET days designated by the school and its developmental team. Other examples are given by Lawson and Comber (2004) in mentioning the needs for the school leaders to plan for effective introduction of ICT into the their schools especially in encouraging teachers to integrate ICT into their teaching and learning (p. 148). Thus effective school leadership can be linked with the ICT integration which though not included by Sammons *et al.* (1995) can be regarded as one of the key characteristics leading to school effectiveness.

2.4.3.3 Effective Teaching and Learning Brought by Teacher Training in ICT

More and more recent studies show or even imply that "student achievement is allied to teachers' own level of knowledge and skills" (Harrison, 1998, p. 99). ICT is said to play an important role in helping students learning and is also regarded as a resource for improving the quality of teaching (Dimmock, 2000, pp. 169-70). With the development of some important learning skills, the contributions of ICT to children's learning can be increased through offering students opportunity to extend their learning (Parkinson, 2003, p. 163). ICT is unique in the way it encourages students to try things out and experiment with techniques "in a way that no other curriculum subject can offer" (ibid.). Hence, ICT will be a significant feature in the education, training and social life of all the students and helps to build up their confidence in the use of ICT in a wide variety of context (Tanner, 2003, p. 16). No wonder the MirandaNet report described the ICT as "a catalyst to help students to be more independent learners" especially in the investigation of Internet (Preston 2004, p. 52). The same metaphor has been used by Dimmock (2000) in comparing the technology to a kind of catalyst for inducing the changes required in teaching and learning (p. 180).

However, according to Kennewell, though there are many good practices in teaching ICT as a subject, still there has been little effort to develop and disseminate knowledge concerning effective teaching strategies (Kennewell, 2003, p.xiv). Tanner (2003) also complains that the use of ICT has been developed in UK schools for over 30 years yet clear thinking about the aims of ICT was rarely found (p. 5). The reason behind may be due to the inadequate teacher training in ICT (Dimmock, 2000, p. 168). This failure, as Hancock (1997) argues, could be attributed to "a mismatch between schools and the workplace" (p. 60). In this regard, the expectation of the students' success by teachers is quite different from that by the employers in the workplace. A competent teacher should, therefore, "have an understanding of ways in which ICT contributes to teaching and learning" in various key stage through knowledge, belief and ability (Harrison, 1998., p. 100); he should also possess a wider perspective of developing students' skills in ICT capacity through different disciplines as a cross-curriculum subject which prepares them for the community.

When Technology was taken as a single subject in the National Curriculum, Benyon (1992) have noticed the importance of the general skills of using ICT rather than the high level 'know-how' at the outset of National Curriculum Technology (p. 20). His other two emphases include:

- the IT capability is a cross-curriculum competence which should be developed through a range of curriculum activities; and
- the use of IT can enhance the learning process at all levels and should develop as a normal and integral part of learning activities throughout and across the whole curriculum (Beynon, 1992, p. 20-1).

Strictly speaking, ICT can be taught, according to Tanner (2003), but the strategy for training teachers' ICT capacity must be "in terms of broad domains of transferable learning skills" within the context of higher order thinking" (p. 7). Within this context, teachers are advised to teach students transferable skills but not the procedural knowledge as those skills are essential for the students to apply across different curricula and in their daily lives. Therefore, the nurturing of the ICT capability among student is found more fundamental and important in:

- recognize in which situations the use of IT is sensible;
- use IT appropriately in such situation;
- evaluate the effects of that use; and
- know and understand the range and purpose of application of IT (Bimbaum, 1989, p. 5).

Thus, it was crystal clear that the successful infusing of ICT or computer

technology into classroom would very much depend on teachers' adoption of the potential and function of the technology in teaching and learning (Dimmock, 2000, p. 180).

2.5 PARADIGM SHIFT AMONG TEACHERS

A paradigm can be thought of as "a matrix of beliefs and assumptions about the nature and purposes of schooling, teaching, teachers and their education" (Zeichner, 1983, p. 3). Nearly all the literature on professional development envisages a paradigm shift which usually involves school improvement assumptions that involvement, ownership, democratic, collegial style etc. will improve performance. There is also a clear expectation of using ICT to enable the paradigm shift among teachers in their teaching culture. This can easily be observed in the official paper of the 'Five-Year Strategy' when paradigm shift in IT in Education requires the school education to change "from a largely textbook-based teacher-centred approach to a more interactive and learner-centred approach" (EMB., 1998, p. 1).

Mak (2001) in his M.Ed. dissertation also mentioned that information technology provides an opportunity for this paradigm to shift among teachers (p. 1). The major challenge for teachers in IT in Education depends on the change in teachers' beliefs about what must be learned. It is this paradigm shift in the teacher education programme which is the key to effect the necessary change (ibid., p. 40).

It was also observed by Law et al. (2001) that "there is no noticeable paradigm shift in teaching practice" in the interim report to Hong Kong's IT in Education initiative (p. ii). Though professional development models are increasingly seeing the improvement of teaching and learning in terms of Gardner's 8 types of multiple intelligences and Goleman's emotional quotient, neither of these features in ICT teacher training works as there is a noticeable lack of emphasis pedagogy and significance dwelling on a on technical/mechanical/operational aspects. It is therefore not surprising that ICT has not been the vehicle for enhancing learning styles or improving emotional intelligence - on the contrary, the computer has become an unintelligent vehicle that shapes learning in mechanistic ways, especially when the skill level of the teacher is limited and when the availability of advanced software is restricted. This claims also corresponds to the problems of resource constraints posed by Dimmock (2000) who attributes the problems of the slow introduction of ICT teaching and learning in schools to two reasons, under-utilization and misappropriation, besides a lack of skill training in teachers (p. 168). The problems posed by resources constraints include inadequacy of government funding, re-allocation of expenditure in library books, the challenge of lowering the ratio of students per computer and how ICT can support the curriculum, teaching and learning programme (ibid., p. 178). All these will hinder the planning of schools' technology policy which is most fundamental to the successful integration of ICT across the curriculum if schools are fail to fully utilize the existing resources (ibid.).

This may explain why the paradigm shift expected has not been taken place. What seems to have happened is that trainers have seen the potential of three new aspects of education and have conflated their aims and objectives.

The teachers, however, at this moment are under great pressure to manage changes in both professional development and their roles (Hancock, 1997, p. 61 and Dimmock, 2000, p. 174).

2.5.1 Managing Changes in Professional Development

Innovation or reform represents change. Any educational reform will bring about school changes. Fullan (1982), in his book of *The meaning of educational change* outlines all the possible changing factors of school changes. His suggestions include:

- 1. Change takes place over time.
- 2. The initial stages of any substantial change always involve anxiety and uncertainty.
- 3. Ongoing technical and psychological support assistance is crucial if the anxiety is to be coped with.
- 4. Change involves learning new skills through practice and feedback; it is incremental and developmental.
- 5. The most fundamental breakthrough occurs when people can cognitively understand the underlying conception and rationale with respect to why this new way works better.
- 6. Organizational conditions within the school (peer norms, administrative leadership) and in relation to the school (e.g. external administrative support

and technical help) make it more or less likely that the process will succeed.

7. Successful change involves pressure, but it is pressure through interaction with peers and other technical and administrative leaders.

Fullan's points may be right but cannot be wholly applied directly to the real situation in professional development. Dean suspects that teacher motivation is probably "an important part of teacher development" (Dean, 1991, p.16). In addition, the process of professional development, according to Dean, is concerned most of the time with the change in the teacher activity (ibid., p. 15). This is usually backed up by the change in attitude and the way of thinking. That is why Dean describes the process as 'complex' (ibid.). Change will always occur in a professional development environment conducive to learning transfer (Bellanca, 1995, p. 50). Teachers, however, have their own values, attitudes and assumptions and do not accept change easily. Christopher Day (1986) notes three areas of constraints which affect the way teachers respond to professional development:

- 1. external factors affecting the climate in which professional development may flourish;
- 2. social and psychological factors affecting the response of teachers; and
- 3. the kinds of leadership roles and strategies used by the leader.

For any change there will usually be resistance to change. In the UK, some teachers are reported to adopt the following manner in order to avoid the challenge arising from the change. They may:

- 1. adopt the language of change but retain the old behaviour;
- 2. become selectively inattentive to information that points to problems;
- 3. change jobs or change roles within the same institution;
- 4. make marginal changes to behaviour; and
- 5. use authority to be avoided (Dean, 1991, p. 37).

The introduction of ICT represents a dramatic change to schools, which has great impact on teachers and students. Due to the existing system and structure, the momentum of the teachers in Hong Kong in managing change is found to be weak in comparison with their counterparts in the nearby countries or districts. With support from the largest teachers' union, the Professional Teachers Union, and some Legislative councillors, the opposing forces from the teachers and the politicians of Hong Kong against educational changes are believed to be one of the greatest in the world.

2.5.2 Changing Roles of Teachers

As the availability of home computers increases, there is an important implication for the changing role of teachers in the USA, enabling teachers to do things that human beings do better than a computer (Dean, 1991, p. 2). In view of this change in the learning mode of students, the role of teachers may also need to change accordingly. Teachers in this case must develop and master those skills which are not easily replaced by any electronic devices (Dean, 1991, p. 3), such as social skills, learning motivation technique, counselling skills, and even production of computer software or evaluating and assessment technique.
Faced with numerous education reforms (the National Curriculum suggested by Dean, 1991, p. 3), teachers all over the world will have to undergo stress for accountability and promotion. There is also pressure from competition of students and better academic results. It creates a greater concern about professional development for teachers in the recent decade, especially for their changing roles and teaching new technologies. Nowadays, there is general agreement among teachers and teacher educators that information and communication technology has become so important that it is necessary for teachers to know how to use it effectively in their teaching (Amiri, 2000, p. 77).

In a study on the attitude of staff in the use of ICT, teachers were found to be under stress which comes from changes imposed outside. The use of ICT in schools belongs to one of them (Bowles, 1999, p. 3). What is needed is both the initial training for those just beginning to use technology and continuing professional development for the serving teachers (Web Commission, 2001). Professional development in ICT in education means not only just building basic technology skills but also developing vision for understanding the technology as a tool to offer solutions to longstanding teaching and learning problems (Web Commission, 2001).

While schools are using ICT in teaching and enabling individual students to learn from a virtually unlimited source of information, the role of teachers in this kind of learning mode is more than a facilitator (Liu, 1999, p. 21). Teachers may find themselves in more of a supportive role by helping students to explore and extract information from computer-related means (ibid., p. 9) Though there are more and more voices for using more ICT in teaching and learning, yet there are not many suggestions found for using ICT teaching in arts or humanities subjects (Leung, 1998, p. 78). This means that education in the future will need a highly skilled teaching profession emphasizing quality but not quantity.

2.6 CONCLUDING REMARKS

This topic of researching the perception of secondary school teachers and IT co-ordinators about the evaluation of the teacher training course in ICT has covered quite a lot of related literature. Here the term 'professional development' has been considered and reviewed for its meaning and definition. Various historical data on different training modes were presented. The most important data for the later chapters to refer to is the information and practice and how to evaluate certain curriculum for teacher training in ICT.

The parts of the definition (Section 2.1.1) and the purpose of the professional development (Section 2.1.2.1) shed some light on the construction of the 'Concept on Professional Development' of the questionnaire (Section C). The content of the ICT in-service teacher training courses under the provision of Hong Kong's IT in Education initiative has shaped the design of 'Evaluation of the Teacher Training Courses' of the same questionnaire (the four questions in Section B). Further details of all these including the design and implementation will be discussed in the following chapter.

CHAPTER 3 METHODOLOGY

3.1 INTRODUCTION

The purpose of this study is to evaluate Hong Kong's ICT in-service teacher training under the provision of the 'Five-Year Strategy' (EMB, 1998) through an analysis of the views of teachers and IT co-ordinators. Evaluation is based on the model of 'Concept-Provision-Outcome' set up in Chapter 1 (Section 1.5.2.1, p. 18). The focus will be on both content and form of the new ICT in-service teacher training courses. Information about the training courses at different levels of competency will be obtained from the views of teachers and the IT co-ordinators (or IT team leaders) who have experienced the relevant training. All of them were asked to comment on all levels of the courses they had attended. The levels of competency for the teacher training courses include basic level (BIT), intermediate level (IIT), upper intermediate level (UIT) and advanced level (AIT) of IT competency. The schools taking part in the research were all secondary schools belonging to the same sponsoring body while the IT in Education initiative required teachers of all primary and secondary schools in the public sector in Hong Kong to participate.

This chapter of methodology consists of seven other sections:

- **Research design** contains the design of this study with a justification of the methods and research tools used;
- Schools in the survey describes how the target schools were chosen with

reference to the reasons and rationales according to the need and nature of the actual study;

- Research Instruments consists of two parts: the first part, Questionnaires, explains how the questionnaire was constructed and reports on the procedure of carrying out the survey; and the second part, Interviewing, clarifies why semi-structured interviews were employed and describes the design of the interview schedule;
- Ethical Issues briefly expresses the stand-point of ethical consideration during the course of the research study;
- Data Collection reports on the details of the process from pilot to the main study;
- Data Analysis reports on the date and the procedures of analyzing the data obtained from the questionnaire and interviews; and

• Conclusion

3.2 RESEARCH DESIGN

This section discusses the choice of research approach used for this study and the research tools and instruments employed for data collection and data analysis respectively.

3.2.1 Choice of Research Approach

Research design, according to Babbie (1989), refers to the designing of a

strategy to find out something (p. 79). It can also be described as the 'structure' of research with its function being to 'glue' all the major parts of the research project - the samples, measures, treatments and methods - to try to address the central research auestions (Trochim, 2000, http://trochim.human.cornell.edu/kb/desintro.htm). Babbie proposed two major aspects of research design. First, the researcher must specify precisely what he wants to find out. Second, he must determine the best way to do that (Babbie, 1989, p. 79). Each and every research design represents some kind of compromise (Johnson, 1994, p. 69). Different types of designs represent different ways of conceptualization (Howard, 1985, p. 56). Research design, according to de Vaus, is affected by the research topic, the technique of data collection, and the experience and personality of the researcher (de Vaus, 1986, p. 9).

Johnson uses the term research approach rather than research design. Among the five research approaches suggested by Johnson (1994), namely the survey approach, case study approach, document research, experimental approach and non-reactive approach, the survey approach was considered to be the most suitable way to elicit 'equivalent information' from a population (a group of over 400 teachers in this case) for this scale of research study (Johnson, 1994, p.13). Survey has the characteristics of gathering data at a particular point in time with the intentions of describing the nature of existing conditions, or for comparison (Cohen and Manion, 1994, p. 83). However, the use of the survey approach, according to Cohen and Manion, is greatly affected by the purpose of enquiry, the population upon which the survey is focused and the resources available (ibid., pp. 85-6).

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3.2.1.1 Purpose of Inquiry

The purpose of the survey was to evaluate teachers' in-service training under the provision of Hong Kong's IT in Education initiative. For this to be successful, it was necessary to get the response from a group of teachers who had participated in different levels of training and who were members of different schools in the sponsoring body. In this case, a fairly large number of teachers were required as subjects of study. A survey research was therefore chosen. On the other hand, approaches other than surveying were not considered appropriate as they suffer from either too heavily relying on the 'skill and industry' of individual researchers (Johnson, 1994, p. 23) or uneven accessibility of the phenomenon studied making the research "led by the data" (ibid.).

3.2.1.2 Population Focus

The population upon which the survey is focussed is the teachers in 15 schools. These schools are all secondary schools belonging to the same sponsoring body. They provide both the junior and senior secondary school curriculum to students between 12 and 19 and prepare them for the two public examinations at completion of the fifth and seventh form. Although case study might have been an appropriate research design to study the sponsoring body, the focus of the research was the teacher population in these schools and therefore the survey was seen as more appropriate. However, it was recognized that the findings of the survey would only be applicable to schools beyond these 15 schools if the teachers in the sample reflected the characteristics of teachers in all secondary

schools.

3.2.1.3 Resources Available

As a single-handed investigator, it was not possible for the researcher, with limited time and resources, to carry out research of a similar scale if the data collection method was too labour-intensive or time-intensive. For this reason it was decided that the survey approach, focussing on a carefully chosen sample would be the best method.

The survey method was planned to contain two parts: questionnaires and follow-up interviews. In the first instance the questionnaire survey seeks the views of a large number of people while in the second instance the researcher would interview a small number of people from the original group to follow up issues in greater depth.

3.2.2 Data Collection Methods

There are many data collection methods that could have been used within the framework of a survey design to address the six specific research questions outlined in Chapter 1 (Section 1.5.2.1, p. 18-9) such as questionnaires, interviewing, carrying out observations, using records and documents, and commissioning diaries to collect data from an identified population. In consideration of the nature of the present study, it was decided that a questionnaire,

to be administered to the teachers and IT co-ordinators, would be the major research method for data collection. However, some of the questions posed might require further probing, therefore it was decided to do a small number of follow up interviews to elicit more qualitative data from the target subjects for supplementary purpose.

3.2.2.1 Using Questionnaires in This Study

The main instrument used in the survey was a postal questionnaire. It was designed to find out the perceptions of teachers and IT co-ordinators regarding (i) their evaluation of the Hong Kong's ICT in-service teacher training courses under the provision of the policy of IT in Education; (ii) their views on the policy of teachers training under the provision of the 'Five-Year Strategy' and (iii) their understanding of the theory and practices of teacher professional development.

Making use of questionnaires is a very common form of evaluation for teacher training courses (Dean, 1991, p. 186). Cohen and Manion felt that the questionnaire especially the postal questionnaire is the best form of survey for educational enquiry (Cohen and Manion, 1994, p. 94). The postal questionnaire was chosen as the main research tool in the current project because it was a method of reaching a comparatively large population at the same time; it enabled the respondents to complete and return the questionnaire at a time convenient to themselves (Johnson, 1994, p. 37); and it has been shown to have good overall reliability (Cohen and Manion, 1994, p. 272).

Some questionnaire surveys may use highly structured questions. For the researchers, a set of completely structured questions has the advantage of obtaining answers covering all the aspects of the research that the researcher has identified as important. Structured questionnaires with pre-coded answers also have the advantage of being easily analyzed. For these reasons, pre-coded questions were used in this survey.

Despite the many advantages of highly structured postal questionnaires, the researcher was aware of their limitations and took precautions to minimize these. It is difficult to construct questions that are short and easy to answer and appeal to those answering the questionnaire and these questions could result in superficial answers. If the questions are pre-coded and the respondent is given a number of options to tick, there is a danger that the options are too confined and do not contain the answers that the respondents would choose. This leads to missing important ideas from respondents, simply because the researcher has failed to think of them during the design of questionnaire. This problem can only be minimized by careful questionnaire design, which ideally involves the members of the target population in the design process. The problem can also be reduced through careful piloting of the questionnaire. Ideally a questionnaire survey needs more than one pilot study to improve its quality and fine-tune the eventual main study questionnaire (Johnson, 1994, pp. 39-40). Other problems include non-response and the difficulties of chasing down unreturned questionnaires. There is also the problem of receiving a high percentage of invalid scripts even with clear instructions.

Despite these limitations, the researcher felt that the effective use of the

questionnaire survey could lead to accurate results and reflect the respondents' authentic feelings. The researcher took account of the following essential requirements in order to make the questionnaire as effective as possible:

1. being clear and comprehensive;

- 2. getting to the appropriate respondents;
- 3. motivating respondents to complete and return the questionnaires and
- 4. making effective administrative arrangements for the returns (Johnson, 1994, p. 38).

It is not easy to achieve the above standards and therefore no questionnaire is perfectly effective. Two other measures were taken in order to increase the effectiveness of the survey. First, a pilot study was conducted in order to improve the quality of the questionnaire (Johnson, 1994, p. 43). Second, to overcome the disadvantage that the information supplied may be too superficial, the data collection process was supplemented by another research tool for triangulation. Interviews were conducted with targeted respondents who, because of their position or standing, were able to further explain or elaborate the issues.

3.2.2.2 Using Semi-structured Interviews in This Study

The decision to conduct interviews was made because some detailed issues might not be uncovered by using large scale surveying or they might sometimes be too personal to answer on a piece of paper. For this step of interviewing, respondents were chosen in order to make clear some issues which might need further probing and elaboration. These respondents could also be followed up for the questions which had very low response rates. Since questionnaire surveying suffers from the drawback of being too simple and insufficient to gather all the necessary information, qualitative research tools such as interviewing are often employed for supplementation. Semi-structured interviews, in this case, were chosen because this type of interview has the advantages of allowing the interviewer to probe the responses and get more information than is possible with a structured questionnaire. The word 'semi' provides much convenience and flexibility to interviewers who, on the one hand attempt to elicit the relevant information conducive to the study, and on the other hand must develop topics for discussions. This type of research tool could also avoid making the atmosphere too formal by adding pressure to the respondents. For this part of study, an interview schedule had to be developed for the semi-structured interview, but this is best done after a preliminary analysis of the questionnaires.

The research interview can be defined as a conversation between two persons for the specific purpose of obtaining research-relevant information (Cohen and Manion, 1994, p. 271). Lang and Heiss (1991) just put it as "the collection of data through direct verbal interaction between individuals" (p. 113). There are three types of interviews namely, structured interview, semi-structured interview and unstructured interview with each of them having different points of application and being used in different situations. In order to understand which type of interview is preferred, both advantages and disadvantages of using interviews are considered. The advantage of the interview, particularly the semi-structured interview, which places less emphasis on a more formal approach (Johnson, 1994, p. 45) is its flexibility to deviate from the set pattern of questions thus enabling the researcher to probe areas of interest or vagueness (Lang and Heiss, 1991, p. 114). Secondly, the context of the interview will be rich as the interviewer can decrease the number of 'no answers' or 'I don't know' when the interviewee is instructed to probe the answers (Babbie, 1989, p. 244). Thirdly, the interviewers can obtain more relevant responses by clarifying misunderstanding and guarding against confusing questions when the interviewee does not understand (ibid.). There are also other advantages in using interviews, such as providing greater communication between the interviewer and the respondent, and, attaining higher response rates than other types of data collecting tools in research. Lastly, it is possible for the interviewer to both observe the respondent's body language and ask questions at the same time.

Lang and Heiss have identified a number of drawbacks in using interviews (Lang and Heiss, 1991, p. 114), but most of these did not apply to the use of interviews in this research. The cost of the interview in terms of time and money can be a drawback, but the number of interviews conducted in this study was small. The problem of determining the worthiness of the information and the truthfulness of that information was less of a problem because the interviewer was following up matters already reported in the questionnaire and seeking further clarification of these. Similarly, the problem of the interviewer's bias and subjectivity was reduced because he was working to an agenda set by answers that the respondents had already given.

Other disadvantages include the fact that the presence of the interviewer may affect respondents' perceptions of a question (Babbie, 1989, p. 245) and that different interviewers could obtain different responses depending on the nature of their probing and the degree to which the questions are structured or open.

In order to minimize part of the above disadvantages, the following precautions were taken by both research and interviewer that:

- 1. the objectives of the interview were clearly defined beforehand;
- 2. the interviewer made sure that he was aware of good interviewing practice and was clear about the ethics of interviewing; and
- optimum time for the interview was given (Lang and Heiss, 1991, p. 114).

Lang and Heiss, advised two more precautions which were not followed in this study as the number of interviewees was less than 10 people that:

- 4. responses should be recorded on an interview schedule which was constructed, tested and revised prior to the interview; and
- the reliability of the interview content should be tested through piloting.
 (ibid.)

3.3 THE SCHOOLS IN THE SURVEY

There are more than 490 secondary schools in Hong Kong SAR. These include government and aided schools, which both belong to the public sector and are 100% financially subsidized by the government of Hong Kong. The survey was carried out among the teachers in aided secondary schools under the

governance of the same sponsoring body. Po Leung Kuk is regarded as one of the largest sponsoring bodies in Hong Kong, amongst others which include the Catholic Church, the Anglican Church, the Tung Wah Group Hospitals and the Buddhist Association. Po Leung Kuk, which means society for the protection of women and girls, has been one of the most important charitable organizations in Hong Kong since 1984. The Kuk has received government support to help orphans and underprivileged children, and to run schools. It is now governing two sixth form secondary schools, 15 secondary schools, 26 primary schools, 23 kindergartens and six special schools (<u>www.poleungkuk.org.hk/services_edu/</u>).

The reason for restricting the survey to Po Leung Kuk schools was because of the shortage of time and resources of the single-handed researcher. Another reason was that the researcher was acquainted with the principals of these schools and was confident that the questionnaire's return rate would be high and that teachers would be more willing to be interviewed.

It seemed likely that schools belonging to the same sponsoring body would bear the same mission and vision for they are managed under the same educational affairs office of a charitable organization. For this reason the schools can be treated as the survey population rather than as a sample. This means that the schools are not assumed to be representative of other schools in Hong Kong.

Permission was sought to conduct the research in all 15 Po Leung Kuk secondary schools. Unfortunately 6 schools were unable to participate in the research for a variety of reasons. However, the teachers and IT co-ordinators in the other nine schools that agreed to participate in the survey which numbered more than 400 recipients. It was decided that this was an appropriate number of respondents for the research to go ahead.

3.3.1 The Representativeness of the Survey Population

An initial concern was that the representativeness of the survey would be impaired because six schools refused to participate. The nine schools that agreed to participate in the survey were spread throughout the 18 administrative districts of Hong Kong (Figure 4) and contained students with a wide variety of intake bandings and academic abilities. Further, these schools shared a commonalty or consensus in value judgment with other schools in the sponsoring body. It was also possible to compare the characteristics of the schools in the survey with all schools within the same sponsoring body and show that the demographic characteristics of these schools were similar to those of the population, thus increasing confidence that the findings for the nine were representative of all schools in the sponsoring body.

All Po Leung Kuk schools showed differences in relation to location, banding and being pilot schools but the nine schools in the survey were not markedly different to the six non response schools.

3.3.1.1 Location

The schools in the survey were scattered all over the territory in both urban

and rural areas in seven districts among the 18 administrative regions in Hong Kong SAR while the other six schools were distributed evenly in five districts (Figure 4). There were, however, 7 regions whose schools were not touched by the survey.

Administrative Districts	Sampled Schools	Non Response Schools
Eastern		
Wan Chai		
Central and Western		
Southern	•	
Islands		●
Sai Kung		●
Kwun Tong		
Wong Tai Sin		• •
Yau Tsim Mong	•	
Kowloon City		
Sham Shui Po		•
Kwai Tsing	•	
Tsuen Wan	•	•
Tuen Mun	• •	
Yuen Long		
North	•	
Tai Po		
Sha Tin	••	

Figure 4. The regional distribution of all 15 Po Leung Kuk secondary schools in Hong Kong

3.3.1.2 Bandings

Among the nine schools in the survey, three were taking a majority of 'band one' students (the top 33% of primary leavers) in the allocation system of Secondary School Places Allocation in Hong Kong, three were taking a majority of 'band two' students which are in middle stream and the other three were taking mostly 'band three' students who are often called academically low achievers. Consequently, the sampled schools represent the whole range of secondary form one (S.1) intake bandings in secondary schools in Hong Kong SAR. On the other hand, the same source of data also shows that the other six secondary schools of the same sponsoring body also consist of schools of different bandings. Among them, there is one school accepting all or 90% 'band one' students; two schools taking mainly 'band two' students and three schools accepting a majority of academically low achievers which are classified as 'band three' students. It can be therefore concluded that the six non response schools are equally representative of whole range of S.1 intake bandings and are not different from the other nine schools.

3.3.1.3 IT Resources from Government

According to the 'Five-Year Strategy', an IT pilot scheme was carried out to look for best ICT practices and strategies for schools in Hong Kong. Under this scheme, 10 primary schools and 10 secondary schools were selected as pilot schools which were more advanced in terms of ICT readiness. These schools received an extra and enhanced level of hardware provision and personnel support at the kick-out of the Project of IT in Education in 1998 (EMB, 1998, p. 24). Within the survey schools, there was only one school selected to be an IT pilot school in which the government has invested over HK\$10 million (approximately £0.7 million) in IT infrastructure, networking, peripheral and software in order to develop them to be model schools. The rest of the sampled schools and the six non response schools were all non-pilot schools with standard IT equipment.

Regarding the above three features, there were no obvious differences between the nine secondary schools in the sample and the six non-response schools. In addition, according to the data of these 15 schools taken from the website of the Education and Manpower Bureau of Hong Kong SAR Government, the number of and the age range of their students, the courses provided, the gender of principals and the number of teachers of the nine chosen schools were not too much different from their six counterparts (http://schooldossier.ed.gov.hk/htm/memarea/htm/sch_search/htm/ss_search.asp). It can, therefore, be confirmed that the nine schools chosen as subject for study are not different from the 15 secondary schools significantly as the data of the former is more or less the same as their counterparts (Table 5).

The present author would like to use these data to represent the views of school teachers from the same sponsoring body about Hong Kong's ICT in-service teacher training courses under the policy of IT in Education. Teachers of other schools may learn from these findings and examine the issues emerging from this research within their own context to see whether they are relevant to their schools or not. The researcher, again, has no intention to generalize the findings to all the secondary schools in Hong Kong.

Types of	School	Sex	Class	No. of	No. of	Courses offered	Gender of
Schools	Name	Туре	Structure	Students	Teachers	CA M NO DOK OF DA	Principal
pola	School 1	Co-ed	3-3-3-2-2	520	28	C E M Sci CH Comp EPA Geog PE Mus A&D SoSt Phy Chem Bio AM IT	F
	School 2	Co-ed	6-6-6-4-4-2- 2	1144	60	C E M Sci CH EPA Geog Hist PE Puton Art Mus Comp HE D&T A&D Eco AM Phy	F
	School 3	Co-ed	S.6: 12 S.7: 12	731	52	Chem Bio C E M Eco Hist CH Comp Phy Chem Bio CL EL Geog PA BS Psyc	M
	School	Coren	1333	480		Sports&Recreation	1. 1. 1. 1.
l Schools	School 4	Co-ed	5-5-4-4-5-2- 2	1068	51	C E M CH Puton Sci CivEd Hist Geog D&T Comp Art HE Mus PE AM Eco Phy Chem Bio PA A&D	М
Sampleo	School 5	Co-ed	4-4-4-4-2- 2	950	49	C E M Sci Geog CH Hist CIT Mus PE CivEd StSk Art Puton CL AM PA Eco	М
The Nine	School 6	Co-ed	4-4-4-5-5-2- 2	995	48	C E M Sc CH Comp Mus PE Puton SoSt AM Phy Chem Bio Geog Hist Eco	M
L	School 7	Co-ed	5-5-5-5-2- 2	1130	57	C E M CH Puton CivEd Sci Phy Chem Bio Hist Geog Comp Art HE Mus PE D&T AM Eco PA Comm	М
	School 8	Co-ed	5-5-5-4-4-2- 2	1040	54	C E M Sci CH Art Mus PE HE Comp Puton SoSt LfEd CL AM PA Phy Chem Bio Geog Eco	М
, Sender men	School 9	Co-ed	5-5-5-4-4-1- 1	876	62	C E M Sci Comp PE Puton Art CM BF TF DF E&E GC BK WP Comm T&T IT ES PA AM Eco	М

|--|

	School	Co-ed	5-5-5-5-2-	1204	54	C E M CH Puton Sci Phy	М
	10		2			Chem Bio Geog EPA Eco	
						Comp Art HE Mus PE D&T	
	School	Co-ed	5-5-5-5-2-	1143	58	C E M Sci Geog CH EPA	F
	11		2			Comp PE HE D&T Art Puton	
S						Lib Mus TD AM Phy Chem	
00						Bio Eco WP Typing	
Sch	School	Co-ed	4-3-3-2-2	523	29	C E M Puton Sci Comp SoSt	F
e e	12					CH Mus PE HE D&T Art Phy	
suo						Chem Bio Geog Eco	
ods	School	Co-ed	5-6-5-4-4-1-	950	63	C E M Sci Comp GC TF BF	М
Re	13		1			HE A&D Puton CH Geog PE	
on						Mus AM IT TS ES E&E Phy	
N						Chem PA	
Six	School	Co-ed	4-5-5-2	480	25	C E M Sci SoSt MorEd Mus	М
he	14					PE Puton Comp Art	
T						CateringServices	
						Fashion&Garment	
						HomeDesign	
	School	Co-ed	5-7	473	28	C E M CH Sci Putong Hist	М
	15					Geog Mus PE Art Comp	
						CivEd LfEd	
	and the state of the				the second s		

(Source: http://schooldossier.ed.gov.hk/htm/memarea/htm/sch_search/htm/ss_search.asp)

Subjects Key: C-Chinese Language E-English Language M-Mathematics Sci-Science
 Puton-Putonghua CH-Chinese History Hist-History Comp-Computer Studies
 Geog-Geography EPA-Economics and Public Affairs Mus-Music
 SoSt-Social Studies PE-Physical Exercise CL-Chinese Literature
 EL-English Literature Eco-Economics AM-Additional/Applied Mathematics
 HE-Home Economics PA-Principles of Account IT-Information Technology
 CIT-Communication and Information Technology Phy-Physics Chem-Chemistry
 Bio-Biology D&T-Design and Technology BF-Business Fundamental DF-Design
 Fundamental TF-Technology Fundamental E&E-Electrical and Electronic
 Lifed-Life Education CivEd-Civic Education MorEd-Moral Education
 GC-Graphic Communication BK-BookKeeping WP-Word Processing
 Comm-Commerce T&T-Tourist and Tourism ES-Engineering Science
 StSk-Study Skills Lib-Library Lesson Psyc-Psychology

Gender code: M-male F-female

Level code: S.1-S.2-S.3-S.4-S.5-S.6-S.7

3.4 RESEARCH INSTRUMENTS

Two instruments were devised: a questionnaire and an interview schedule. The questionnaire was designed for the teachers and IT co-ordinators for their perception of teachers' professional development and their evaluation of Hong Kong's ICT in-service teacher training courses and her new IT policy in education. The interview schedule was designed following the analysis of the questionnaires (data found in Chapter 4) and would focus on the issues whose responses in the questionnaire needed further probing and elaboration.

The difference in focus between the questionnaire and the interview was in the level of hierarchy. The questions for the semi-structured interview were designed at the school level while those in the questionnaires concentrated more on the individual level. Interviewing teachers, IT co-ordinators and IT team leaders enabled the researcher to gain a more holistic view of the present situation because of their close and frequent contact with many other teachers in the front-line.

3.4.1 Designing and Constructing the Questionnaire

The design of the questionnaire was based mainly on the course outline and content of the teacher training courses in the four levels of IT competency, namely basic, intermediate, upper intermediate and advanced. The information of course outline for the first three levels was extracted from a report for teacher training in IT in Education in 1998 (Au *et al.*, 1999, pp. 126-7) and the criteria of course appropriateness and course evaluation of Halbach (1999) and William (2000) (referring to Section 2.4.1 on p. 74 and Section 2.4.2 on p. 78 respectively). However, the last level, AIT, was taken from a training circular memorandum in 2001 (No. 87/2001) issued to fulfill the aim set out in the official paper of IT in Education (Director of Education, 2001). The questionnaire was drafted with reference to both the objectives and research questions of this study (referring to Section 1.5.2 of Chapter 1, p. 17). The content was fine-tuned with the input from the official documents for the course requirements of Hong Kong's ICT in-service teacher training.

The questionnaire was designed to find out from teachers and IT co-ordinators the:

- highest qualification in ICT formal training
- highest level of IT competency
- personal views on the content of different levels of IT competency
- views on the methods of delivery of different levels of IT competency
- understanding and mastery of the course materials of the training courses
- perceptions of the relevance of the training courses to their own teaching
- evaluation of the trainers and tutors of the courses of different providers
- views on the assignments or the requirements for each level of IT competency
- views about the contribution of ICT to effective teaching and student learning:

3.4.1.1 Section A on Personal Data

The questionnaire was divided into three main sections. Section A asked for information about gender, age, working experience, current post, qualifications and level(s) of ICT competency achieved. It also asked respondents, as shown in Question No. 8, to evaluate a list of seven items in terms of what they had expected from Hong Kong's ICT in-service teacher training before the training course was commenced. The idea of these items was taken from a questionnaire survey among a group of secondary school teachers on their attitude toward the computer (Leung, 1998, p. 46). Some of the questions were adopted and others were generated from the researcher's past experience as a school teacher.

The original design of Question No. 8 in the questionnaire was anticipated that respondents would complete the answers of their expectations and feelings in advance of attendance of the teacher training course. The data yielded from it (shown in Section 4.6.1 in p. 203), however, could not be taken to represent pre-course expectation due to the difficulty of making the respondents recall their authentic feelings in advance of the training course.

3.4.1.2 Section B on Course Evaluation

Section B, which could be regarded as the central body of the questionnaire, asked respondents to evaluate the ICT training courses that they had attended and say what they had learned from the course. Questions 9, 10, 11 & 12 each dealt

with a different level of IT competency, from basic (BIT) to advanced (AIT) but contained the same set of items with which the respondent could agree or disagree according to a 5-point Likert scale from 'Does not at all reflect what went on' (1 point) to 'Is a totally accurate reflection of what went on' (5 points). The idea of this design was taken from Nunan's (1996) checklist for evaluating classroom work as a means for professional self-development. Some of the questions on evaluation of courses in the questionnaire to the teachers were taken directly from his classroom observation checklist (Nunan, 1996, pp. 147-8).

These items, which are displayed in Figure 5 as an example in evaluating the BIT course, include the course materials, instructional approach, methods of delivery, presentation tools and feedback or response from instructors. Some of the items were directed to the curriculum including its design and content, some to the pedagogy covering both the mode of delivery and tutors' efficacies while others were directed to the learning effectiveness and immediate learning outcomes of those training courses.

a.	The teaching schedule of the course was carefully designed.		
b.	All instructions given by trainers or tutors were clear.		
C.	The curriculum content was appropriate for the level of BIT.		
d.	The technical content was useful in equipping learners in ICT.		
e.	The skills offered were beneficial to future classroom teaching.		
f.	Use of media was appropriate in amount.		
g.	The course provided sufficient hands-on practical elements.		
h.	Trainers and tutors provided sufficient on-the-spot help.		
i.	Choices of methods of delivery were appropriate in the course.		
j.	The course provided opportunities for learners to share ideas.		
k.	Trainers' or tutors' feedback on questions was appropriate.		
I.	Requirements for passing this level were easy to meet.		
	After the course		
m.	I knew how to perform simple windows-based operations		
n.	I knew how to receive and send e-mail.		
0.	I knew how to search and browse in the internet.		
			r-

- p. I could recognize the ethics of using computers.
- q. 18 hours were enough to achieve all the course objectives above.

Figure 5. Sample questions of evaluating the training course in the basic level of IT competency

After they had evaluated the checklist, respondents were asked to give the year in which they had completed the course and which organization provided the course. They were also asked to name their preferred course provider and say what else they would like to have added into the curriculum of the course(s) they attended.

Issues concerning both policy level and school level were considered in the 'Post-course evaluation' (Question No. 13). Respondents were asked whether they had applied the knowledge to their teaching environment and whether they had

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enough confidence to integrate IT into their subjects. Here the beliefs and confidence of the teachers, which also included the belief of making teaching and learning better through the uses of ICT, were drawn to their attention. In the policy level, questions were directed to the respondents' agreement with the training policy of the IT in Education.

3.4.1.3 Section C on Concept of Professional Development

Section C of the questionnaire was about respondents' views on professional development. They were asked to comment on three aspects of this. First, they were asked if they agreed with a number of possible meanings of the term 'professional development'. These 12 items were adopted from the interview data drawn from a group of teachers in a survey done for an assignment of Human Resources Management in the Doctorate of Education programme (Fung, 2000, p. 15). Most of them were in layman's terms as they were recorded as the first-hand information from the teachers (Question No. 14). Second, the respondents were asked about the aims of professional development from the views of the teachers in their own school. These items were drawn from various literature on professional development or staff development (Too, 1987 p. 11, Kirk, 1988, pp. 16 & 45 and Hoyle, 1982, p. 164, on upgrading knowledge and skills of teaching; Williams, 1982, Conners, 1991 and Bellanca, 1995, on organizational growth; Griffin, 1983 p. 2, Hoyle, 1982, p. 164, Huges, 1991, p. 54, Kirk, 1988, p. 16 and Cawood and Gibbon, 1981 on individual or personal growth). Respondents were allowed to have more than one choice (Question No. 15). Lastly in this section, the respondents were asked about different modes of staff development activities they

had experienced. They were asked to write down 'Yes' or 'No' beside the mode of professional learning in the 'experience' column and 'enjoyment' column to indicate their experience and enjoyment. They were also invited to rank those activities in the 'effectiveness' column according to their importance.

The idea of evaluating different modes of professional learning based on experience, enjoyment and effectiveness was adopted from Craft's model of evaluating professional development and in-service provision (Craft, 1996, p. 7). The different modes of professional learning listed in this part of the questionnaire can be found in Figure 6. These activities were taken from literature about professional development or in-service teacher training (Question No. 16). This part also fulfilled the function of finding out the most common mode of activities in the staff development programme and the teachers' favourite mode of professional learning.

- a. Listening to a seminar or panel discussion
- b. Participating in a workshop
- c. Making visits and excursions
- d. Attending short term courses
- e. Attending a meeting about a subject specialism
- f. Participating in a group discussion
- g. Engaging in professional reading
- h. Conducting library searching
- i. Pursuing a higher degree

Figure 6. List of different modes of professional learning for the teachers

At the end of the questionnaire, all respondents were invited, on an optional basis, to an informal interview to share their feeling on the overall ICT teacher training programme under the provision of IT in Education.

The whole questionnaire was expected to be completed within 15 minutes and was self-administered. The completed questionnaires were to be returned to the researcher by post and a stamped envelope was provided.

3.4.2 Designing of Interview Schedule

An interviewing schedule was constructed after the preliminary analysis of the questionnaire so that more detailed and complicated answers could be sorted out through face-to-face interviews.

The interview questions were designed to follow up issues that had emerged from an analysis of responses to the questionnaire. (1) They were designed to focus on those items receiving very low individual response rates. Examples of the low responding issues included questions like 'What else would you like to add into the curriculum of BIT/IIT/UIT/AIT?' (Question No. 9u, 10s, 11u and 12t) and 'Please provide additional comments on the IT courses as AIT, UIT, IIT and BIT' (Question No. 13h). (2) The preliminary analysis of the questionnaire showed that issues requiring more elaboration were the teachers' opinions on the policy and implementation of IT in Education (Question No. 13d to 13g). In order to get a more complete picture of the effect of the Hong Kong's ICT teacher training, more details of changes in the role of teachers as a result of the training as well as their use of ICT in teaching were badly needed. (3) There were also other questions that occurred to the researcher subsequently which had not been mentioned in the questionnaire such as the training needs and the role of IT co-ordinators.

The following issues were included in the design of the interview schedule. The reason for putting them in the interview schedule is in brackets:

- the recent IT policy in education, especially the part of 'Teacher Enablement' (low individual response rate in the comment of the training courses and further elaboration to Question 13f and 13d);
- whether the Hong Kong's ICT in-service teacher training courses were useful to teaching and students' learning (further elaboration to Question 13b and 13c);
- whether the increase in the use of computer or ICT facilities among teachers was due to the Hong Kong's ICT in-service teacher training they received (further elaboration to Question 13e);
- any changes in curriculum design and teaching methods observed by the teachers after they completed the courses (further elaboration to Question 13a);
- whether the IT co-ordinator played his role of promoting IT in Education through helping teachers (new and useful information); and
- the training need of the IT co-ordinators (new and useful information).

3.4.3 Instrument for Data Analysis

One important point in the design of data analysis is how to organize and summarize a set of data in order to draw conclusions about the study. These objectives can be accomplished through the use of a software called Statistical package for the social sciences (SPSS). This can be done even in an ordinary computer bundled with Windows platform. SPSS is an application software specifically designed for data and image analysis, statistics, graphing, electrophysiology, enzyme kinetics, and a variety of other scientific needs as well as social science subjects (http://www.spssscience.com). The basic analytical techniques needed in this study would be descriptive and correlation statistics. Descriptive statistics deal with the means, mode and median of the data while correlation statistics deal with the relationship between two or more groups.

3.5 ETHICAL ISSUES

The data collecting process of this study adopted the ethical guidelines from AERA, the largest professional associations, among other research organizations such as APA or BERA, in the field of education. In a nutshell, researchers carrying out their investigation must concern themselves about ethical issues by respecting and showing concern for the dignity and welfare of their research participants (Howard, 1985, p. 226).

This was achieved by making sure that respondents understood what was involved in participating (informed consent), by making it clear that participation was voluntary, by making sure that no false information was given to participants, and by making sure that all participants were anonymous.

3.6 DATA COLLECTION

The process of data collection started with the pilot study and then extended to the data collected from the teachers and IT co-ordinators in the main study until the completion of the interviews of the chosen respondents. The invitation to target schools to participate in the main study was carried out while the pilot study was being conducted. The questionnaire was amended and updated by referring to the supervisor's comments. Of course, opinions from the teachers and IT co-ordinators in the pilot study were considered too as they were going to be the end-users. A main study was then carried out on the teachers of the nine chosen schools as soon as the final draft of the questionnaire was approved. A time-table of the actual data collection of this research study, showing the chronological order of the return of all the questionnaire scripts and time of interviews, was provided (Figure 7). With the help from the nine principals, the questionnaire survey was successfully accomplished in their schools within three months' time. Eight interviews were conducted with eight respondents within two months after that.

Date	Types of Data Collected	Remarks
Late Mar 2002	Reviews of the final draft of the Questionnaire from the first pilot school	Pilot Study I
Mid Apr 2002	Reviews of the revised Questionnaire from the second pilot school	Pilot Study II
Late Apr 2002	Comments on the Questionnaire from the principal of the second school	Main Study
Late Jun 2002	Return of Questionnaire scripts from the first school	of wate
Jul 2002	Return of Questionnaire scripts from the second school	
Jul 2002	Return of Questionnaire scripts from the third school	I no ling
Late Jul 2002	Return of Questionnaire scripts from the fourth school	to kanding -
Late Jul 2002	Return of Questionnaire scripts from the fifth school	Questionnaire
Early Sept 2002	Return of Questionnaire scripts from the sixth school	Survey
Sept 2002	Return of Questionnaire scripts from the seventh school	
Sept 2002	Return of Questionnaire scripts from the eighth school	p Rotter
Late Sept 2002	Return of Questionnaire scripts from the ninth school	epecific)
Late Dec 2002	Interviewing of the first interviewee	oung to
Late Dec 2002	Interviewing of the second interviewee	chitica
Late Dec 2002	Interviewing of the third interviewee	
Early Jan 2003	Interviewing of the fourth interviewee	Interviewing
Early Jan 2003	Interviewing of the fifth interviewee	
Early Jan 2003	Interviewing of the sixth interviewee	-
Mid Jan 2003	Interviewing of the seventh interviewee	-
Late Jan 2003	Interviewing of the eighth interviewee	-

Figure 7. A time-table showing the chronological order of the different data collection process

3.6.1 Pilot Study

After the questionnaire was discussed with the supervisor and amendments were made, a letter bearing the intention of the research study and 10 copies of questionnaire scripts of the first draft were sent to the principal of a secondary school by post in late March 2002 for a pilot study. Teachers of this school were invited to criticize on the design of the survey. Some of them commented on the design and diction of the questionnaire while others completed the questionnaire and commented on any difficulties. Adjustments to the questionnaire were made as a result of the feedback, which included the rephrasing of some questions (such as the use of unclear instructions and the asking of two questions in one item), clearing some ambiguities (some were quoted as a 'vague phrase' or not specific) and increasing the choices of answers to some questions (Table 6). However, the suggestions that the whole questionnaire was too long and too time-consuming to fill seemed to be quite beyond the researcher's limit to remedy. The only solution was to make the questionnaire more lively and easier to complete.

The amended questionnaire, after discussion again with the supervisor, was sent to another secondary school for a second pilot study in mid April 2002. This time, 28 scripts were sent by post to the principal for distribution, and 24 scripts were returned. Further minor amendments were made to the questionnaire.

The limited number of interviewees available for the study does not imply that there was no need to pilot the interview schedule. On the contrary, the problems encountered during the design of the interview schedule would never be less than that of the questionnaire. However, the piloting was not conducted in this instance because of lacking of time.

Response	Comments / Suggested amendment		
6. Professional training in ICT acquired	"Not clearly specified. You better		
□ No □ Yes	suggest some examples"		
13. Did you apply what you have learned in	"Very difficult to tell the reasons"		
the above IT competency courses to	"You should have an option of		
training?	'others' to choose in Question 13 to		
\Box Yes (How?) \Box No (why?)	17"		
19. (instruction part)	"Complicated!"		
SD – Strongly Disagree	"Use scale as Question 9 as		
D – Disagree	1 - Strongly Disagree		
N – Neutral / No opinion	2 – Disagree		
A – Agree	3 – Neutral / No opinion		
SA – Strongly Agree	4 – Agree		
	5 – Strongly Agree.		
	This is basic questionnaire		
	technique"		

Table 6. Some comments from pilot study on the first draft of the questionnaire

3.6.2 Invitation of Target Schools

In late January 2002, a letter was sent to the superintendent of the Educational Affairs of the charitable organization, Po Leung Kuk, seeking approval for carrying out the research study in the secondary schools under his purview. Unfortunately, he refused to offer help, and indicate this by responding with a letter (Appendix I with English translation). As it became apparent that this superintendent had no authority with the secondary school heads, phone calls

were made to ten principals who were expected to offer help to the researcher. Those principals, after giving a favourable response, were sent a set of sample questionnaire and instructions by fax for their scrutiny. Luckily, all except one principal was willing to offer assistance by encouraging their teachers to participate in the survey. One principal, after consulting with the senior management team, declined the invitation for the school to take part in the survey because of teachers' lack of time and because the questionnaire was long and time-consuming to complete (with his reply letter attached in Appendix II).

3.6.3 Main Study

The main study took place when the final draft of questionnaire was approved and the principals of the target schools were acknowledged. There were three stages: the initial data collection (questionnaire survey), analysis of the questionnaire and interviewing to collect supplementary data. Since there were too few interviews and the data collected were at a personal level, the supplementary data can only be used for further probing of meaning or to enhance the descriptions of the main findings.

3.6.3.1 Questionnaire Surveying

Between June and September, a suitable number of the final draft of the questionnaires (Appendix III) were sent by post to nine secondary schools of Po Leung Kuk together with a copy of a recommendation letter (Appendix IV) from the supervisor of this research project, and a cover letter (Appendix V) from the researcher to invite their teachers and IT co-ordinators to participate in a survey on the evaluation of the ICT teachers training scheme under the provision of Hong Kong's IT in Education initiative they had received so far. The questionnaire was self-administered and then returned by school using the stamped return envelope provided. Some principals preferred their teachers to fill in the questionnaires at home during the summer holidays while some allowed teacher to take time from the professional development day to complete it. Principals were kindly asked to return the questionnaire by mid September of 2002. One principal advised the present author that the end of the school term was not a good time to ask teachers to fill in any questionnaire to avoid competing with other higher degree candidates from local universities. He would prefer to receive the questionnaire scripts in early September and to return them in mid September to ensure a higher return rate.

During the data collection process, nine schools of the same governing body with more than 400 teachers were surveyed. Invalid cases were first taken out from the returned questionnaires with supporting reasons given. Tolerant cases were retained with full justifications (refer to Section 3.6.4.2 in p. 135).

3.6.4 Response Rate

At the end of September, all nine schools had returned all their questionnaire scripts after reminder calls were made to two schools with a very low return rate. The results are tabulated as below:
Survey duration: Mid June – Late September Questionnaires sent out through post: 406 Number of returned scripts: 272 Response rate: 67% Number of valid scripts: 227 (about 56%) Statistical Analysis: collected data was analyzed by the SPSS for Windows (version 9) to enable data analysis through descriptive and correlation methods

Of the 406 teachers and IT co-ordinators of the nine secondary schools under the governance of Po Leung Kuk, 272 responded to this questionnaire and 45 scripts were considered as invalid.

3.6.4.1 Invalid Cases

The major problems of those 45 invalid questionnaire scripts included:

- 1. missing pages: one respondent tore off the first page and forgot to staple it back.
- omitting important questions: scripts omitting all questions from No.9 to No.12 but indicating the acquisition of certain level of competency in Section A would be considered as invalid. Other similar cases were considered invalid in Question 13, 14, 15 or 16 when all of them or the whole Section C was left blank.

 choosing the same option throughout all questions: one picking the same option such as '4' throughout the whole questionnaire must indicate a failure to differentiate and was rejected.

3.6.4.2 Tolerant Cases

There were also some marginal cases which could be tolerated such as:

- mixing the 'highest qualification or training in Computer / ICT / IT' with the 'level of IT competency': most of the respondents simply copied the option of his highest level of IT competency in Question 7 to the blank in Question 6. They put an equal sign to both of them but actually it was not.
- 2. completing just one question in Section B: respondents were required to fill up all the questions up to the level of competency in IT he attained but tolerance was given only if the questions equivalent to his highest level were answered.
- 3. mixing up rating and ranking: More than half of the respondents rated the individual activity instead of ranking it in the third column of Question 16. Manual amendment was made to adjust the rating numbers to the nearest ranking number when the data of other items were compared.

3.6.4.3 Description of Interview and Interviewees

The final draft of the interview schedule was approved after a series of discussions and exchanges held with the supervisor (Appendix VI). It acted as a

guide for the semi-structured interview between the researcher and the interviewees.

Eight interviews were carried out with six teachers and two IT co-ordinators. These people, seven male and one female, had agreed to be interviewed by providing their contact details in the last part of their returned scripts. Descriptions of these eight respondents and other information such as the levels of IT competency acquired by each respondent are tabulated below (Table 7).

Interviewee	Post	Organization	Level(s) of ICT training	Time taken
Case 1: Mr. A	Mathematics Teacher	School 8	BIT & IIT	14 minutes
Case 2: Miss B	Science Teacher	School 4	BIT	25 minutes
Case 3: Mr. C	Native-speaking English Teacher	School 3	BIT & IIT	16 minutes
Case 4: Mr. D	Science Panel Chairman	School 1	BIT & IIT	14 minutes
Case 5: Mr. E	Both IT Co-ordinator and Computer Teacher	School 7	BIT, IIT, UIT & AIT	23 minutes
Case 6: Mr. F	Vice-Principal teaching Chinese Language	School 5	BIT & UIT	17 minutes
Case 7: Mr. G	Mathematics Teacher	School 6	BIT, IIT & UIT	19 minutes
Case 8: Mr. H	Both IT Co-ordinator and Computer Teacher	School 5	BIT, IIT, UIT & AIT	20 minutes

Table 7. Information of the eight interview samples

The first interview took place in late December 2002 with the last being

finished in late January 2003 according to Figure 7 (p. 129). Each interview lasted between 14 and 25 minutes depending on the willingness of different interviewees and how much they wanted to share on Hong Kong's ICT in-service teacher training under the provision of the 'Five-Year Strategy' and the policy of IT in Education.

3.7 DATA ANALYSIS

The data analysis process in this study only analyzed the data obtained from the questionnaire survey. This featured interview data which were new material that showed different unique views not found in the questionnaire. One could also find views that elaborated those found in the questionnaire. Those findings might suggest a way forward or further research.

The analysis of questionnaire data was carried out shortly after all the questionnaire scripts were returned from the nine secondary schools under survey. That was in early October 2002 according to the time-table of the data collection in Figure 7 (p. 129). The instrument for analyzing the quantitative data in the questionnaire was a statistical software called SPSS for Windows (version 9) while the written data, such as comments and specified data, were recorded and analyzed by head counting. The whole process of analyzing the quantitative data took about three days' time including constructing a data file and performing a different descriptive and item analyzes for some related variables.

3.7.1 Interviewing after Questionnaire Analysis

Data analysis of the questionnaire found that eight respondents from seven schools agreed to be interviewed regarding their impressions on Hong Kong's ICT in-service teacher training under the provision of the IT in Education. Interviews were started in late December 2002, right after the analysis of the questionnaire and concluded on late January 2003. Confirmation of the interview over the phone was made to all 6 teachers and 2 IT co-ordinators of the seven schools. Face-to-face interviews were made either in the interviewee's schools or the researcher's office. Each of the interviews lasted from 14 minutes to 25 minutes.

3.7.2 Data Treatment of the Interviews

The term 'data analysis' was not used for interviews because interview data were of a different order from the questionnaire data. Such findings do not confirm or undermine what was found in the questionnaire. No additional instrument was needed for the handling of interview data but simply head counting and data comparison. Due to the small sample, method like phenomenological analysis could never be applied to this part of the research.

The data derived from the interview not only acted as the supplementary information to the discussion of the findings from the questionnaire survey but also allowed the researcher to reflect critically on his findings and to imagine new directions that the research could take in the future. Proper handling of the data could make the result of the study more convincing by upholding the credibility of conclusion.

Analysis of the interview scripts needed only about eight hours' time but the write-up took more than four days. The whole task was then accomplished in late January of 2003 (Fig. 7 in p. 129).

3.8 CONCLUSION

From this methodology chapter, it can be established that the main method of data collection was a questionnaire which was given to teachers in a defined population of schools with the expectation that the results from the questionnaire could be generalized to that population. The questionnaire was developed to elicit from teachers and IT co-ordinators information, which could be used in the evaluation of Hong Kong's ICT in-service teacher training under the provision of the 'Five-Year Strategy'.

Additionally a small number of interviews were planned, on a voluntary basis, with the aim of following up needs that were identified from an analysis of the questionnaire data. Although the analysis of data from the small number of interviews cannot be used to corroborate the findings of the questionnaire, it was intended to help the researcher provide a richer picture of the meaning of the questionnaire results and to point to possible areas of ambiguity that might be followed up in future research.

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3.8.1 Diagrammatic Representation of Research Design

This chapter outlines and justifies the methodology of this study including the research design, the sample, the research instruments and the strategies employed for data collection and data analysis. The overall research design has been summarized as a diagram showing each individual step in the course of the research (Figure 8).



Figure 8. Diagram showing research design for this study

CHAPTER 4 DATA ANALYSIS

4.1 INTRODUCTION

This chapter contains the results, analysis and findings from an exploratory study of teachers and IT co-ordinators' views on Hong Kong's ICT in-service teacher training under the provision of the policy of IT in Education initiative in Hong Kong proposed in 1998.

Data were collected from a questionnaire administered to a sampled population of 406 subjects from nine secondary schools under a single sponsoring body.

The data from the questionnaires administered to teachers and IT co-ordinators were analyzed through the use of the statistical tools of SPSS on windows (version 9). These included descriptive statistics with frequency counts and cross-tabulation, means comparison including reliability analysis and one-way ANOVA, the repeated measures ANOVA of general linear model, correlation and factor analysis.

ANALYZING QUESTIONNAIRE DATA

All questionnaire data except the demographic data, was analyzed within the three stages of the 'Concept-Provision-Outcome' model proposed in Chapter 1 (Section 1.5.2.1, p. 18):

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- 1. concept and practices of teacher professional development;
- 2. provision of Hong Kong's ICT in-service teacher training courses; and
- 3. outcomes of such training including both expected and learning outcomes.

4.2 DEMOGRAPHIC DATA

The demographic data include the personal data from Questions No. 1 to No.7 of Section A, which cover gender, age, working experience, academic qualification, highest qualification in ICT training and level of IT competency attained.

4.2.1 Gender Ratio (Question No. 1)

There were 272 returned scripts of which 227 were valid cases. Among these 227 respondents, 117 were male (51.5%) and 110 female (48.5%). The gender ratio was found to be 1.06:1or roughly 1 to 1. The gender distribution of this sample was nearly the same as that in the nine schools in the sample, which was about 1 to 1.13, where the female teachers marginally outnumbered their male counterparts (Table 8). The gender ratio was 1 to 1.19 for the 15 Po Leung Kuk secondary schools (ibid.). Similarly, the gender ratio for all secondary day school teachers in Hong Kong in 2001 was 11248 men to 13218 women, which is approximately 1:1.18 (Census & Statistics Department, 2002). The regional

gender distribution of male teachers to female teachers in Hong Kong is nearly the same as that of the 15 Po Leung Kuk secondary schools and is not very different from that of the sampled schools in this study. This means that in terms of gender the teachers in the sample are representative of all teachers in Hong Kong secondary schools.

Name of School	Total Number of	Sex of 7	Feachers
	Teachers		
		Male	Female
School 1	28	18	10
School 2	61	24	37
School 3	52	29	23
School 4	53	28	25
School 5	49	18	31
School 6	58	26	32
School 7	47	16	31
School 8	56	26	30
School 9	61	33	28
Subtotal of nine sampled schools	465	218	247
Gender ratio of the nine schools		1:1	1.13
School 10	55	25	30
School 11	57	31	26
School 12	38	14	24
School 13	61	26	35
School 14	36	14	22
School 15	23	8	15
Total of all fifteen schools	735	336	399
Gender ratio of all 15 schools		1:1	1.19

Table 8	. The	gende	er ratio	of the	teacher	rs in	the nine	e schools	under	survey	and
that of t	he fif	teen s	econda	ry sch	lools of	the	same sr	onsoring	body	•	

4.2.2 Age Group (Question No. 2)

The age of the majority of respondents fell within the 26-50 year old age group, which accounted for more than 91% of the total number of subjects (Table 9). In 2001, about 86% of teachers in ordinary secondary day schools in Hong Kong were in this age group (Education Department, 2002). The two figures were quite close to each other (Table 10).

				age		
			25 or		51 or	1 1
			below	26-50	above	Total
sex	male	Count	5	108	3	116
		% within sex	4.3%	93.1%	2.6%	100.0%
		% within age	33.3%	52.7%	75.0%	51.8%
	female	Count	10	97	1	108
		% within sex	9.3%	89.8%	.9%	100.0%
		% within age	66.7%	47.3%	25.0%	48.2%
Total	/**	Count	15	205	4	224
		% within sex	6.7%	91.5%	1.8%	100.0%
		% within age	100.0%	100.0%	100.0%	100.0%

Table 9. The age and gender distribution of the teachers and IT co-ordinators

The gender ratio in each age group was, however, different in this survey. Among the teachers in the younger group below 25, women teachers outnumbered men teachers, while in the 51+ age group, men outnumbered women (Table 9). The number for each sex was nearly the same in the age group of 26 to 50 with slightly more men than women (1.11 to 1). The trend was clear that as teachers got older, men came to outnumber women in the schools in the sample.

Table 10. Number of teachers in ordinary secondary day schools in Hong Kong by age

Age group	Number of teachers	Percentage
20-24	1087	4.4%
25 – 29	4374	
30 - 34	5012	
35 – 39	4707 > 20923	85.5%
40 – 44	3876	
45 – 49	2954 ^J	
50 - 54	1783	7.3%
55 – 59	600	2.5%
60 and above	82	0.3%
Total	24466	100%

(Adapted from Teacher Survey 2001)

4.2.3 Working Experience (Question No. 3)

There were 131 out of 220 respondents (nearly 60%) who possessed 10 or more years' teaching experience. Of those, 126 teachers (57%) had 10 to 25 years of teaching experience. This group is regarded as the modal class (Figure 9). Theoretically, one would expect the number of teachers in each teaching group to increase until this modal position is reached and then to fall. This trend was interrupted because there were more teachers in the 1-5 year group than those in the 6-9 year group. The anomaly is quite common in other research. The reason may be due to the different width of each bar chart of the histogram. For if the 10-25 year group was further sub-divided into say three groups such as 10-15, 16-20 and 21-25, the appearance of the histogram would be quite different. Perhaps the fall in the 6-9 group has something to do with family commitment for woman such as marriage, maternity leave and care of children (Coleman, 1997, p. 131). Apart from this, graph may look more like the normal distribution or exhibit even distribution.





A cross-tabulation between the gender and working experience showed that the 'dip' in 6-9 group does not only happen in women but also applies to male teachers (Table 11). The decline of the latter was, however, more gentle than that of the former. It looks like that the 5 year or below group and the 6-9 year group have roughly the same number of male teachers. The number in the two groups was different by only one. <u>Table 11. The cross-tabulation between the gender and working experience of the</u> sampled teachers in nine secondary schools

Count						
		5 or below	6-9	10-25	above 25	Total
sex	male	18	17	73	3	111
	female	30	24	53	2	109
Total		48	41	126	5	220

There was no information available about the teaching experience of the teachers in the 15 Po Leung Kuk secondary schools for comparison. However, some interesting comparisons can be made with Liu's survey of teachers' use of ICT in 10 IT pilot secondary schools in Hong Kong (Liu, 1999, p. 31). In the current study most of the teachers were well experienced, the mean teaching experience of the group being 12.6 years. In Liu's group the average teaching experience was estimated to be about 11.3 years. Both figures fell inside the 11-15 year range.

The age distribution in Liu's study was almost a normal distribution, except that there was a bulge of teachers in the group of over 15 years (Figure 10). The current study did not distinguish these age groups so it is not possible to conclude whether this trend was present or not. If the group of 'over 15 years' in Liu's study is further divided into groups like 16-20, 21-25, 26-30 the pie chart will likely exhibit a normal distribution.



Figure 10. Years of teaching of a group of teachers in 10 IT pilot secondary schools

(Adapted from the pie chart of Liu, 1999, p. 48)

The difference between the teaching experience of the respondents in the current study and that of Liu's study can be attributed to a number of factors including differences in the population sampled and the time when the study was done. Liu's sample was drawn from teachers in the 10 pilot secondary schools that have contained teachers particularly interested in ICT while the current sample was drawn from secondary schools in a particular sponsoring body. Those enthusiastic teachers were generally expected to be younger teachers thus the average age of those 10 pilot schools might be lower. Although Liu sent questionnaires to all the teachers in these schools, the return rate was recorded as 24.6% compared to the 67% of return rate of this study.

4.2.4 Highest Academic Qualification

In this study, the academic qualifications of the respondents ranged from teachers' certificate to master's degree. To be a secondary school teacher in Hong Kong today, the minimum requirement is a bachelor's degree in any discipline.

Most teachers in Hong Kong have a bachelor's degree. The exception to this is a group of teachers who were admitted to colleges of education in the 1960s and qualified with a teacher's certificate to teach at primary up to junior secondary levels. Although the government of Hong Kong has encouraged all non-degree holders to upgrade their qualifications to a degree, there remain a number of teachers who have not done this. However, less than 5% of teachers in the current sample are non-degree holders who did not have a bachelor's degree. This figure is lower than the percentage of non degree holders in the ordinary secondary day schools in Hong Kong in 2001 (Education Department, 2002). In this study, 30% of respondents had advanced qualifications. The proportion of teachers holding advanced qualification in the current sample is much higher than that of overall teacher population in the ordinary secondary day schools by 12% (Table 12).

Table 12. Highest academic qualification achieved by the teachers in ordinary secondary day schools and in the sampled schools of this study

Academic qualification acquired by	Number of teachers	Number of teachers
teachers	in Hong Kong's	in the sampled
	secondary day schools	schools
	(adapted from Teacher	
	Survey 2001*)	
Non-degree holders	3055 (12.5%)	10 (4.6%)
(i.e. Teachers' certificate or below)		
Degree holders : B.Ed. or others	17013 (69.5%)	126 (58.1%)
(with P.C.Ed/ Cert. Ed./ Dip. Ed.)		14 (6.5%)
Advanced Qualification holders		
(including a master's degree,	4398 (18.0%)	65 (30%)
Advanced DipEd, Ed.D.and Ph.D.)		
Others (e.g. MIL)	/	2 (0.9%)
Total	24466 (100%)	217 (100%)

* Education Department (2002) Teachers' Statistics 2001. Hong Kong: Government Printer

4.2.5 Highest Level of IT Competency

At the time when this survey was being conducted, the sampled schools had achieved the government's 'Five-Year Strategy' target that a minimum 75% of all teachers attain the intermediate level (IIT) by the end of the school year 2002/03 (EMB, 1998, p. 13). In fact, the findings show that over 90% of the sampled teachers from Po Leung Kuk secondary schools who provided information about their levels of IT competency had achieved the intermediate level of IT training (IIT) or above. This figure was obtained from adding up all the percentages from intermediate level to advanced level of IT competency giving a total of 93.2% (Table 13). Similarly, a total of 25.3% teachers with qualification of upper intermediate or advanced level of IT competency showed that the target of the 'Five-Year Strategy' is attainable. In other words by the 2002/03 school year there shall be 'about 25% of the teachers' reaching at least the upper intermediate level (EMB, 1998, p. 13). Lastly, the figure of 12 holders of advanced level of IT competency (AIT) shared by the nine schools implies that each school has 1.33 holders of AIT on average. With more than 5% of AIT-achievers, this group of schools have already met the target for the advanced level of IT competency (AIT) set by the government where each school should have one to two teachers reaching this level by 2001/02 (Table 13). In addition, no teachers in the survey reported that they had not reached the basic level (BIT). There was only one teacher who obtained an exemption from the Education Department because of his formal training of ICT in undergraduate studies (ibid.).

Table 13. Highest level of IT competency attained by teachers and IT co-ordinators

Highest level of IT	Frequency	Percentage
competency		
BIT*	15	6.8%
IIT	150	67.9%
UIT	44	19.9%
AIT	12	5.4%
Total	221	100%

* Including one teacher who was granted an exemption

A cross-tabulation between gender and level of IT competency found no female teachers achieved the advanced level of IT competency (AIT) within the nine sampled schools. The percentage of men achieving the upper intermediate level (UIT) was similar to that of women while a higher percentage of women than men had achieved the intermediate level of IT competency (IIT) (Table 14). In fact 80% of women teachers were at the intermediate level (ibid.). Less than 2% of women teachers (compared to 10% of men) were at the lowest level (BIT).

Table 14. The	gender di	stribution a	and the	highest	level o	of IT	<u>competency</u>	v of the
teachers and IT	<u>Co-ordi</u>	nators						

			hig	highest level of IT competency			
			AIT	UIT	IIT	BIT	Total
sex	male	Count	12	23	63	13	111
		% within sex	10.8%	20.7%	56.8%	11.7%	100.0%
		% within highest level of IT competency	100.0%	52.3%	42.0%	86.7%	50.2%
		% of Total	5.4%	10.4%	28.5%	5.9%	50.2%
	female	Count		21	87	2	110
		% within sex		19.1%	79.1%	1.8%	100.0%
		% within highest level of IT competency		47.7%	58.0%	13.3%	49.8%
		% of Total		9.5%	39.4%	.9%	49.8%
Total		Count	12	44	150	15	221
		% within sex	5.4%	19.9%	67.9%	6.8%	100.0%
		% within highest level of IT competency	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	5.4%	19.9%	67.9%	6.8%	100.0%

In addition, the low correlation value between the gender and the IT competency proves no significant difference between the two variables (Table 15). That means the highest IT competency will be affected by the gender only to a very limited and insignificant extent as 0.13 means that the two variables are not significantly different from each other and the correlation between the two variables is low and insignificant.

Table 15. Correlation between the gender and the highest level of IT competency

			highest level of IT
		sex	competency
Sex	Pearson Correlation	1.000	.102
	Sig. (2-tailed)		.130
	Ν	227	221
highest level of	Pearson Correlation	.102	1.000
IT competency	Sig. (2-tailed)	.130	
	N	221	221

4.2.6 Post Held (Question No. 4)

Among the 227 respondents surveyed, only 26 were computer teachers and 7 were IT co-ordinators. The majority of teachers entered English, P.E., Geography, Economics or Engineering Science teachers in the space labelled as "Please specify". Only two respondents left the space blank.

4.2.7 The IT Specialists

IT co-ordinators and computer teachers are regarded as the information technology specialists in secondary schools as they are presumed to know more about ICT than their colleagues. They are very important to the school as they are usually responsible for IT-related teaching and learning activities and are expected to support colleagues who must integrate ICT into the school curriculum.

A closer look at these 33 specialists in this survey found that the number of

males exceeded that of the females by more than 4 times ('sex' table of Appendix VII).

The age group and working experience of these 33 people follows the same pattern as that of the whole subject group in this project. When the data of the 'age group' of IT co-ordinators or computer teachers is compared with those of the overall teachers in the 9 schools (by comparing the 'age' table of Appendix VII with same figures in Table 9), the ratio among the three groups, 25-, 26-50 and 51+ in the two populations exhibits a similar pattern, that is 9.4%: 87.5%: 3.1% compared with 6.7%: 91.5%: 1.8%. Similar analysis done on the working experience would give a comparable match (comparing the 'working experience' table of Appendix VII with Table 11).

4.3 CONCEPT AND PRACTICES OF PROFESSIONAL DEVELOPMENT

Section C of the questionnaire covered teachers and IT co-ordinators' views about the concept and practices of professional development. Two questions dealing with the concept asked teachers about the meanings (Question No. 14) and aims (Question No. 15) of professional development. Another question focused on the practices, asking teachers about their knowledge and experience of staff development (Question No. 16).

4.3.1 Meanings of Professional Development (Question No. 14)

14. How far do you agree with the following meanings of the term 'professional development' suggested by a group of secondary teachers?

Teachers were asked to rank 12 statements on a five-point scale from Strongly Disagree (1), Disagree (2), Neutral / No opinion (3), Agree (4) to Strongly Agree (5). Between 225 and 227 teachers completed the items in this section except for one item, which received responses from only 217 subjects.

Mean scores and standard deviations were calculated for each statement and tabulated (Table 16).

Meanings of Teacher Professional Development	N	Mean	Std.
collection on what they have deno" (mean eccave 3.65, SD = 0.75 , 7	be at	Score	Dev
c. To be a well-prepared teacher	227	3.99	.77
f. To give insights and to enhance teachers' teaching practice; and to enlighten teachers in the latest development in education	225	3.92	.71
 Enhancing the professionalism of teachers – subject knowledge, skills and attitude 	225	3.91	.80
e. To provide teachers with new trends and development in education	227	3.90	.71
j. To gain more knowledge / skills in one's profession to make one more competent	226	3.90	.72
a. Teachers try their best to equip themselves	226	3.88	.86
b. "Learn to teach better and find opportunity for adversity"	226	3.88	.78
g. To enhance the teachers' competency and their strategy in teaching	217	3.83	.74
d. To collaborate with colleagues to achieve school's objectives	226	3.80	.75
k. Teachers training, seminars for subject knowledge and new teaching methods	227	3.78	.81
i. Knowing what is the trend in current or future education system	226	3.76	.70
h. "A day set aside for whatever input the school had arranged for teachers; a day for teachers to do reflection on what they have done"	227	3.65	.75

Table 16. Meanings of professional development perceived by teachers

The mean scores of all statements being greater than 3 suggested that most teachers responded positively to the statements. The mean scores ranged from 3.65 to 3.99, with a difference of 0.34 between the highest and the lowest value (Table 16). The higher the mean value, the more the respondents agreed with that perception of professional development. On the other hand, the standard deviations (SDs) of these statements varied between 0.70 and 0.86, indicating that these figures were not significantly different from their mean scores (ibid.). The greater the standard deviation, the larger the difference among the individual values within the same group. The most popular response was subsequence c, "To be a well-prepared teacher" (mean score = 3.99, SD = 0.77). The standard deviation 0.77 is about the mid point compared to the standard deviations of the other statements. The lowest mean score was subsequence h, "A day set aside for whatever input the school had arranged for teachers; a day for teachers to do reflection on what they have done" (mean score = 3.65, SD = 0.75). The standard deviation for this statement was slightly smaller than that of the statement with the highest mean score, suggesting less disagreement about the rating.

4.3.1.1 The Most and Least Popular Definitions of Professional Development

Despite the limitation of the instrument design, there were interesting differences between the most popular and the least popular meanings of professional development. Using the mean scores, the statements were arranged in descending order, with the highest mean score at the top and the lowest at the bottom. This enabled the identification of the most and least popular meanings of the term 'professional development'.

Looking at the 12 items in Table 16 (p. 154), a pattern can be discerned that separates the top six items from the bottom six items. It seems that the top six items (subsequences 'c', 'f', 'l', 'e', 'j' and 'a') share the common characteristics of 'self-directed' while the bottom six items (subsequences 'b', 'g', 'd', 'k', 'i' and 'h') belong to the group of being 'other-directed' (ibid.). This idea of dividing the meanings into self- and other-directedness is derived from Knowles' conceptionalisation of an instructional design model with the learners' participation or learners' making decisions (Cranton, 1996, p. 53). He defined self-directed learning as a process in which learners "take the initiative, with or without the help of others" (Knowles, 1975, p. 78). Jarvis (1992) in attempting to develop a model of self-directed learning sees learners being either self-directed or other-directed in taking various paths to solve the same problem (p. 131).

However, the idea of evenly dividing the 12 items into two equal parts seems infeasible because of two reasons. One is the closeness of the mean scores of all the items while the other reason is the same value shared by the 6^{th} and the 7^{th} item. This poses the problem of the difficulty of drawing a line between the 6^{th} and the 7^{th} item and is ridiculous to classify the former to be self-directed and the latter other-directed when both values are equal.

A data-reduction technique in statistics called factor analysis was employed to reduce the large amount of overlapping data to a much smaller set of factors

(Green et al., p. 292). In order to find out how many subscales can be identified as driven by the data set, factor analysis was performed in the data collected from Question No. 14. The result of such analysis showed that two egenvalues were identified. As suggested by the result of the analysis, two groups of data are produced where group one contains the subsequences 'b', 'c', 'e', 'f', 'g', and 'j', and group two contains subsequences 'a', 'd', 'h', 'i', 'k' and 'l' (first and second table of Appendix VIII). Since this result clearly shows that subsequence 'b' belongs to group one and the reliability test conducted on the first group of data generates a relative high reliability coefficient, 0.9140 as its Cronbach Alpha value (first analysis of Appendix VIII), it means that the two groups may not necessarily contain the same number of subsequences in this case. Analysis of other combinations were performed. Since the addition of item 'b' into the first group (Cronbach Alpha value = 0.9070) yields a more acceptable result, it is then proposed that the self-directed group should contain more elements than the other-directed group as subsequence 'b' is included in the former. Followings are the categorization of the meanings and additional characteristics borne by both types of professional development, 'self-directed' and 'other-directed'.

<u>4.3.1.1.1 Teacher-centred or 'Self-Directed' Professional Development (Top</u> seven items)

The teachers' self-directedness here is equivalent to the teacher-centred professional development. The meaning of the self-directed teacher professional development with their additional characteristics given by the teachers is tabulated (Table 17).

Categories	Meanings of Teacher Professional	Additional characteristics
	Development	
1. 2. 4.	To be a well-prepared teacher	To be in control of the
		classroom and the subject.
		To have expertise and
Andread and a	The "Lither-cliegcled Professional Davi	knowledge that is relevant.
	To give insights and to enhance teachers'	The emphasis is on
	teaching practice	'teachers' teaching
		practice' and the necessary
Althor		insights. This also suggests
		practical knowledge
and first u	artistell broathe of Mondawolfni graverablee	relevant to the job.
sted	Enhancing the professionalism of teachers	Professionalism is
lf-direc		associated with autonomy.
		Look at definitions of
Se	he schooll's objectives rether than the teach	professional.
	To provide teachers with new trends and	Emphasis on being up to
Serie Search and	development in education	date, expert.
colleges. 1	To gain more knowledge / skills in one's	Emphasis on knowledge,
suggests a	profession to make one more competent	skills and competency
	Teachers try their best to equip themselves	Competence
	"Learn to teach better and find opportunity for	This suggests that teachers
	adversity"	are not teaching as well as
reve and the		they could and therefore
		implies a deficit view of
		teaching.

Table 17. The meanings and the additional characteristics of self-directed teacher professional development

The top seven items are clearly related to a model of professional development that emphasizes the professional autonomous teacher who is well

prepared and competent in terms of both knowledge and skills, in addition to positive attitude. It suggests competence in relation to the subject and to teaching methodology (Table 17). It also emphasizes practical knowledge and skills that are relevant to teachers' teaching practice. The last item 'learn to teach better' suggests that teachers want to improve their teaching as well as they could.

<u>4.3.1.1.2 The 'Other-directed' Professional Development (Bottom five</u> <u>items)</u>

Although there are some similar themes in the bottom five items, overall they suggest a different picture of professional development. The least popular item mentions 'whatever input the school had arranged for teachers' suggesting that management has arranged it without consultation (Table 18). One item deals with achieving the school's objectives rather than the teachers' goals. Another item suggests external training programmes, presumably arranged by 'trainers' from colleges. 'Knowing what is the trend in current or future education system' suggests academic achievement rather than practical knowledge. The model of professional development suggested by the last five items is different from the one that emerges from the top or most popular seven items.

Table 18.	. Interpretation	and the	additional	characteristics	of the of	ther-directed
teacher p	rofessional dev	elopme	nt			

Categories	Meanings of Teacher Professional	Additional characteristics
On 12 improveno from one	To enhance teachers' competency and their strategy in teaching	This mentions competence, but the statement does not suggest that the teacher is in control. Competency targets are usually set externally.
Other-directed	To collaborate with colleagues to achieve school's objectives	The emphasis in this is on the schools rather than the teachers' goals.
	Teachers training, seminars for subject knowledge and new teaching methods	Training seen as extrinsic
	Knowing what is the trend in current or future education system	Knowledge about the future education system is not very practical and could be viewed as too academic.
then do bet	"A day set aside for whatever input the school	Programme arranged by
value-adde	had arranged for teachers; a day for teachers to do reflection on what they have done"	management not teachers.

4.3.1.2 Further Views on Professional Development

At the end of Question No. 14 about the meaning of professional development, teachers and IT co-ordinators were asked the open question:

14m. What comes to your mind when you think of 'professional development'?

Fifty-four teachers (23.8%) completed the open question (Appendix IX). It

was interesting that very few teachers associated professional development with external provision. Only three teachers mentioned courses or teacher training when they thought of the term professional development.

On the whole, teachers associated professional development with personal improvement rather than school improvement. The only reference to 'school' was from one teacher who said that professional development meant 'sharing with different schools' and from another teacher who mentioned the 'development of curriculum' (Appendix IX).

Many teachers tended to associate professional development with personal improvement. Ten teachers made general comments about personal improvement or increased competence and these included ideas such as 'a chance to think and then do better in the future', 'be a good teacher' and 'well-prepared and equipped, value-added' (Appendix IX).

The acquisition of knowledge was the most frequently mentioned meaning for professional development. Eighteen teachers mentioned it. The most frequently mentioned type of knowledge was 'subject knowledge' mentioned by seven teachers but other types of knowledge were related to 'teaching methods', 'new technology', and 'understanding education'. Ten teachers associated professional development with the improvement of teaching skills and one other teacher said that it meant 'practical as opposed to theoretical development' (Appendix IX).

Some teachers indicated that they saw the improvement of knowledge or

skills in terms of 'new insight' or 'renewal', for example one teacher wrote "to acquire new technology in education and renew one's idea in education". Some teachers used the word 'upgrade' to stand for this. Two teachers spoke of 'catching-up' and 'refreshing' which indicated the need for remedial action. One teacher mentioned that it was a way of 'mastering required knowledge' (Appendix IX).

There were a group of items related to teachers' views that professional development was about motivation, attitude and continuous learning. One teacher said that professional development was associated with 'motivating ourselves' while another said that 'professional development will be successful only if most teachers really want to improve their teaching and care about the development of their students' (Appendix IX). Three teachers mentioned the link between professional development and 'attitude'. Presumably 'attitude' referred to their positive motivation and responsibility for improving their teaching, for example what another teacher referred to as 'teaching themselves' and another as 'self study, not being forced'. 'Attitude' might also have been related to teachers' sense of responsibility, for example one teacher mentioned 'ethics, responsibilities'. 'Attitude' was also related to the views of those teachers who saw professional development as a continuous or lifelong process (Appendix IX). Finally attitude may have been related to teachers who saw their responsibility in terms of care for their students.

One teacher linked professional development with the problem of distinguishing 'teaching work versus spare time' (Appendix IX). Another teacher signalled a similar concern, saying that 'every small piece of cake is good, but it

would be too much to eat many in a short period of time', and another said that professional development was 'good but more allowance of time required'. Other teachers warned that professional development meant a greater workload while another one went up as far as to indicate that 'less' professional development would mean a 'reasonable workload'.

4.3.1.3 Which teachers completed Question No. 14m?

It seemed possible that the teachers who completed Question No. 14m had a greater interest in professional development than those who left it blank. To test this hypothesis, a number of tests were conducted including a cross-tabulation between the teachers' highest level of IT competency and their filling of objective thinking of 'professional development' (Appendix X).

It was also found in the correlation test that there was no significant relationship between teachers' level of IT competence and their filling of objective thinking of professional development in Question No. 14m (Appendix X). However, there were significant differences between teachers from different schools in the sample. The response rates for this question ranged from 9% to 42% in School 1 and School 7 respectively (Table 19). School 1 got the lowest response while School 7 obtained the highest response at 42%. There will be a discussion about differences between schools in the later sections of this chapter.

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School Names	Sch 1	Sch 2	Sch 3	Sch 4	Sch 5	Sch 6	Sch 7	Sch 8	Sch 9	Total
Total No. of	11	24	22	43	30	35	12	33	17	227
Returned scripts										
No. of teachers	1	6	7	9	7	10	5	4	5	54
making response										
Response Rate	9.1%	25%	31.8%	20.9%	23.3%	28.6%	41.7%	12.1%	29.4%	23.8%

Table 19. The response rates of teachers in different schools to Question No. 14m

4.3.2 Aims of Teacher Professional Development (Question 15)

15. Professional development for teachers in your present school should aim to (you can
have more than one choice)
□ upgrade teachers in knowledge and skills of teaching
\Box stimulate organizational growth for the whole school (as a learning
organization)
\Box have both personal and organizational growth
\Box fulfil the requirements from the principal or a group of senior management team
\Box meet the requirement of having three professional development days as one of
the prerequisites of SMI schools according to the documents

Question 15 was intended to find out teachers' views about the aims of professional development. It presented teachers with five options from which they could make multiple choices. Figure 11 presents a histogram showing the number of times each item was chosen in descending order. As respondents were allowed to choose more than one answer, the total percentage would be more than 100.

The results of Question No. 15 show that among the five options, the most important aim of professional development was to 'upgrade teachers in knowledge and skills of teaching' which was chosen by more than 73.1% of respondents (Figure 11). Charts presenting the result of aims of professional development perceived by teachers also show that the second and third most important aims are 'personal and organization growth' (56.8%) and pure 'organizational growth' for the whole school (46.3%) respectively (ibid.).



Figure 11. Aims of professional development perceived by teachers (N=227)

Although only 25% of the teachers responded to Question No. 14m, it is significant that data obtained in Question No. 14m (Appendix IX) closely match with the aims of professional development stated in Question No. 15 as both of them show the same trend (Figure 11). By combining the results in both questions, the teachers' interpretation of the aims of professional development according to the result of Question No. 15 can be identified as firstly knowledge and skills of teaching, and then secondly the personal growth which is followed by organizational growth. Next come the requirements of school management team and last requirements from outside the school.

It is clear that teachers were responding to the first part of the option three, that is 'personal growth' rather than the 'organizational growth'. It is therefore obvious that respondents of this survey put organizational growth for the whole school after the personal growth. This view, again, is supported by the result from Question No. 14m that very few suggestions were related or concerning organizational growth in terms of school development (Appendix IX).

4.3.3 Programmes of Staff Development (Question 16)

16. According to your knowledge and past experience in staff development, please answer the following questions by writing Yes or No in each box. Have you experienced any of the following methods of professional learning? Have you enjoyed any of the following methods of professional learning? Please rank each method of professional learning from 1 to 9 in terms of their effectiveness.

Question 16 asked teachers to provide three distinct types of information about nine methods of professional learning. At first it asked teachers if they had experienced the nine methods (Section 4.3.3.1). Secondly it asked teachers if they had enjoyed the nine methods (Section 4.3.3.2). Thirdly it asked the teachers to rank the methods in terms of their effectiveness (Section 4.3.3.3).

4.3.3.1 Experience of Professional Learning

Respondent were asked to write 'Yes' or 'No' against each of nine methods of professional learning to indicate if they had experienced the activity or not.

Table 20 tabulates the results of the teachers' experience of different methods of professional learning. The results are expressed in percentages which represent the portion of respondents who have experienced that type of activity and answered 'Yes' in this part of the questionnaire.

Table 20. Percentages	of teachers	experiencing	different	types of staff
development activities				

Methods of professional learning (N=227)	Teachers' experience of the method (Percentage of respondents who have experienced the activity)
Listening to a seminar or panel discussion	96.0%
Participating in a workshop	91.9%
Participating in a group discussion	80.3%
Attending short term courses	77.5%
Attending a meeting about a subject specialism	75.8%
Making visits and excursions	64.4%
Engaging in professional reading	53.8%
Pursuing a higher degree	47.7%
Conducting library searching	43.5%

The three most common activities were seminars, workshops and group discussions, which were all activities that might have taken place in the school.

(Table 20). The three next most-experienced activities (attending short term courses, attending a meeting about a subject specialism, making visits and excursions) all involved teachers in 'out of school' activity but are usually undertaken with colleagues. The three activities that were least experienced were the more academic forms of professional learning such as conducting library searches, pursuing higher degrees or engaging in professional reading.

4.3.3.2 Enjoyment of Professional Learning

Respondents were asked to write 'Yes' or 'No' beside each of nine methods of professional learning to indicate if they had enjoyed the activity or not.

Table 21 tabulates the results of the teachers' enjoyment of different methods of professional learning. The activities are arranged in descending order of percentages of teachers who had enjoyed them and put 'Yes' as the answer in the relevant parts of the questionnaire.

It was immediately obvious from the results of this question that teachers' enjoyment of different methods of professional learning was not related to their experience of these methods. The rank order in Table 21 suggests a number of interpretations of activities that teachers would enjoy. The first five items consist of activities that most likely take place away from the school and do not repeat what teachers do in the school's routine work while the last four activities are activities that most likely would take place in school and may be part of the routine of school life. The most popular item is the only item that has a direct
impact on teachers regarding their professional development. In Hong Kong, however, a higher qualification does not necessarily mean higher position or higher salary as most promotions depend on experience or performance rather than academic qualification. Pursuing a higher degree among teachers in Hong Kong is often because of teachers' interest and their own development.

Table 2	<u>21.</u>	Percentages	<u>of</u>	teachers	enjoying	<u>different</u>	types	<u>of</u>	activities	<u>in</u>	<u>staff</u>
develop	ome	ent									

Methods of professional learning	Teachers' enjoyment of the				
(N=227)	method				
	(Percentage of respondents who				
	have enjoyed the activity)				
Pursuing a higher degree	94.4%				
Making visits and excursions	91.5%				
Attending short term courses	90.5%				
Conducting library searching	87.8%				
Engaging in professional reading	84.7%				
Participating in a workshop	84.6%				
Attending a meeting about a subject specialism	81.3%				
Participating in a group discussion	75.6%				
Listening to a seminar or panel discussion	73.7%				

4.3.3.3 Effectiveness of Professional Learning

Respondent were asked to rank each of nine methods of professional learning to indicate their order of effectiveness in promoting professional learning.

Table 22 presents the mean scores of teachers' ranking of the relative effectiveness of the nine methods.

Table 22.	Mean	scores	of th	e effectiv	veness of	<u>`different</u>	types	of	activities	<u>in staff</u>
developm	ent									

Methods of professional learning	Effectiveness				
(N=227)	(Mean value of effectiveness				
	provided by respondents:				
	1=most effective				
	9=least effective)				
Participating in a workshop	3.21				
Attending short term courses	3.50				
Attending a meeting about a subject specialism	4.00				
Making visits and excursions	4.00				
Listening to a seminar or panel discussion	4.06				
Pursuing a higher degree	4.38				
Participating in a group discussion	4.62				
Engaging in professional reading	4.80				
Conducting library searching	5.48				

It was immediately clear from this table that there were differences between the activities that teachers judged to be most effective and those that they had experienced or enjoyed.

The criteria for enjoyment, identified earlier, do not seem to relate to the ranking of effectiveness. There is no marked pattern concerning activities that are conducted away from school or activities that repeat what they were doing in school's routine work.

The two activities judged to be least effective are both activities in which the teacher would engage on their own.

4.3.3.4 Overall Comparison of Different Methods of Professional Learning

Table 23 compares teachers' experience, enjoyment and judgment of the effectiveness of the nine methods of professional learning, ranking the order of the items from most frequently chosen to least frequently chosen.

Table 23. Percentages and mean scores together with the ranks of different types of activities in staff development

	(Colun	nn 1)	(Colur	nn 2)	(Colu	mn 3)	
Methods of professional learning	Percentage of respondents who		Percentage of respondents who		Effectiveness of the activity		
(N=227)	had experie	enced the	had enjo	yed the	(1=most effective		
	activ	rity	activ	vity	9=least e	9=least effective)	
and the second		Rank		Rank		Rank	
Participating in a workshop	91.9%	2	84.6%	6	3.21	1	
Attending short term courses	77.5%	4	90.5%	3	3.50	2	
Attending a meeting about a subject specialism	75.8%	5	81.3%	7	4.00	3	
Making visits and excursions	64.4%	6	91.5%	2	4.00	3	
Listening to a seminar or panel discussion	96.0%	1	73.7%	9	4.06	5	
Pursuing a higher degree	47.7%	8	94.4%	1	4.38	6	
Participating in a group discussion	80.3%	3	75.6%	8	4.62	7	
Engaging in professional reading	53.8%	7	84.7%	5	4.80	8	
Conducting library searching	43.5%	9	87.8%	4	5.48	9	

The pattern of rankings of teachers' experience in the staff development activities (Column 1 of Table 23) was found to somewhat coincide with that of the effectiveness of those activities (Column 3 of the same table). The first, the second and the third items of the effectiveness table matched with second, the fourth, and the fifth items of the table of teachers' experience respectively (Table 23). On the other hand, the last four items of effectiveness table also roughly matched with the eighth, the third, the seventh and the ninth respectively too (ibid.). The result of this comparison showed that there were discrepancies between what the teachers thought as effective programmes and the actual activities of professional learning they had experienced.

For some activities considered to be highly effective such as 'participating in a workshop' and 'attending a meeting about a subject specialism', surprisingly they were rated among the four least enjoyable activities in the enjoyment list (Table 23).

When the rankings of experience column was compared with those of the enjoyment column in Table 23, some odd results were obtained especially for the items of 'listening to a seminar or a panel discussion' and 'pursuing a higher degree' which exhibited two contrasting results in the two columns (Table 23). Other less rigorous examples included 'participating in a group discussion' and 'conducting library searching' (ibid.). The discrepancy might be due to the respondents' interpretation of the word 'enjoy'. Perhaps they were telling what they would enjoy if they had the opportunity, or what they had enjoyed from what they had experienced. It was believed that the answers might contain both interpretations.

Some methods of professional learning were worth discussing as below.

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4.3.3.4.1 The Importance of 'Attending seminars or panel discussions'

Based on the results of the survey on the methods of professional learning, the format of 'Attending seminar or panel discussion' was found to be the most popular method of professional learning among the secondary teachers in the schools under survey with 96% of the respondents agreeing to its popularity (Table 23). However, not many teachers showed appreciation to using seminars as a format of teacher professional development activity because only 74% of the respondents enjoyed them, which is the lowest enjoyment index (ibid.). After all, it is interesting to find that attending seminars is the most popular but at the same time the least enjoyable and a medium effective form of professional learning according to the teachers' response in this study.

4.3.3.4.2 The Enjoyment of 'Pursuing a higher degree'

Another finding is about the form of 'Pursuing a higher degree'. It is interesting again to find that most teachers, about 95%, enjoyed pursuing a higher degree as another form of professional learning (Table 23) which, however, at the same time, was the second least common kind of practice in professional learning among the secondary teachers in the sample. Only about 47%, or less than half of the respondents, have obtained a higher degree. Does this mean that teachers in Hong Kong are hard working, or just more practical, in achieving higher academic qualifications? Therefore, the pursuing of a higher degree as a form of professional learning was not a common practice but could be a kind of teachers' enjoyment though it was not effective enough from the view of professional development.

4.3.3.4.3 The Curious Position of 'Conducting library search'

The idea of 'Conducting library search' is rarely heard in the local context of teacher professional development. It was, therefore, rated the least effective method of professional learning by the teachers, with a mean score at 5.48 (Table 23). This kind of method of professional learning is less welcomed because it has the lowest popularity, with less than 44% of respondents experiencing it. Besides, it cannot be seen as enjoyable, otherwise it would not be placed at the third last position in the ranking of enjoyment (ibid.).

4.3.3.5 Other Methods of Professional Development

Out of the 227 respondents, there were only 8 teachers from 5 schools making suggestions in the column of 'Other methods of professional learning', but most of their suggestions were far from satisfactory. The only suggestions worthy of mentioning include a reflective journal, class observation and traveling/exchange tour (Appendix XI). Others did not stick to the point.

On the other hand, only 7 respondents would like to be interviewed regarding their training in professional development of ICT. The response rate was so low that it could be concluded that teachers in Hong Kong could not be bothered to be interviewed, nor did they like to participate in anything of public interest.

4.4 COURSE COMPLETION TIME AND COURSE PROVIDERS

This part of the research findings deals with the factual information about course completion time by the teachers and about the actual and preferred course providers according to teachers' views. The former will be focussed on the year while the latter on the organization.

4.4.1 Course Completion Time

(Question 9s/ Question 10p/ Question 11r/ Question12q)							
When did you complete your BIT/ IIT/UIT/AIT course?							
□ 1999	□ 2000	□ 2001	□ 2002				

Teachers were asked to indicate the year in which they completed each of the courses they had attended.

As ICT teacher training was a relatively new provision in 1999, no wonder only 14 out of 227 teachers completed it in that year (Table 24). Table 24 shows that most teachers obtained their ICT training in the period between 2000-2001, with BIT-goers reaching their peak time in 2000 and IIT-goers in 2001 (ibid.). Of the 168 respondents who had completed BIT, 153 completed it in 2000 (61.9 %) or 2001 (29.2%). Accomplishment of the basic level course (BIT) within these two years was very common, accounting for more than 91% of all the BIT-goers (ibid.).

Table 24. Year when respondents completed their training courses at different levels

Year of	Frequency (Percentage)						
Completion	BIT (N=168)	IIT (N=184)	UIT (N=53)	AIT (N=11)			
1999	14 (8.3%)	/	/	/			
2000	104 (61.9%)	26 (14.1%)	5 (9.4%)	/			
2001	49 (29.2%)	109 (59.2%)	27 (50.9%)	3 (27.3%)			
2002	1 (0.6%)	49 (26.6%)	21 (39.6%)	8 (72.7%)			
Total	168 (100%)	184 (100%)	53 (100%)	11 (100%)			

A few teachers upon acquiring IIT level, finished their IIT course in 2000 (14% of all the IIT-goers) leaving the remaining 86% accomplishing their IIT course in 2001 or 2002 (ibid.). The bloom of teacher enrollment in the ICT training courses in each level was found to shift from 2000 for BIT to 2001 for IIT within the sampled schools of this study. There is no clear peak in UIT as no significant difference was found between the number of teachers completing this level of ICT training in 2001 and that in 2002 (comparing both figures in Table 24).

Lastly, there were only 11 teachers or IT co-ordinators who had completed the requirements of the advanced level (AIT), 3 in 2001 and 8 in 2002 (Table 24). It seems that the number of teachers acquiring AIT is expected to increase and reach a ceiling in 2003 when the implementation of 'Five-Year Strategy' is coming to an end. This may probably be explained by the reason that many teachers wanted to attain the qualification before the Hong Kong government stops subsidizing any ICT in-service teacher training in September 2003.

Referring to the columns of BIT and UIT in Table 24 again, one would find that there is a bell shaped curve for BIT and IIT with fewer teachers initially, moving to maximum and then declining. One could also inevitably forecast that similar distributions would apply to at least UIT and AIT if the data for 2003 and 2004 were obtained. However, as mentioned before, Hong Kong's IT in Education initiative will end after the school term 2002/03, the distribution of AIT will certainly not exhibit any bell shaped curve.

4.4.2 Actual Course Providers

Teachers who had completed BIT/IIT/UIT courses were asked to indicate the providers of each of the courses they had attended. A range of providers offered courses at the first three levels of competence, including:

□ colleagues of their own school

- □ trainers from a software house or business organization
- □ trainers from a local university or tertiary institution.

Teachers could also specify a provider who was not on this list.

Courses at the advanced level of IT competency (AIT) were contracted only to the Hong Kong Polytechnic University with its detailed being listed in the School Circular Memorandum No. 87/2001 (Director of Education, 2001). Teachers were given options if they indicated another provider. Table 25 shows providers for courses of different levels of IT competency both at the time of and before the survey.

Types of Course Providers	Frequency (percentage)							
	BIT	IIT	UIT	AIT	All			
School teachers as school-based	129(76.3%)	119	10 (18.2%)	/	258			
training		(64.3%)						
Software houses / business	34 (20.1%)	48 (25.9%)	19 (34.5%)	/	101			
organizations								
Local university or tertiary	2 (1.2%)	14 (7.6%)	24 (43.6%)	10(100%)	50			
organization								
Others	4 (2.4%)	4 (2.2%)	2 (3.6%)	0	10			
Total	169 (100%)	185(100%)	55 (100%)	10(100%)	419			

Table 25. Courses providers in ICT teacher training courses in different levels

The main providers of the BIT and IIT training courses were school teachers themselves (76.3% of BIT, 64.3% of IIT), while the second most common provider belonged to the business organizations. Tertiary institutes dominated the provision of UIT training courses, accounting for more than 43% (Table 25). These were also the sole providers of AIT training courses. Although the Hong Kong Polytechnic University had been contracted to provide these courses, some teachers took advantage of courses provided by the Chinese University of Hong Kong at their own expenses. No teacher among the 11 AIT-goers, however, chose the option beyond Hong Kong Polytechnic University as the provider of the course for this level.

4.4.3 Preferred Course Providers

Question No. 9t/ Question No. 10r/ Question No. 11t/ Question No. 12s
Who are your preferred course provider(s)?(You can tick more than one box)
school teachers
central training vendors
trainers from government (e.g. Education Department or Information Technology Services Department.)
others (Please specify ______)

The reason for giving respondents a different list of choices for actual and preferred courses providers is to compare the teachers' expectation in the course providers with the actual ones they got. The discrepancy between the two may reflect the respondents' overall satisfaction with the course providers. In order to facilitate the study, the data collected from the two choices were tabulated in a combined table (Table 26).

Table 26 shows both the preferred and the actual providers of Hong Kong's ICT in-service teacher training courses.

Types of Preferred (and	Frequency (percentage)							
Actual) Courses Providers	BIT	IIT	UIT	AIT	Overall			
School teachers as	83 (49.1%)	93 (50%)	17 (31.5%)	1 (10%)	194 (46.4%)			
school-based training	[129(76.3%)]	[119 (64.3%)]	[10 (18.2%)]		[258 (61.6%)]			
Central training vendors	57 (33.7%)	63 (33.9%)	26 (48.1%)	3 (30%)	149 (35.6%)			
(tertiary institutes or	[36 (16.2%)]	[62 (33.5%)]	[(43 (78.1%)]	[10 (100%)]	[151 (36.0%)]			
business organizations)								
Government	23 (13.6%)	26 (14%)	8 (14.8%)	6 (60%)	63 (15.1%)			
(Education Department or								
Information Technology								
Services Department)								
Others	6 (2.6%)	3 (1.6%)	3 (5.6%)	1	12 (2.9%)			
	[4 (2.4%)]	[4 (2.2%)]	[2 (3.6%)]		[10 (2.4%)]			
Total	169 (100%)	185 (100%)	54 (100%)	10 (100%)	418 (100%)			
	[169 (100%)]	[185 (100%)]	[55 (100%)]	[10 (100%)]	[419 (100%)]			

Table 26. Preferred (and actual) courses providers of ICT teacher training courses

(Percentages are represented in parentheses while the corresponding values of actual course providers are in square brackets.

There is no such option as 'Government' for the choices of the actual course providers.)

4.4.3.1 School-based Training in ICT

A total of 258 teachers had completed their teacher training by using school-based training and 194 of them have shown their preference in this type of training (First row of Table 26). Although school-based training was the most popular provision at both basic (BIT) and intermediate levels (IIT), the discrepancies between the number of teachers preferring and that practicing school-based teacher training account for 27% and 14% in BIT and IIT courses respectively (the percentage different between the preferred and the actual course providers suggested in the first two columns of Table 26). This means that about 27% of teachers who have completed BIT courses and 14% of teachers who have

completed IIT courses may have preferred a different form of training. Some of them are expected not satisfied with the school-based training courses provided by their colleagues. For teachers in the two higher-level courses, this was reversed, with nearly 70% of teachers who had experienced other course providers for UIT and one teacher who had completed AIT, actually preferring school-based provision. A total of 31.5% of teachers completing UIT showed that their preference of ICT teacher training as school-based mode (ibid., third column). Altogether, there were more than 61% of sampled teachers practising school-based training but only about 46% preferred that mode of teacher training as an overall review (ibid., last column).

4.4.3.2 Central Training Vendors for Training Courses

Although the central training vendors, which comprised tertiary institutes and business organizations, were the second most preferred providers of training, there were marked differences between teachers' actual and preferred providers for all the courses except IIT where actual and preferred provision was almost identical (Table 26). Twice as many teachers, than was the actual case stated that they would have preferred to have completed their BIT training with the central training vendors (33.7% as compared with 16.2% in Table 26). Far fewer teachers than was the case preferred the central training vendors over other providers in the two higher level courses, i.e. UIT and AIT (ibid.).

4.4.3.3 Government as One of the Course Providers

There was no option of 'government' in the choice of actual course providers because the Hong Kong government has asked the schools to run the courses or simply contracted them out to central training vendors. No comparison could therefore be made between the preferred and the actual courses providers. Although no teachers in the sample said that they had experienced training provided by the government, between 13.6% and 14.8% of teachers who had completed BIT, IIT and UIT courses, and 6 out of the 10 teachers who had completed AIT would have preferred government provision. There have been no AIT-goers reported to receive training at this level through any other courses providers beyond Hong Kong Polytechnic University yet.

4.4.3.4 Differences of the Course Providers at All Four Levels

A comparison of the preferred and the actual course providers resulted in some interesting differences between teachers who had completed courses at the different levels of provision.

At the basic level of training (BIT), a large percentage of the teachers who had done school-based training would have preferred another provider. Some of these teachers would have opted for the central training vendors while others would have preferred direct government provision.

At the intermediate level of training (IIT) there was little difference between actual and preferred training although some teachers would have preferred government training if it had been available at the time.

At the two highest levels of training, quite a number of teachers would have preferred a school-based training or government training although their actual providers had come mainly from the central training vendors.

4.5 EVALUATION OF THE TRAINING COURSES IN ICT

Section B of the questionnaire was made up of four parts, each part was devoted to the evaluation of an ICT in-service teacher training course provided at one of four different levels namely, the basic level (BIT), the intermediate level (IIT), the upper intermediate level (UIT) and the advanced level (AIT) of IT competency in ascending order of difficulty.

Each level of IT competency contained 15 to 17 statements depending on which question about the courses teachers had attended. Respondents were asked to evaluate those courses offered by different course providers on a 5-point scale: 1. Does not reflect what went on; 2. Marginally reflects what went on; 3. Neutral; 4. Describes rather well what went on; 5. Is a totally accurate reflection what went on. Each statement reflected one course attribute (referring to Section 3.4.1.2, p. 120). These 15 or 17 statements could be divided into two parts: the core (or common) part and the extended part. The core part contained 12 statements which were the same throughout the four questions or levels of IT competency. The extended part must be specific to each question of its own level and different from other three's. Here the core part, i.e. the common portion would be analyzed first and the extended part (named 'After the course') would be treated later in the section of 'learning outcomes' (Section 4.6.2, p. 205). The mean scores for all items were calculated for each course and arranged in descending order of the mean scores. Besides comparing the courses in terms of the attributes, each course was analysed and discussed by using the group variables such as curriculum, pedagogy and learning effectiveness as stated in Chapter 1 (Section 1.5.2, p. 17).

4.5.1 Analysis of Basic Level Course (BIT) by Course Attributes

Table 27 presents the mean scores and standard deviations for the 12 course attributes of the core part of BIT course in descending order.

Items of attributes for evaluation	N	Mean	Standard
		Score	Deviation
1. Requirements for passing were easy to meet	169	3.70	.89
c. The curriculum content is appropriate for this level	169	3.59	.81
h. Trainers/ tutors provided sufficient on-the-spot help	168	3.49	.92
b. All instructions given by trainers or tutors were	168	3.48	.92
clear			
a. The teaching schedule was carefully designed	169	3.47	1.75
f. Use of medium was appropriate in amount	169	3.43	.75
i. Choice of methods of delivery were appropriate	169	3.40	.79
d. Technical content was useful in equipping learner	167	3.39	.87
k. Trainers/ tutors' feedback on questions appropriate	169	3.36	.84
g. The course provided sufficient hands-on practical	169	3.35	.90
e. Skills offered were beneficial to future teaching	169	3.34	.82
j. Providing opportunity for learners to share ideas	169	3.11	.90
Overall mean scores of BIT courses	/	3.43	/

Table 27. Mean scores of twelve attributes of the training courses at BIT

4.5.1.1 Comparison of Mean Scores

It can be inferred that the BIT course was well-received among teachers as the mean scores of all its items were higher than 3.00 which is the mid-point of the rating. However the mean scores ranged between 3.70 and 3.11 allowing the researcher to discriminate between course attributes that were more or less positively experienced.

The item "Requirements for passing were easy to meet" scored the highest rank with its mean score equal to 3.70 while the second highest is found to be the item "The curriculum content is appropriate for this level" (mean score = 3.59). The mean scores of the other items cluster together and fall between 3.34 and 3.49 except for the last item, "The course provided opportunities for learners to share ideas" whose mean score falls far behind the others at 3.11.

The all-higher-than-three mean scores may mean that teachers were satisfied with the BIT course and that they might have no problem in fulfilling the requirements to pass at this level, understanding what the tutors conveyed and in comprehending the subject content. Supported by the item "Providing opportunity for learners to share idea" being rated 3.11, the results obtained at this level reflected the true picture of the BIT courses that it provided little sharing time and that the trained skills might not be applied in the future teaching. This claim was supported by the result that the item "Skills offered were beneficial to future teaching" being rated at a relatively low score and was ranked the second last in the list (Table 27). Moreover, there seems to be no direct relationship between the top item and the bottom items. Therefore, the order of the rating can more or less reflect the true image of the course from the views of the teachers.

4.5.1.2 Comparison of Standard Deviation

All items of BIT courses were found to achieve a mean score of more than 3.00 with their standard deviations falling between 0.75 and 0.92 except that relatively greater variance was observed in the mean score of the item "The teaching schedule was carefully designed" (S.D. = 1.75) (Table 27). This implies that there was a much greater variation in individual responses for this item than other items. The values of standard deviation reflect that the dispersal of the data in the choice for the above items was wide and the data were not concentrated in any specific area(s).

4.5.2 Analysis of Intermediate Level Course (IIT) by Course Attributes

It was particularly interesting to look at the evaluations for the attributes of the IIT course because this course showed the least difference between teachers' actual and preferred course providers (see Table 26, p. 181).

The intermediate level course was also well-received by the teachers with mean scores for all items higher than 3.00, which was the neutral rating. There was just a difference of 0.32 between the top and bottom ratings, so though the item "The curriculum content is appropriate for this level" obtained the highest score, its mean score was only 3.48 (Table 28). The mean scores of all the items

fell between 3.35 and 3.48, except the last item, "Providing opportunity for learners to share ideas", which scored only 3.14. All in all, the variation among the mean scores of all the attributes was very small and not significant (ibid.). It was noteworthy that mean scores did not represent anything about the distribution of data in each item as most of them clustered around the overall mean score of 3.39 (ibid.). Moreover, by comparing with the overall mean scores of BIT courses, the IIT courses were seemed to be more acceptable as an overview.

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Items of attributes for evaluation	N	Mean	Standard
		Score	Deviation
c. The curriculum content is appropriate for this level	185	3.48	0.87
f. Use of medium was appropriate in amount	184	3.46	0.77
d. Technical content was useful in equipping learner	181	3.42	0.77
h. Trainers/ tutors provided sufficient on-the-spot help	185	3.43	0.86
e. Skills offered were beneficial to future teaching	185	3.43	0.81
i. Choice of methods of delivery were appropriate	185	3.42	0.82
1. Requirements for passing were easy to meet	185	3.41	0.88
g. The course provided sufficient hands-on practical	185	3.38	0.85
b. All instructions given by trainers or tutors were clear	185	3.36	0.90
k. Trainers/ tutors' feedback on questions appropriate	185	3.36	0.85
a. The teaching schedule was carefully designed	185	3.35	0.81
j. Providing opportunity for learners to share ideas	185	3.14	0.90
Overall mean scores of IIT courses	/	3.39	/

Table 28. Mean scores of twelve attributes of the training courses at IIT

The standard deviations of all items of the intermediate level ranged from 0.77 to 0.90 and were not different from each other. It is also interesting to find that the values of the standard deviations were nearly in a descending order. Actually the standard deviation shows the degree of disagreement of data within

an individual item. The value of the standard deviations reflected that teachers attending these courses seemed to be satisfied with the choices provided. Compared with the corresponding figures of BIT courses, the standard deviations of IIT courses fell in a shorter range with their figures crowded more closely together. This shows that the data in IIT agreed with each other than those of BIT.

4.5.3 Analysis of the Upper Intermediate Level Course (UIT) by Course Attributes

Table 29 presents the mean scores and standard deviations for the 12 course attributes of the core part of the UIT course in descending order.

Items of attributes for evaluation	N	Mean	Standard
		Score	Deviation
d. Technical content was useful in equipping learner	55	3.56	1.08
f. Use of medium was appropriate in amount	55	3.55	.72
b. All instructions given by trainers or tutors were clear	55	3.51	.96
g. The course provided sufficient hands-on practical	55	3.45	.79
h. Trainers/ tutors provided sufficient on-the-spot help	55	3.40	.83
k. Trainers/ tutors' feedback on questions appropriate	55	3.40	.85
l. Requirements for passing were easy to meet	55	3.38	.89
c. The curriculum content is appropriate for this level	55	3.38	.95
e. Skills offered were beneficial to future teaching	55	3.38	.87
a. The teaching schedule was carefully designed	55	3.36	.82
i. Choice of methods of delivery were appropriate	55	3.35	.80
j. Providing opportunity for learners to share ideas	55	3.04	.92
Overall mean score of UIT courses	/	3.39	1

Table 29. M	lean scores of	different	attributes of	the training	courses at UIT

The UIT course was also welcomed by teachers as all their mean scores are higher than 3.00 too. Judging from the overall mean score of this level, the popularity of UIT is the same as that of IIT (Table 29). However the mean scores ranged between 3.56 and 3.04 allowing the researcher to discriminate between course attributes that were more or less positively experienced. Compared with the range of the mean scores in IIT, which was shorter, the UIT-goers were found to make their choices at a larger range beyond their mean scores on the attributes of this level.

The item of "Technical content was useful in equipping learner", for instance, received the highest mean score (mean score = 3.56). The item "Use of medium was appropriate in amount" scored the second highest (mean score = 3.55) with nearly the same score as that of the highest item. However, the standard deviation of the highest scoring item was larger than that of the second one, implying that there was a much greater variation in individual responses for the first item than the second item. Thus although some teachers may have agreed that "Technical content was useful in equipping learner", other teachers may choose some other answers or something completely opposite. If the number of the latter is high, the phenomenon would be reflected in the greater value of the standard deviation.

The mean scores of the fourth to the eleventh items are not much different from each other and fall between the value of 3.35 and 3.45. The least popular item is, same as that in BIT and IIT, "Providing opportunity for learners to share ideas" (ibid).

4.5.4 Analysis of Advanced Level Course (AIT) by Course Attributes

Only 11 teachers had completed the advanced course, making a statistical analysis less appropriate. For example, most of the standard deviations are equal to 1 or above indicating a large variation in the answers given and therefore reducing confidence that the mean score is an accurate reflection of the questionnaire responses (Table 30).

However, the analysis is interesting because the mean scores for four items fall on or below the neutral point (i.e. 3.00). This means that considerably more negative evaluation occurred in this course than in the other courses.

In this level it is normal to have the item "Requirements for passing were easy to meet" being the most highly rated attribute as it was also rated the highest in the basic level, but the middle in both intermediate and upper intermediate level. However, it was strange to see the item "Providing opportunity for learners to share ideas" being rated second as it was rated the lowest in all other three levels, BIT, IIT and UIT. The result might be attributed to the small sample in this level as few respondents' preference would easily affect the result in this case containing only 11 subjects.

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Items of attributes for evaluation	N	Mean	Standard
		Score	Deviation
1. Requirements for passing were easy to meet	11	3.55	1.04
j. Providing opportunity for learners to share ideas	11	3.45	.93
k. Trainers/ tutors' feedback on questions appropriate	11	3.36	.81
h. Trainers/ tutors provided sufficient on-the-spot help	11	3.27	.90
a. The teaching schedule was carefully designed	11	3.27	1.01
e. Skills offered were beneficial to future teaching	11	3.27	1.19
b. All instructions given by trainers or tutors were clear	11	3.18	.75
i. Choice of methods of delivery were appropriate	11	3.09	1.14
c. The curriculum content is appropriate for this level	11	3.00	1.00
f. Use of medium was appropriate in amount	11	3.00	1.00
g. The course provided sufficient hands-on practical	11	3.00	1.10
d. Technical content was useful in equipping learner	11	2.91	1.04
Overall mean score of AIT courses	1	3.19	1

Table 30. Mean scores of different attributes of the training courses at AIT

Items having their mean scores equal to or below 3 included "The curriculum content is appropriate for this level", "Use of medium was appropriate in amount", "The course provided sufficient hands-on practical" and "Technical content was useful in equipping learner". It seems that the teachers were not satisfied with the advanced level course (AIT) compared with the courses of other levels which never had any course attributes with a mean score equal to or below 3. Also, the overall mean scores of other levels were all higher than that of the advanced level. Whether it was due to the poor quality of the advanced level course or due to the higher expectation of the teachers was not known. Of one thing, however, it can be certain is that the standard deviations of most AIT course attributes on the whole were observed to be higher than the corresponding items in other three levels. This was further confirmed by plotting a comparison table of the standard deviations of the mean scores of all the course attributes across all four levels

(Table 31). The table showed clearly that seven out of 12 items had the highest standard deviation in the advanced level course (AIT) while others were quite close to the highest value (ibid.). The large disagreement in the course attributes of AIT level is again due mainly to the smaller sample being easily affected by even any individual preference.

Table 31	<u>. Table to</u>	compare t	<u>he standard</u>	deviations	of scores	of different of	course
attribute	s of the tr	aining cou	rses at all fo	our levels			

Items of attributes for evaluation	BIT	IIT	UIT	AIT
*1. Requirements for passing were easy to meet	0.89	0.88	0.89	1.04
*j. Providing opportunity for learners to share ideas	0.90	0.90	0.92	0.93
k. Trainers/ tutors' feedback on questions appropriate	0.84	0.85	0.85	0.81
h. Trainers/ tutors provided sufficient on-the-spot help	0.92	0.86	0.83	0.90
a. The teaching schedule was carefully designed	1.75	0.81	0.82	1.01
*e. Skills offered were beneficial to future teaching	0.82	0.81	0.87	1.19
b. All instructions given by trainers or tutors were clear	0.92	0.90	0.96	.075
*i. Choice of methods of delivery were appropriate	0.79	0.82	0.80	1.14
*c. The curriculum content is appropriate for this level	0.81	0.87	0.95	1.00
*f. Use of medium was appropriate in amount	0.75	0.77	0.72	1.00
*g. The course provided sufficient hands-on practical	0.90	0.85	0.79	1.10
d. Technical content was useful in equipping learner	0.87	0.77	1.08	1.04

(Those items denoted with * have the highest standard deviation at AIT level among its scores in all four levels)

4.5.5 Overall Analysis of the Courses at All Four Levels of IT

Competency

In order to establish the main differences between the courses in terms of the analysis presented above the following table was constructed (Table 32). It shows the mean scores of each attribute for each of the four courses and the average mean score of each attribute for all courses. The table lists the attributes in descending order of the average mean score of all items.

Firstly, the item "Requirements for passing were easy to meet" was found to yield the highest average mean score for the aggregated level courses (average mean score = 3.51) and for both BIT (mean score = 3.70) and AIT (mean score = 3.55) courses, although it was ranked 7th for both the IIT and UIT courses (Table 32).

Secondly, the item "The curriculum content was appropriate for this level" scored highest in IIT (mean score = 3.48) but not too far ahead of the second. Although it was ranked second for BIT, it was ranked 5th overall (Table 32).

Moreover, the item "The technical content was useful in equipping learners in ICT" was so appealing that it scored the first in UIT (mean score = 3.56) and 3^{rd} in IIT. It was ranked 9^{th} or last fourth overall but was actually the least popular attribute (mean score = 2.91) for the teachers who had completed AIT (Table 32).

In fact there was little correspondence between the ranked mean scores for course attributes by teachers who had completed the different courses. The only exception was the item, "The course provided opportunities for learners to share ideas", which obtained the lowest score in the averaged mean scores in three levels, namely BIT (mean score = 3.11), IIT (mean score = 3.14) and in UIT (mean score = 3.04) (Table 32).

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	BIT	IIT	UIT	AIT	Average	Average
Courses	N=178	N=185	N=55	N=11	mean	mean
					scores of	scores of
Items for evaluation					all items	BIT, IIT
						& UIT
1. Requirements for passing were easy to meet	3.70	3.41	3.38	3.55	3.51	3.50
h. Trainers/ tutors provided sufficient on-the-spot help	3.49	3.43	3.40	3.27	3.40	3.44
b. All instructions given by trainers or tutors were clear	3.48	3.36	3.51	3.18	3.38	3.45
k. Trainers/ tutors' feedback on questions appropriate	3.36	3.36	3.40	3.36	3.37	3.37
c. The curriculum content is appropriate for this level	3.59	3.48	3.38	3.00	3.36	3.48
a. The teaching schedule was carefully designed	3.47	3.35	3.36	3.27	3.36	3.39
e. Skills offered were beneficial to future teaching	3.34	3.43	3.38	3.27	3.36	3.38
f. Use of medium was appropriate in amount	3.43	3.46	3.55	3.00	3.36	3.47
d. Technical content was useful in equipping learner	3.39	3.45	3.56	2.91	3.33	3.47
i. Choice of methods of delivery were appropriate	3.40	3.42	3.35	3.09	3.32	3.39
g. The course provided sufficient hands-on practical	3.35	3.38	3.45	3.00	3.30	3.39
j. Providing opportunity for learners to share ideas	3.11	3.14	3.04	3.45	3.19	3.10
Total mean scores for each level of IT competency	41.11	40.67	40.76	30.35	/	/

Table 32. Mean scores of different attributes of the training courses at all four levels

Another column was constructed adjacent to the column of 'Average mean scores of all items', which tried to average the mean scores of each attribute of BIT, IIT and UIT, and formed a new average mean without the involvement of AIT. The results showed extensive reshuffling of positions except the first and the last item (Table 32, last column). The effect of AIT on the ranking of individual course attribute is profound though it accounts for less than 5% of the population.

A similar table was constructed to compare the different ranks of all the course attributes across all four levels to support the findings above (Table 33). Here the arrangement of the course attributes no longer followed the average mean score of all levels but formed a new pattern.

Table 33.	Mean	ranks	of di	fferent	attributes	of the	training	courses	at all	four
levels										

	BIT	IIT	UIT	AIT	Average	Average
Courses	N=178	N=185	N=55	N=11	mean rank	mean rank
	Mean	Mean	Mean	Mean	of all	of BIT,
Items for evaluation	rank	rank	rank	rank	items	IIT & UIT
1. Requirements for passing were easy to meet	1	7	7	1	1	1
c. The curriculum content is appropriate for this level	2	1	7	9	5	2
f. Use of medium was appropriate in amount	6	2	2	9	5	3
d. Technical content was useful in equipping learner	8	3	1	12	9	3
b. All instructions given by trainers or tutors were clear	4	9	3	7	3	5
h. Trainers/ tutors provided sufficient on-the-spot help	3	4	5	4	2	6
a. The teaching schedule was carefully designed	5	11	10	4	5	7
i. Choice of methods of delivery were appropriate	7	6	11	8	10	7
g. The course provided sufficient hands-on practical	10	8	4	9	11	7
e. Skills offered were beneficial to future teaching	11	4	7	4	5	10
k. Trainers/ tutors' feedback on questions appropriate	9	9	5	3	4	11
j. Providing opportunity for learners to share ideas	12	12	12	2	12	12

The traching schedule was

The averaged mean score of each attribute is obtained by adding up the mean scores in all four levels with the assumption that each level bears equal weight. In fact this is not true because the number of respondents in each level is not the same. Since the number of respondents in the AIT is so small, and since the scores of many of its course attributes had very high standard deviation, that absence of data at this level is believed not only to affect the result but also to reflect the true picture represented by the data. Hence, a column of 'average mean scores of BIT, IIT and UIT' was added adjacent to the column of 'average mean rank of BIT, IIT and UIT' was also added adjacent to the column of 'average mean rank of all items' in Table 33. Both aimed to solve the problem caused by the influence

of advanced level course (AIT). Another set of average mean scores was constructed again with the scores of course attributes from BIT, IIT and UIT but excluding AIT in Table 32 while another set of data of average mean rank was constructed in Table 33 using the new set of average mean scores of BIT, IIT and UIT.

This time, the first and the last positions remained unchanged but the item of "The curriculum content is appropriate for this level" rose to the second as it formerly scored the sixth position when the AIT was considered too. Other rising items included "Technical content was useful in equipping learner" (from 9^{th} to 3^{rd}), "Choice of methods of delivery were appropriate" (from 10^{th} to 7^{th}), "The course provided sufficient hands-on practical" (from 11^{th} to 7^{th}). There were also items falling in rank after AIT's influence was removed, namely, "All instructions given by trainers or tutors were clear" (from 3^{rd} to 5^{th}), "Trainers/tutors provided sufficient on-the-spot help" (from 2^{nd} to 6^{th}), "The teaching schedule was carefully designed" (5^{th} to 7^{th}), "Skills offered were beneficial to future teaching" (from 5^{th} to 10^{th}), "Trainers/ tutors' feedback on questions appropriate" (from 4^{th} to 11^{th}) (Table 33).

4.5.6 Evaluation by Grouped Variables (Question 9-12)

The 15 to 17 course attributes, depending on the level of IT competency, were better grouped into some meaningful subscales for the sake of analysis. Since the data had the characteristics of being quantitative, having a wide range of scores and being symmetrically distributed, a data-reduction technique in statistics called factor analysis was employed to reduce the large amount of overlapping data to a much smaller set of factors (Green *et al.*, p. 292). In order to explore the existence of potential subscales, factor analysis was then conducted in the values of the course attributes in each level of IT competency. By using the factor extraction and factor rotation, the number of eigenvalues greater than 1 in the four levels were found to be 2 for both BIT and IIT, while 3 in UIT but 4 in AIT according to plot of the eigenvalues, that is the scree plot for each individual level (Appendix XII). The present author has concluded with his experience and observation that three factors were reduced to include all the course attributes since eigenvalues are helpful in deciding how many factors should be retained in the analysis. These factors were then taken to be the three subscales of 'curriculum', 'pedagogy' and 'learning effectiveness' which had been outlined in Chapter 1 as the three grouped variables (Section 1.5.2, p. 17).

The attributes from subsequence 'a' to subsequence 'q' in Question 9 and 11, from subsequence 'a' to subsequence 'o' in Question 10 and similarly from subsequence 'a' to subsequence 'p' in Question 12 could be grouped together under three categories, which are named as variables. The first two variables come from grouping of the course attributes listed in Table 32 (in p. 195). The three variables include:

- Curriculum (course design, course content in both skills and knowledge level, hand-on practicals and requirements to pass the course);
- Pedagogy (quality of trainers' instructions, use of teaching media, methods of delivery, tutors' feedback and assistance); and
- 3. Learning effectiveness (learners' understanding of the course content and acquisition of skills after the course, and assigned study time).

The third variable 'learning effectiveness' was constructed from the items in the subsequence not listed in Table 32 (in p. 195). Only the first two of these variables will be discussed in this part. Discussion of 'learning effectiveness' will be put in next section of learning outcomes. Figure 12 shows all three variables and their attributes, which are represented in the subsequence number in each question. The categorization of the attributes into each grouped variable wholly depended on the researcher's experience and observation. This needs some further statistical support later.

Proposed Variables		Curriculum	Pedagogy	Learning effectiveness
Relevant	Q. 9:BIT			m, n, o, p, q
Subsequences	Q.10:IIT	a, c, d, e, g, j, l	b, f, h, i, k	m, n, o
	Q.11:UIT			m, n, o, p,q
	Q.12:AIT			m, n, o, p

Figure 12. Relevant subsequences corresponding to their proposed variables

4.5.6.1 Confirmation of the Grouping

ANOVA and reliability analysis were performed to confirm the proposed subscales found out by the factor analysis conducted previously. Repeated measures of General Linear Model were employed to perform ANOVA among the means of the attributes of the each grouped variable including 'curriculum', 'pedagogy' and 'learning effectiveness' in all four levels of IT competency. The result which was tabulated in the appendix with the F ratio, and p value (Appendix XIII) showed that the means among the attributes of the three independent variables in both BIT (p<0.005) and IIT level (p<0.05) were all significantly different from each other while those of UIT and AIT level behaved not so.

In order to demonstrate a more vigorous approach to the construction of the three grouped variables, a standard reliability test was performed to test the reliability coefficient, Cronbach Alpha, of each of these subscales. The result that all the Alpha values lies between 0.76 and 0.92 shows that the means of the three grouped variables can meet the acceptable level of reliability test (Table 34).

Level of IT competency	Cronbach Alpha Value of each grouped variables							
	Curriculum	Pedagogy	Learning effectiveness					
BIT	0.7634	0.8932	0.9271					
IIT	0.8863	0.9046	0.7879					
UIT	0.8704	0.8874	0.8625					
AIT	0.7787	0.8238	0.8787					
Aggregated	0.8834	0.9010	0.9598					

Table 34. The Cronbach Alpha value of the means of the three grouped variables

Combining the data in ANOVA and the reliability test, the grouping of the three variables in both BIT and IIT level were completely valid if the significant level of p<0.05 was adopted in the ANOVA. Only the variables in BIT and IIT were more reliable if such a high significant level was set. However, it was interesting to find out that the Cronbach Alpha values obtained from the reliability test demonstrated the high reliability coefficients in all variables throughout all

four levels of IT competency (referring to the Cronbach Alpha values in Table 34).

4.5.6.2 The Grouped Variables of 'Curriculum' and 'Pedagogy'

'Curriculum' being one of the subscales generated from the factor analysis of the whole group of items (attributes) in each levels of IT competency, is composed of the subsequences 'a', 'c', 'd', 'e', 'g', 'j' and 'l' of Question 9 to 12. All these attributes bear a common characteristic of being curriculum-related that the course planning and design, course content, assignments, assessments and passing requirements are included.

Similarly, 'Pedagogy' is another grouped variable identified from the same process of analysis. It is based on the subsequences 'b', 'f', 'h', 'i' and 'k' of Question 9 to 12 and concerns about the teaching pedagogy of the tutors such as instructional strategy, teaching aids, method of delivery, his feedback on questions and the help offered by him and his assistance during the ICT in-service teacher training courses at different levels of IT competency.

In order to find out how close the data within the same grouped variable, a two-tailed Pearson Correlation was conducted separately for the two subscales. The results showed that nearly all items of IIT and UIT of the variable 'Curriculum' were found correlated to each other at the significant level of 0.01 while that in BIT are mostly correlated. In fact items of this grouped variable in BIT are all significant if 0.05 level of significant is taken (Appendix XIV).

Similar cases were found in the correlation analysis of attributes of the variable 'Pedagogy' in that all items in the levels of BIT, IIT and UIT were all correlated even at the significant level of 0.01 (Appendix XIV). Most of the attributes of AIT level of both grouped variables were found to be poorly correlated. That means the correlation among items in AIT were not significant at any level. Therefore, the decision to treat the proposed subsequences as two groups of individual variables as 'Curriculum' and 'Pedagogy' is considered to be statistically valid.

As the total number of items of the grouped variable 'Curriculum' was 7 throughout all levels of IT competency while that of 'Pedagogy' was 5, a mean score was then taken in each grouped variable. By averaging the scores of the relevant subsequences belonging to curriculum and pedagogy respectively, mean score of the 'Curriculum' and 'Pedagogy' of the training course at each level were obtained (Table 35). Table 35 was obtained by calculating the mean scores of the two grouped variables at each level of IT competency from the data supplied from the total and mean scores (Appendix XV)

Level of IT	Number of	Total Scores	Mean Score	Total Scores	Mean
competency	Respondents	of all items	of	of all items	Score of
		forming	'Curriculum'	forming	'Pedagogy'
		'Curriculum'		'Pedagogy'	
BIT	169	23.95	3.42	17.16	3.43
IIT	185	23.61	3.37	17.03	3.41
UIT	55	23.55	3.36	17.21	3.44
AIT	11	22.45	3.21	15.9	3.18

Table 35. The mean scores of curriculum and pedagogy of Hong Kong's IT in-service teacher training course at each level of IT competency

4.6 OUTCOMES OF THE TEACHER TRAINING COURSES

This section presents the teachers' evaluation of the outcomes of the teacher training courses under the provision of Hong Kong's policy of IT in Education. It begins by exploring teachers' expectations before they joined the training schemes first (Question No. 8), and then tries to determine the learning outcomes by reviewing teachers' use of those acquired knowledge and skills in their own classroom setting. The outcomes for teaching and policy will be discussed too.

4.6.1 Expected Outcomes

(Question No. 8)

8. What did you expect from your training in IT before the courses commenced?

Teachers were asked to think back and remember what they expected before they attended the ICT teacher training courses. A total of seven statements were provided for the teachers to determine how close those statements were to the teachers' expectations. There are five options in each statement as:

Key: 1. Does not at all reflect what went on.2. Only marginally reflects what went on.3. Neutral.4. Describes rather well what went on.

5. Is a totally accurate reflection.

All the expectations for the respondents to choose from are printed in descending order of their preferences in Table 36. The first thing observed in the table is the value of the mean scores. Ranging between 3.45 and 3.79, all the values of mean scores were greater than 3.00, which lies on the positive side of the scale, meaning that all the options are quite close to their expectations (Table 36). In the same table, the option of "I expected the courses could help me increase my knowledge in IT and its application" received the highest response (mean score = 3.79). The two items scoring the lowest mean score were "I expected the courses could help me in teaching with IT or computer" and "help me use more technologies in classroom teaching" with both having a mean score of 3.45. From this result, it can be inferred that the teachers would relatively rather expect the teacher training course to help them on acquiring more ICT knowledge than using ICT in the classroom or in teaching at least among the sampled schools (ibid.). Since all the ratings are positive, the rating of 3.45 for the last two options just mentioned represents endorsement instead of negligence.

	N	Mean	Standard
		Score	Deviation
Help me increase my knowledge in IT and its application	224	3.79	0.86
Teach me how to use some common application software	224	3.74	0.89
Help me enhance my skills on computer operation	224	3.70	0.95
Help me be familiar with the use of computer for general purpose	223	3.61	1.00
Help me prepare the lessons with IT and its resources	224	3.46	1.00
Help me in teaching with IT or computer	224	3.45	1.01
Help me use more technologies in classroom teaching	223	3.45	0.97

Table 36. Teachers' expectation for the outcomes of Hong Kong's ICT in-service teacher training courses

In the original design of the questionnaire, it was anticipated that respondents would complete their answers in this question in advance of attendance at initial ICT training. However, in reality, this proved impractical and the answers given represent a post-hoc impression rather than a contemporary view of their experience. This means that the question is not valid in the terms in which it is stated but the fact that every respondent completed the boxes in Question No. 8 without difficulty, there is some value and significance in their reported feelings. The analysis of Question No. 8 is therefore included but the findings are reported with caution and no great reliance is placed on their accuracy as a historically-based indication.

4.6.2 Learning Outcomes

The data in this section mostly came from the teachers' response in the part of 'After the course' in questions No. 9 to No. 12 which asked the respondents how many skills they have acquired after the course was completed. Again, all these statements were assessed through a 5-point Likert Scale from 'Does not reflect what went on' to 'Is a totally accurate reflection what went on' (the assessment scheme can refer to Section 3.4.1.2, p. 120). Other data were obtained from the respondents' answers to 'Post-course evaluation' in Question No. 13 of the questionnaire.

By performing a two-tailed Pearson Correlation on a group of related attributes from Question 9 to Question 12, it was found that nearly all attributes
high in the group were correlated with each other within the samples in this survey in different levels of IT competency (Appendix XVI). It was also reasonable to accept the hypothesis that they can be grouped under the same variable called 'Learning effectiveness'. The idea was confirmed by performing an analysis in SPSS viewer in that their correlations were all significant at the 0.01 level at 2-tailed test of significance (referring to the BIT, IIT and AIT table of Appendix XVI) but the significance was high in both basic (BIT) and advanced (AIT) level but low in upper intermediate (UIT) level.

4.6.2.1 What Did the Teachers Learn?

The questions were all level-based depending on the learning objectives of that level of IT competency. One example was taken from the basic level of IT competency (BIT) as below (Question No. 9):

	After the course
m.	I knew how to perform simple windows-based operations
n.	I knew how to receive and send e-mail.
о.	I knew how to search and browse in the internet.
p.	I could recognize the ethics of using computers.
q.	18 hours were enough to achieve all the course objectives above.

Here the learning objectives were checked one by one. Usually the last subsequence of this part would refer to the length of time for that level of course. Similar design was found in the course of intermediate level (IIT) which emphasizes on the web-page design and evaluation of computer software (Question No. 10). The upper intermediate level concerns the operation of school networks, integrating IT in teaching and learning, the using of authoring tools and the practising of certain audio-visual devices (Question No. 11). Lastly, whether a learner can manage the school's local area network and whether he was acquainted with web-based teaching became the most important performance indicator for a teacher to pass the advanced level of IT competency (Question No. 12). After all these were the skills considered to be the key measurable indicators of the immediate learning outcome of the teachers in different levels of the training courses.

4.6.2.2 The Grouped Variable 'Learning effectiveness'

A new grouped variable, 'learning effectiveness' has been mentioned earlier (see Section 4.5.6, p. 197). The variable was based on Question No. 9's subsequence 'm' to 'q', Question No. 10's subsequence 'm' to 'o', Question No. 11's subsequence 'm' to 'q' and Question No. 12's subsequence 'm' to 'p', which were used to find out whether learners could have acquired both the knowledge and the skills stated in the learning objectives of courses of BIT, IIT, UIT and AIT respectively. By performing a two-tailed Pearson Correlation on these questions, the results showed that nearly all the items in the group were correlated and that their correlations were all significant at the 0.01 level (Appendix XVI). It was decided to treat this group of items as a variable called 'Learning effectiveness' (refer to Section 4.5.6 again).

Since the content of Question No. 9 'm' to 9 'q', Question No. 10 'm' to 10 'o', Question No. 11 'm' to 11 'q' and Question No. 12 'm' to 12 'p' were different

at each level of IT competency, comparisons of same items across levels were not possible. Also, as the total number of items of 'Learning effectiveness' in each level is different, a mean score was taken. By averaging the scores of all of the relevant items in the subsequences, the mean scores of the learning effectiveness of the training course at each level is obtained. Table 37 shows the mean scores in descending order for the variable of 'Learning effectiveness' at each level of IT competency. The source of these data was taken from the summation of individual mean of this group of attributes from all levels of IT competency (Appendix XVI).

Table 37.	The	mean	scores	<u>of lear</u>	<u>ning (</u>	effective	eness	<u>of Ho</u> ı	<u>ng Ko</u>	<u>ng's ICT</u>	•
in-service	e teac	cher tra	aining	course	at eac	<u>h level </u>	of IT	compe	etency		

Level of IT Number of		Total Scores of all	Number of	Mean Score
competency of	Respondents	the items forming	items forming	of 'Learning
the course		'Learning	'Learning	effectiveness'
		effectiveness'	effectiveness'	at each level
BIT	169	19.74	5	3.95
IIT	184	10.26	3	3.42
UIT	54	16.81	5	3.36
AIT	11	12.90	4	3.23

The table shows that the mean score of the learning effectiveness decreases with the increase in level of IT competency of the teacher training. The best learning effectiveness was found in the teacher training courses in BIT (mean score = 3.95) while the worst was in AIT (mean score = 3.23). It seems that the learning effectiveness was the highest in BIT courses because of the lower level of difficulty (Table 37). In this situation, learners could easily understand the theory and master the skills in the basic level (BIT) when the learning effectiveness is

high.

4.6.3. Outcomes for Teaching and Policy

(Question No. 13)

		Yes	No
a.	Did you apply what you have learned in the above IT competency course(s)		
	to your teaching?		
b.	Do(es) the above course(s) enhance your own learning in IT, in terms of		
	both knowledge and skills?		
c.	Do you have confidence to have 25% of the curriculum of the subject		
	you are teaching to be taught with the support of IT?		
d.	Do you believe that the delivery of the existing curriculum can be improved		
	with the assistance of IT?		
e.	Based on your observation, are your colleagues able to at any time		
	demonstrate most of the skills learned in teachers training course(s) in ICT?		[
f.	Is it worth for the government to spend an amount of money, say \$500m a year		
	in ICT teachers training?		1
g.	Do you agree to the strategy of dividing the teachers training course of		
	ICT into 4 levels (stages) of competency?		
h.	Please provide additional comments on the IT courses below.		

This part of post-course evaluation was aimed at finding out how much the teachers supported Hong Kong's IT in Education initiative and its training course regarding the teaching and political aspects. This question contained two items relating to policy and six items relating to teaching. The two policy-related items asked the teachers whether it is worth it to train the teachers in ICT at such a cost and whether they would agree to the system of dividing the teacher training into four levels (Question No. 13f and 13g). The six teaching-related items deal with the teachers' application of what they had learned in curriculum planning, lesson

delivery and demonstration in teaching. The frequencies and percentages of those answering 'Yes' in the above items were tabulated (Table 38). Their comments on the training courses at different levels were also collected and analysed.

Table 38.	Frequency of	of respondents	agreeing with	n the course e	effectiveness of ICT
training		_			
training					

Level of IT competency	N	Frequency (Percentage)
		of those answering "Yes"
Effect of training on teaching and policy		
Enhanced ICT knowledge & skills	214	181 (84.6%)
Led to the application of ICT in teaching	214	172 (80.4%)
Led to improvement in the delivery of the	214	153 (71.5%)
curriculum		
Found the 4 stages of ICT training an effective	212	150 (70.8%)
strategy for training provision		
Led to inclusion of ICT in 25% taught curriculum.	214	134 (62.6%)
Made colleagues demonstrably more skilful with	213	123 (57.7%)
ICT		
Given the government value for money	213	106 (49.8%)

The table was arranged in the descending order of the respondents' frequencies of saying 'Yes'. Among those items of effects of training, the percentage agreeing with the teaching strategy of the policy and its application in teaching varied between 50% and 85% among all the teaching staff of the nine sampled schools (Table 38). Again, in the post-course evaluation, enhancement of ICT knowledge and skills still gained the support of nearly 85% of the respondents (ibid.). The data which showed support for the effect of these training courses on teaching is much more dominant than that on policy as the two items for policy only scored at the middle and the last position (ibid.). This reflects that

the teachers' concern was on teaching rather than on policy issues.

4.6.3.1 Teaching

Question 13 contained five items about teaching. The effectiveness of the training courses on individual learners was best reflected by their ability to recall the knowledge and repeat those skills acquired in the courses inside their classrooms during daily teaching. More than 80% of teachers said that the training courses had enhanced their knowledge and skills (84.6%) and that they had applied their new knowledge in their teaching (80.4%) but far less, below 58%, in recognizing the same improvement in their colleagues (Table 38).

On the other hand, 71.5% said that the training courses had led to improvement in the delivery of the curriculum, but only 62.6% thought that the government's goal for the inclusion of ICT in 25% of the taught curriculum had been met (Table 38). This suggests that many teachers admitted that the teacher training had made an impact but some of them still thought that the impact was not sufficient to meet the government's target.

4.6.3.2 Policy

Question 13 contained two items about the policy of IT in Education. The first was about whether teachers found the four-stage ICT teacher training an effective strategy for training provision. There were 70.1% of teachers supported

this system by choosing 'Yes' in this part of question.

The other question about policy, which asked teachers if the training was good value for the HK\$500 million spent each year, did not get such a positive response. Less than half of the respondents thought that the government should spend so much money in teacher training in ICT (Table 38). This means that the other half would rather the government spent the money on something else. Where the money should be spent could be answered by some of the respondents through the interview part later and their opinion in the form of interview data would be recorded.

4.6.3.3 Comparison of Expected and Actual Training Outcomes

In fact the comparison of the two events should be difficult because the expectation of the course was assessed by a 5-point Likert scale while the effect on teaching and policy was assessed by an 'agreeing' percentage. However, by comparing the mean scores of each item of teachers' expectation in the ICT training and the 'agreeing' percentage of the effect on teaching and policy from the components of the actual training courses, it was found that the demand for increase in ICT knowledge and skills was met. The highest 'agreeing' percentage in the 'Enhanced ICT knowledge and skills' in the post-course evaluation strongly supports the proposition (Table 38). This means that the desire of enhancing teachers' skills in computer and increasing their knowledge in IT before the commencement of the courses was fulfilled by the learning effectiveness of the training courses.

On the other hand, teachers' evaluation of the training course also revealed that the effect of teaching of the courses had changed some of their expectation in the course. One example was given by the use of 'more technologies in classroom teaching' which was rated the last in the expectation (Table 36, p. 204), but won the second highest in the effect of training in teaching when it was rephrased as leading 'to the application of ICT in teaching' (Table 38). Maybe the teachers dared not expect that the training courses would help them much to use more technologies in the classroom, but it ended up to their surprise, that the availability of those tools could help them in classroom teaching.

4.6.3.4 Comments on IT Training Courses

Comments on the IT training courses came from the data obtained from the part of post-course evaluation of the questionnaire (Question No. 13h). Here respondents were asked to provide any additional comments on various levels IT competency courses which they had experienced or were experiencing. It ended up that 38 respondents made comments, of which 30 comments were on BIT, 25 on IIT, 12 on UIT and 4 on AIT (Appendix XVIII). Some respondents commented on more than one level while one teacher was found to comment on all four levels.

A tally count recording the number of respondents in each school responding to this part of the questions showed that teachers of School 3, School 4 and School 6 were more likely to give response than teachers in other schools (Table 39).

School Names	Sch 1	Sch 2	Sch 3	Sch 4	Sch 5	Sch 6	Sch 7	Sch 8	Sch 9
Total No. of	11	24	22	43	30	35	12	33	17
Returned scripts									
No. of teachers	2	3	6	10	1	9	2	2	3
giving comments									
Response Rate	18.2%	12.5%	27.2%	23.2%	3.3%	25.7%	16.7%	6.1%	17.6%

Table 39. Response rates of each school on giving additional comments to the IT training courses

Answers to this part of question can be divided into the four levels of IT competency, the basic level (BIT), the intermediate level (IIT), the upper intermediate level (UIT) and the advanced level (AIT). The response in each level would be demonstrated as positive and negative comments with their percentage reckoned based on the total number of responses in that level. Analysis of those comments was made below in each individual level.

4.6.3.4.1 Basic Level of IT Competency (BIT)

There were 30 items of comments from the teachers on the basic level of training course in which 5 were classified as 'interesting', 9 were negative and 16 were positive accounting for 17%, 30% and 53% of the total items in this level respectively (BIT part in Appendix XVIII). The positive comments quite outnumbered the negative comments. About one third of the responses for BIT in the questionnaire were negative and the main criticism disclosed that the courses were too simple and easy for teachers (ibid.).

4.6.3.4.2 Intermediate Level of IT Competency (IIT)

Among the 20 items of comments in the intermediate level, negative comments amounted to about 45% of all the comments. One of the positive responses for IIT expressed that the depth and width of the content was appropriate for general teachers' level. The positive comments still outnumbered the other comments a little bit in this level (IIT part in Appendix XVIII).

4.6.3.4.3 Upper Intermediate Level of IT Competency (UIT)

There were 11 additional comments in which nine belonged to the negative while two were the positive. Those who gave negative comments complained about the instructors' competence and the lack of practice time, especially in the upper intermediate level courses. Some teachers criticized the UIT courses as being 'too unrealistic, theoretical and having little value to teaching in practice' while only one UIT-goer praised the courses as 'good and well structured' (UIT part in Appendix XVIII).

4.6.3.4.4 Advanced Level of IT Competency (AIT)

All the additional comments given by the teachers on the course of advanced level of IT competency (AIT) were negative. Most of them concerned some specific skills such as requiring more practice in the LAN system inside the school campus. Others might concentrate on the assessment scheme and the curriculum design (AIT part in Appendix XVIII).

Throughout the survey carried out with the teachers, the total number of responses decreased with the increase in the level of IT competency but the proportion of negative comments increased with the level, with up to 100% in the advanced level of IT competency (AIT). The positive comments followed the same trend but in the opposite way.

4.6.4 Overall Evaluation of the Training Courses

The overall evaluation of Hong Kong's ICT in-service training course from the data of the questionnaire as a quantitative study can be summarized by a table showing all the mean scores in each course variables in the four levels of IT competency (Table 40).

<u>Table 40.</u>	The overall	mean scores	<u>s of all attr</u>	ibutes of the	courses at ea	<u>ch level of</u>
IT compe	tency					

Level of IT competency of the course	N	Overall Mean Scores
		of all Attributes
BIT	169	3.58
IIT	184	3.40
UIT	54	3.39
AIT	11	3.20

[The overall mean scores were obtained by averaging the sum of the total mean value (Table 33) and the total scores of all the items of learning effectiveness (Table 37) by the number of total number of items in each level such that: Overall Mean Score of BIT = (41.11+19.74)/(12+5); Overall Mean Score of IIT = (40.67+10.25)/(12+3); Overall Mean Score of UIT = (40.76+16.81)/(12+5) and

ANALYZING INTERVIEW DATA

A questionnaire survey is able to provide some room for respondents to comment on any issue. But it is not a good and useful research instrument to find out new and more detailed information which usually comes by interview. This technique is also capable of supplementing the inadequacy of the large scale one-way questionnaire survey. Taking this study, for instance, when respondents were asked to give comments on Hong Kong's ICT in-service teacher training course (Question No. 13h), they seldom wrote down anything on the questionnaire but preferred speaking out during the interviews.

4.7 INTERVIEW ANALYSIS

The face-to-face interviews were recorded through note-taking by the present author. Important points were jotted down. Sometimes remarks were made on issues which were not fully understood during post-interview follow-up. At the end of each interview, notes were reviewed with the interviewee to check whether there were any missing points or misinterpreted meanings. An interview summary then was drafted immediately after each interview, with the views and opinions following the order of the dialogues which were mostly guided by the interview schedule (Appendix VI).

Although the interview did not necessarily follow the order set out in the

interview schedule, the data has been presented in the order of the four main parts of the interview schedule as follows:

4.7.1 More on the Training Courses

Data obtained from interviewing teachers and IT co-ordinators revealed some issues about the teacher training courses and the policy of Hong Kong's IT in Education. Coincidence was found on teachers' views from both questionnaire and interviews on topics concerning the proportion of trained teachers in each level, the usefulness of the training and the extra workload of the training (Appendix XIX).

4.7.1.1 Proportion of Trained Teachers

The data in Table 7 (Chapter 3, p. 136) showed that the percentage of the teachers interviewed acquiring the basic level (BIT), the intermediate level (IIT), the upper intermediate level (UIT) and the advanced level (AIT) of IT competency were 100%, 100%, 50% and 25% respectively among the interviewees in this sample. Compared with the corresponding figures in the highest IT competency acquired by the respondents from the questionnaire survey of this study which were 97.2%, 91.2%, 24.7% and 5.3% respectively (Table 13, p. 151), both sets of data were closely coinciding with each other very much, at least from the intermediate (IIT) to advanced level (AIT). This group of interviewees are found to have obtained higher qualification in ICT than the respondents of the

questionnaire which was supported by the high percentage in the upper intermediate (UIT) and advanced level (AIT) in the former case. Both sets of figures are higher than the expected percentage proposed by the 'Five-Year Strategy' (EMB, 1998, p. 13). In the year-book, the Hong Kong government claimed to have trained all 46,000 teachers at the basic level of IT competency (BIT) at the end of 2001 while another 48,000 training places will be provided for the other levels (Information Services Department, 2002, p. 152).

4.7.1.2 Usefulness of the Training Courses

All except one interviewee, Mr. D, agreed that the training courses were useful. Among these interviewees, one of them, Mr. F, accepted that the basic level (BIT) was useful but not the intermediate level (IIT). His reason was that some of the learners could not keep up with the learning schedule of the intermediate level (IIT) and simply gave up (Appendix XIX, Case 6). It must be pointed out that though Mr. D had not mentioned the usefulness of the courses, owing to the interviewer's carelessness and absent-mindedness, still the ICT in-service teacher training courses have actually proved, from other evidence, to be useful.

Another piece of supporting evidence came from the additional comments of the courses. If the number of negative comments or complaints in each level of IT competency were compared, it was found that the number of negative comments in the various levels was very little accounting for less than 20% of the total number of all the comment statements. These comments were not destructive, for instance, 'Messy', 'Too simple' (Appendix XVIII, BIT level), 'A bit too demanding', 'Too difficult' (ibid., IIT level), 'Not necessary', 'Content too much' (ibid., UIT level). Comments for the advanced level (AIT) were all negative such as (ibid., AIT level):

'It should have more practice in LAN system'

'The course is too loose for learners'

'The assessment cannot reflect the actual ability'

'The skills are not necessary for teachers to use IT in classroom'

'Syllabus not deep enough; not sufficient practical exercises at time allocation'

4.7.1.3 Teacher Training as Extra Workload

It was interesting that half of the teachers interviewed reported that their colleagues regarded ICT training as an extra workload beyond their normal duties (Table 41). One respondent suggested that teachers feeling this burden could use self-learning packages (Appendix XIX, Case 2) and that the problem might be mitigated by putting the training courses in Saturday morning as suggested by the same teacher (ibid.).

Name of	Mr. A	Miss B	Mr. C	Mr. D	Mr. E	Mr. F	Mr, G	Mr. H
Interviewees								
Regarding	No	Yes	No	No	(Not	Yes	Yes	Yes
teacher		(most		(courses	mentioned)			
training in		course		offered				
ICT as extra		offered		in				
workload		in		summer				
		Saturday		vacation				
		morning)		only)				

Table 41. Interviewees regarding the teacher training in ICT as extra workload

4.7.2 Teachers' Changes

Teachers' changes during and after the ICT teacher training can be shown by their application of what they have learned and the change of their teaching methods as a kind of paradigm shift among them.

4.7.2.1 Use of ICT in Classrooms

Putting the knowledge and skills learned from the teacher training into practice was mostly found among the interviewees in their schools but to a different extent. No one denied that their colleagues used computers in preparing lecture notes and setting examination papers by means of word-processing such as

Microsoft Word; and in presenting teaching content by presentation software such as Microsoft PowerPoint. Use of ICT in assessing the performance of students' learning was next to none as reported by the interviewees (Appendix XIX, Case 2 and Case 3). Only Mr. E mentioned a data-bank being set up for each subject in his school (ibid., Case 5). Five out of eight interviewees observed an increase in the use of ICT compared with the time before the initiative of IT in Education was enforced. This left three other interviewees unable to answer or forgetting to mention. One teacher attributed the increase to the trend of the IT development (Appendix XIX, Case 2 and Case 6). On the other hand, three interviewees, Miss B, Mr. D and Mr. H, including an IT co-ordinator and two teachers, proposed a strong relation between the use of ICT in teaching and enhancement of students' learning. Six others, especially Mr. E, held different opinions on the issue. They either disagreed or did not think of any correlation between the two variables. One even thought it debatable as it depended on the students' motivation and self control (Appendix XIX, Case 5). Similar results will be obtained in the relationship between the increased use of ICT and the attendance of teacher training courses as no unified stance could be collected from all eight interviewees.

4.7.2.2 Changes in Teaching Methods

One teacher reported that most of his colleagues still stayed with the traditional way of teaching with chalk and talk (Appendix XIX, Case 1). They were mostly textbook-based with teacher-centred approach as quoted in the 'Five-Year Strategy' (EMB, 1998, p. 1). Other interviewees stated that the use of

ICT in teaching among their colleagues was limited to electronic books or presentation of their old hand-out. Neither teaching approach and methods, nor teaching aid was changed, let alone the mind set and culture.

4.7.3 Policy of Hong Kong's IT in Education

The ratio between the number of respondents agreeing to the expenditure of HK\$514 million (approximately £40 million) for the teacher training in ICT for the past three years and that of the opponents is four to four, that is half and half. Those holding a positive view, such as Mr. A, Mr. C, Mr. D and Mr. E, disclosed that the expenditure was for the teachers or students' own sake. Those holding opposite opinion would question the cost effectiveness of the expenditure (e.g. Miss B) and whether the learners could master the skills after they completed the relevant course. There was also a voice for combining the basic (BIT) and intermediate (IIT) level of IT competency as the former was too easy. Other suggestions of reclassifying the existing system to three levels was gaining ground, though one of the respondents attempted to reduce it to two levels only (Appendix XIX, Case 3). After all, four respondents agreed that it was appropriate to retain the four-level system, two disagreed, one said no objection and Mr. A did not mention it during the interview. The requirements stated by the 'Five-Year Strategy' would easily be achieved by all nine schools, including the proposal that all teachers reach at least the basic level of IT competency. The interviewees answered this question by saying either 'no problem' or 'reasonable'. Some schools suggested that all their teachers would achieve at least intermediate level

(IIT) which was more than the requirement of 75% of the teaching staff reaching this level of IT competency set by the 'Five-Year Strategy'. Therefore, over 87% of the respondents felt comfortable with this kind of requirements. However, Mr. H, one of the IT co-ordinators, thought it too rigid.

4.7.4 IT Co-ordinators

The IT co-ordinators of all the seven schools under survey, except one, came from their serving teachers. As a teacher from their own school, they were supposed to be familiar with the needs of their colleagues and able to make lots of contributions conducive to the well-being of their own schools. Their professionalism and value of existence can be judged by their achievement in helping their colleagues in integrating ICT into the curriculum of each subject.

4.7.4.1 Daily Work of an IT Co-ordinator

There was only one respondent saying that the greatest contribution made by his IT co-odinator was to lead the whole school onto the trend of ICT. Other teachers being interviewed agreed that their IT co-ordinators were busy at maintaining the school intranets and servers, but not much work was done in integrating ICT into the curriculum of any subject. The importance of the IT co-ordinator lay in the technical support and operation level. Most of the teachers, six out of eight, would like their IT co-ordinators to have training in either curriculum development or integrating ICT into school curriculum while the other two could not see any training need for them for the time being. On the other hand, the two IT co-ordinators during the interview showed their effort in assisting teachers in using ICT in teaching and learning. Their work, however, was limited to booting up the computers, preparing video, installation of software and taking care of the computers in case of accidental shut-down. There were two cases where an IT co-ordinator had to take some teaching for part of their workload. Twenty periods per week was one of the examples given by an interviewee (Mr. H, Case 8 of Appendix XIX). Some of them also tried to organize some courses for teacher as a kind of extra staff development, but in vain because nobody turned up in one case.

4.7.4.2 Role of an IT Co-ordinator

As regard to the greatest contribution of the IT co-ordinators in their schools, five teachers responded that their IT co-ordinators were good at maintaining the school's intranet or server. Others appreciated their IT co-ordinators in technical support. In fact, nearly all the teachers misunderstood the role of an IT co-ordinator as more than that of a technician or a certificate holder of computing from a technical institute. Only one IT co-ordinator could spell out their function as to "take charge of all IT-related teaching and learning activities" and "tailor software to meet the needs of the teachers and students" (EMB, 1998, p. 14) but very few teachers have sought for their assistance so far. Hence, Mr. E sighed at his little influence on the change of their colleagues because of his inferior position in the school's organization structure (Appendix XIX, Case 5).

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4.7.4.3 Integrating ICT into the School Curriculum

Up to this moment, all except one interviewee, Mr. F, were dissatisfied with the effort paid by their IT co-ordinators in integrating ICT into teaching and learning though some were content with their performance in technical support, both in software and hardware. As a specialist in ICT in the school, the IT co-ordinators were supposed to lead their colleagues and guide them in how to teach and learn with the use of ICT. The real situation was not as expected, however. The training needs, expressed by both teachers and IT co-ordinators themselves, were either the curriculum or the technique of integrating ICT in curriculum. The problem, responded by the IT co-ordinators, was that no tertiary institutions to date were able to provide courses in meeting such needs.

4.8 SIGNIFICANCE OF OTHER DATA RECORDED

There were some interesting findings discovered during the interviews of the secondary school teachers and the IT co-ordinators. This interview data could not prove anything, due to the scarcity in number of interviewees, but would provide some insight to the policy makers and the curriculum planners of Hong Kong's ICT in-service teacher training scheme about the true picture. The following were some examples of these interesting findings.

1. Course content being too skill-oriented;

2. Principals as the last gate-keepers of assessment;

3. 'Collaborator' as getting authorized assistance in finishing the portfolio assessment tasks.

These newly discovered data could uncover the unseen side of the new ICT in-service teaching training in Hong Kong. Again, these data were not significant statistically but can be used to illustrate or provide a possible elaboration of the meaning of what was found from the questionnaire. Some of them were debatable but will still be quoted every now and then in the next chapter of discussion to suggest avenues of research that were not taken up in the original questionnaire. These data will be broken up and used to support different sections in next chapter.

4.9 CONCLUSION

This chapter tried to perform extensive statistical analysis on the questionnaire data thoroughly and carefully. The categorizations of 'self-directed' and 'other-directed' were employed in both the sections of meanings and definitions, and aims of professional development. Personal growth was prioritized higher than organizational development in the teachers' choice of aim of professional development. The programme which was also referred to as 'methods of professional learning' was classified and assessed according to its popularity, enjoyment and effectiveness. A large number of pages were devoted to the evaluation of the ICT in-service training course under the provision of the 'Five-Year Strategy'. Courses of different levels were assessed and then analyzed through course attributes and grouped variables of curriculum, pedagogy and

learning effectiveness with different criteria. In addition, interview data obtained from eight teachers were presented, but without any elaboration.

During data analysis, there were some interesting findings which needed further exploration, elaboration and discussion. These findings will be dealt with in the next chapter included under the theoretical model of 'Concept-Provision-Outcome' as:

Concept and Practices

- 1. The teachers' concept of ICT teacher training in general was either lacking or very limited confined most of time to knowledge and skills updating.
- 2. The learning style of self-directedness was more dominant than the style of other-directedness in teacher training of Hong Kong's ICT in-service teacher training.

Provision

- 1. The basic level of ICT teacher training (BIT) was very well received but other levels were not so popular.
- 2. The school-based teacher training was more welcomed than other types of course providers in Hong Kong's ICT in-service teacher training.

Outcomes

The requirements of teacher training stated in the 'Five-Year Strategy' seemed to be fulfilled, but the expected change in teaching was not observed and the IT co-ordinators' role was not well performed.

It is inevitable that data obtained from interviews would be used in the discussion part to illustrate and provide possible elaboration such as the questions regarding the change in teaching and jobs of IT co-ordinators.

CHAPTER 5 DISCUSSION

5.1 INTRODUCTION

This thesis presents an evaluation of Hong Kong's ICT in-service teacher training that started under the policy of IT in Education proposed in 1997. Views and opinions were collected from a group of secondary school teachers and IT co-ordinators by using questionnaires and interviews. The questionnaire survey was analyzed by means of the software of SPSS for Windows while the information obtained from the follow-up interviews has been used to provide additional insights into the findings.

This chapter presents a discussion of the main findings of the survey in relation to the concept and practices, provision and outcomes of the ICT in-service teacher training courses which were implemented in response to the new policy of IT in Education in Hong Kong initiated in 1998.

The findings from teachers in the survey are compared with the official aims and objectives of Hong Kong's ICT in-service teacher training scheme and with relevant research and theory that has been reported in the literature. Lastly, the evidence collected in this research project is used to determine whether Hong Kong's ICT in-service teacher training, under the provision of the 'Five-Year Strategy', is a success or not.

The order of discussion will follow the three stages of the 'Concept-

Provision-Outcome' model outlined in Chapter 1 (p. 18). Teachers' and IT co-ordinators' views about the concept and practices, provision and outcomes of Hong Kong's ICT in-service teacher training have enabled the present author to clarify the main issues in evaluating the implementation of the policy. New ideas are generated through careful analysis of the statistical findings and comments of the informants through the survey with supplementation of interviews.

5.2 STAGE OF CONCEPT AND PRACTICES

This section covers both the concept and practices of professional development. It compares the specific views of the concept and practices of professional development in the context of Hong Kong's IT in Education initiative with the broader views taken in the general literature on professional development and with the views of the teachers and IT co-ordinators who participated in the survey.

The first part of the discussion focuses on the concept. The concept of professional development in Hong Kong's IT in Education policy has been stated as the 'Teacher Enablement' or the in-service teacher training. It was generated in the vision and rationale of the 'Five-Year Strategy' published in 1998 (EMB, 1998, pp. 10-5). This concept is compared with broader definitions of 'professional development' from the literature and is further informed from the survey data by the views of the teachers and IT co-ordinators on the aims and meanings of the term 'professional development'.

The second part of the discussion focuses on the practices of professional development. It compares the practices of professional development described in the literature and the actual activities of professional development found in the teacher training offered by the sampled schools in this study.

5.2.1 Teachers' Concepts of Professional Development

The following section outlines the concept of professional development as formulated in three different sources, namely, the ICT in-service teacher training scheme of Hong Kong's IT in Education, the general literature and surveys conducted as part of this study.

5.2.1.1 The Concept of 'ICT In-service Teacher Training' in Hong Kong's IT in Education Policy

The concept of 'ICT in-service teacher training' was first expressed as the commitment to a five-year strategy on information technology in education in the Chief Executive's 1997 Policy Address so as to "promote the use of IT to enhance teaching and learning" and to "enable students to use IT creatively" as part of their learning activities (Tung, 1997). As for teacher professional development, the Chief Executive also expected the main tasks of the IT education strategy to equip "teachers with the necessary IT skills" so that they can "apply computer assisted teaching and learning across the curriculum" (ibid.). Moreover, another policy discussion paper in 1998 expected that "teachers should be able to use

common presentation tools" (Law, 1998, p. 29) and be effective users of IT-based resources to support learning (ibid., p. 30). The concept was later interpreted in the 'Five-Year Strategy' in late 1998 as a vision promoting IT in Education so as to bring about "changes to the mind set and culture among teachers, parents and students" and "to facilitate more effective teaching and learning and development of a creative mind" (EMB, 1998, p. 1). Furthermore, to proceed toward this vision, the government made an undertaking specifically to teachers to "integrate IT into school education meaningfully through necessary curriculum and resource support" (ibid., p. 2). The Strategy was based on the assumption that teachers in Hong Kong were "receptive to the challenge of taking up their new role as a learning facilitator" and that they were willing to make the transition "to the new mode of teaching" according to what had been found in a survey conducted before (ibid., p. 10). Teachers were needed to develop students' skills in selecting, analyzing and absorbing the abundant and most updated information obtained through ICT in order for Hong Kong to achieve the above vision which means a paradigm shift and effective teaching and learning. All these goals are all inter-related and constitute the ultimate goal of enhancement of the quality of education (Law, 1998, p. 29).

As pledged by the government, the training cost for the serving teachers for the whole project amounted to HK\$514 million (approximately £40 million) which was used to pay for the trainers of schools and central vendors at different levels of IT competency (EMB, 1998, p. 10).

The concept of professional development in the policy of Hong Kong's IT in Education about the implementation of ICT in schools was clearly based on a training model in which teachers were expected to learn new skills in order to implement change in schools. The key idea of such kind of implementation of teacher training was that all changes came from the top or government policy that can be regarded as a kind of outside-driven motivation.

5.2.1.2 Comparison of Hong Kong's In-service Teacher Training Model of Professional Development with other Models of Professional Development

The model of professional development underpinning Hong Kong's ICT in-service teacher training initiative shares two important features with other models of teacher training outlined on the literature reviewed in Chapter 2.

Firstly, the ultimate goal of professional development, both in ICT in-service teacher training and other teacher training is more or less the same: enhancing teaching and learning (Tung, 1997; EMB, 1998, p. 1). Huges (1991, p. 54) put it as "support effective teaching practices", while other researchers focus on professional development for the benefit of students especially in their learning (Burke, 1993, p. 75; Dean, 1991, p. 8). The teaching practices to be enhanced by professional development are mostly referred to in terms of pedagogy and subject matter (Kirk, 1988, p. 16 and p. 45). Hewton's (1988) point to "increase the quality of pupil learning" through the development of teachers' potential (p. 90) matches very much with the concept of professional development underpinning Hong Kong's ICT in-service teacher training scheme.

A second point of similarity between Hong Kong's ICT teacher training scheme and other professional development provision is the idea that teachers should become change agents, i.e. that they should bring about "changes to the mind set and culture among teachers, parents and students" and "to facilitate more effective teaching and learning and development of a creative mind" (EMB, 1998, p. 1). This idea is found in many different schemes although different terms and jargon are often used to express the same meaning.

For example, the change in mind set and culture expressed in the 'Five-Year Strategy' corresponds to the 'the process of change' for individual's knowledge and skills for practice suggested by Hoyle (1982, p. 164). The meaning of this 'change' can further be extended to mean improvement (Huges, 1991, p. 54; Ballanca, 1995, p. 6), staff growth (Huges, 1991, ibid.), development (Kurk, 1988, p. 16), and effectiveness (Burk, 1993, p. 75). Besides knowledge and skill, change can also cover the 'alter' of belief and understanding (Griffin, 1983, p. 2; Huges, 1991, p. 54). But it is less likely that it includes renewal in broader sense (Huges, 1991, p. 54) or change in the school organization' (Bellanca, 1995, p. 6). To summarise, preparing teachers for future changes and advancement becomes one of the aims of professional development (ACFHE/APTI, 1973, p. 2). It seems that the five-year plan was not a radical move to reform teachers' professional development and to give teachers more autonomy but a narrow plan to improve their expertise with IT and to introduce the subject into the school curriculum.

Discrepancies between the concept of professional development from Hong Kong's ICT teacher training scheme and that from the literature reviewed could be summarized into four aspects, namely,

- teacher development versus school development;
- individualism versus system thinking;
- knowledge-skill orientation versus attitude-belief orientation and
- teacher-led versus top-down.

5.2.1.2.1 Teacher Development versus School Development

The concept of the 'ICT in-service teaching training', as revealed in the 'Five-Year Strategy', concentrated on the percentages of teachers receiving different levels of IT training and the content of training courses at each level of IT competency. There was no reference to the link between the teacher development and school development. The only way impact on school development could be found maybe through the funding mechanism in purchasing furniture and equipment and recruiting staff which can be taken as part of the school administration and management. Another possible impact may be brought by the changes in curriculum which are developed through the support of ICT but co-ordinated in the school level.

On the other hand, nearly all the authors in the general literature review mentioned both teacher development and the school development. For example, Hughes (1991) described professional development as a complex process through which teachers improved and developed their skills, attitude and belief (p. 54) but at the same time described related activities as 'the sum of all activities' carried out by 'individual or system' (ibid.). Fullan has argued that professional development and school development are intrinsically linked and has related to the improvement of school (Fullan, 1991, p. 5). Taking another instance, Dean claimed professional development as "a process whereby teachers become more professional" (Dean, 1991, p. 5), she also covered both organization development and individual development in her discussions of the influence of professional development (ibid., p. 8). She further suggested to have aims of professional development to be included in the overall school development plan (ibid., p. 5-6).

5.2.1.2.2 Individualism versus System Thinking

From the Policy Address in 1977 to the 'Five-Year Strategy', the policy of Hong Kong's IT in Education has emphasized the importance of teachers' competency in teaching with computers or, more accurately, ICT. However, the focus of the provision to enhance teachers' skills has frequently been placed in the individual teacher or a group of teachers instead of the whole school, community-wise or even territory-wise. Examples are found in the document, such as:

To effect the paradigm shift, there have to be changes to the mind set and culture among *teachers, parents and students*; the way in which the curriculum is designed and delivered; student assessment etc. (EMB, 1998, p. 1, emphasis is added).

Yet, the four key components of the mission of the 'Five-Year Strategy', namely access and connectivity, teacher enablement, curriculum and resource support, and fostering a community-wide culture are found to be concerned with teachers' teaching or training and students' learning. There is obviously a lack of system thinking in the formulation of the policy of Hong Kong's IT in Education and also in the design, implementation and assessment of her ICT teacher training strategy.

On the contrary, educators supporting a professional development model, especially within the school effectiveness group such as Williams (1982), Conners (1991) and Bellanca (1995) were seen to pave the way for developing a whole school or system approach in their construction of any strategy or policy. Bellanca (1995) demonstrates this particular approach by presenting professional development as a "planned, comprehensive and systemic programme designed by the *system*" (emphasis is added) (p. 6) in that if applied in the local context:

- 'planned' means the policy of Hong Kong's IT in Education has been formulated before 1997 for its implementation in 1998;
- 'comprehensive' means that the teacher training scheme in ICT specified levels is clear and concrete and that all teachers should achieve it;
- 'systemic' means well structured which does not apply to the said IT in Education policy in Hong Kong as there have not been any specifications from the education authority about whether or not a school has to employ a certain percentage of teachers qualified at each level of IT competency;
- 'designed by the system' means that the formulation and implementation of the initiative were designed by the former Education Department.

Again, Huges (1991) also considered professional development as activities

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"carried out by individuals or *system*" to promote growth (p. 54). The school-wide or systemic concept was pervasive all over most of the literature concerning professional development. It was therefore quite strange how the planners and policy makers of Hong Kong's IT in Education initiative could miss such an important characteristic when the policy of the teacher training was formulated in 1997. Proponents of the systemic or school-wide professional development such as Burke (1993) and Dean (1991) suggested that school-wide professional development must bear the concept of school improvement in which the teacher must be aware of the well-being of the school development (Burke, 1993, p. 75). That the professional development programme should provide support for school (Dean, 1991, p. 7) and that the "professional development goes hand in hand with the school development" are two important concepts for the school-wide professional development (ibid., p. 10).

5.2.1.2.3 Orientations of Knowledge-skill versus Attitude-belief

The 'Five-Year Strategy' in its part of 'Teacher Enablement' stressed more than once, as an echo to the Policy Address in 1997, that the teacher training courses must be concerned, not only with technical skills, but also "how the pedagogical approach itself can benefit from more usage of IT" (EMB, 1998, p. 11). The policy makers tried their best "not to place emphasis solely on technical skills, but also on how the traditional textbook approach to pedagogy could diversify to include elements of IT" (ibid., p. 10). Despite these intentions, the notion of skills training in ICT was pervasive both in the vision and from the stand-point of the policy. One reason for its pervasiveness was the view that, "Whilst some teachers are eager to embrace IT in education and have sophisticated IT skills, teachers in general have little experience in using IT to teach, partly due to lack of training opportunities and facilities." (EMB, 1998, p. 4)

The ultimate goal of the new initiative was "to train up a large number of teachers" and to "integrate IT meaningfully in school education" (ibid. pp. 4-5). Though a voluminous amount of the 'Five-Year Strategy' was devoted to the description of 'paradigm shift' and 'integrating IT into the school curriculum', the final products and the course content of those ICT in-service teacher training courses throughout all four levels were observed to adopt mostly the skill-oriented approach.

Looking up the literature, it is clear that most writers would take a broader view of the meaning of professional development than that taken by the policy makers of Hong Kong's IT in Education initiative. The broader perspective includes attitudes, values and beliefs, as well as knowledge and skills. For example, Huges (1991) describes professional development as a complex process for teachers to improve and develop their skills, attitudes and beliefs (p. 54) while Griffin (1983, p. 2) explains the same term as a system to "alter the professional practices, beliefs and understandings" of teachers. The NCET have developed seven statements of teachers' competence in ICT which Harrison (1998) adapted as a framework of understanding through, besides knowledge:

- belief that ICT should contribute to the learning of children;

- the ability to review and reflect critically on the implementation of ICT; and
- appreciation that ICT culture continues to evolve and grow rapidly (p. 100)

In addition, any ICT/IT capability as a standard to measure the ICT ability of teachers would stress on the understanding of the implication of ICT for working life and society (DfE, 1995, p. 1)

5.2.1.2.4 Teacher-led versus Top-down.

There can be no doubt that the target of any type of professional development in education is the teacher. The policy of Hong Kong's IT in Education initiative took the top-down approach that teachers were forced to take the training courses according to the reform in the ICT in education. Teachers were placed under the spotlight and became the main focus of the policy goals in the policy address which stated that:

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; (1997 Policy Address, emphasis is added).

The government's commitment to a five-year strategy on information technology in education was in fact an opportunity to move the teachers to accept a new paradigm in teaching. The new paradigm was to be achieved through changes in teaching brought about by the introduction of IT throughout the school curriculum:
A committee on IT in Education should be formed in the school management...to plan for the gradual roll out of IT across the curricula, the related student preparation, staff training, support and responsibilities, and to formulate the related school policies (Law, 1998, p. 39).

Besides using a graded certification system to assess teachers on professional development in the long term (EMB, 1998, p. 13), the government used wordings like 'challenge' and 'help' in the policy paper to denote the importance of teacher training (Law, 1998, p. 39). The challenge was that teachers were expected to move away from their traditional teacher-centred role to a more student-centred role as:

To respond to these new requirements, our school education needs to see a paradigm shift – from a largely textbook-based teacher-centred approach to a more interactive learner-centred approach (EMB, 1998, p. 1).

The 'help' was in recognition that it would not be easy to achieve. No wonder the discussion paper by Law ended by saying that "teachers are at the heart of a successful school change" and that they need incentives and support from the public (Law, 1998, p. 40).

A major limitation of the government model was that it placed too little emphasis on the importance of teachers taking a leading role in initiating change. Researchers like Bellanca (1995) and Dean (1991) have stressed the importance of teacher-led professional development and that teachers should have a role in determining "the content, location, format, incentive and rationale of their development" (Bellanca, 1995, p. 5). Altrichter (1986), as quoted by Gouge and James (1990), pointed out the need for teachers being the designers of their own professional development (p. 15). Moreover, Rossner (1992) mentioned that, among other key characteristics of teacher development, most teachers opined that teacher development has to be 'bottom-up' rather than dished out by 'managers' or schools' administrators.

In summary, it would seem that the concept of professional development underpinning ICT in-service teacher training under the provision of the policy of IT in Education in Hong Kong can be described in terms of these four models identified from the literature. In a nutshell, the major characteristics of the Hong Kong model were: it supported a model of teacher development rather than school development; it was implemented through individuals rather than systems; it had a knowledge-skill orientation rather than an attitude-belief orientation; and it was a top-down approach which was controlled by government and was not a teacher-led initiative.

5.2.1.3 Sampled Teachers' Concepts of Teacher Professional Development

The survey attempted to uncover the concept of professional development held by the teachers. It did this by (i) asking teachers to rate twelve statements suggested by teachers about the meaning of professional development, (ii) asking teachers what came into their minds when they thought of professional development, and (iii) asking teachers whether they agreed with five aims of professional development.

5.2.1.3.1 Asking Teachers to Rate Twelve Statements Suggested by Other Teachers about the Meaning of Professional Development

The response to the question about the meaning of professional development (Question No. 14) suggested that teachers favoured a self-directed (teacher-led) rather than an other-directed (top-down) model of professional development (data referred to Section 4.3.1.1, p. 156). A self-directed model stresses that learning is a process in which learners "take the initiative, with or without the help of others" (Knowles, 1975, p. 78).

5.2.1.3.2 Asking Teachers What Came into Their Minds when They Thought of Professional Development

Very few respondents volunteered an answer to the question asking them what came to their minds when they thought of professional development (Question No. 14m). Only 54 teachers answered this question and the little response suggested that respondents' concepts of the term 'professional development' were limited to the items provided in the previous question. (It is, therefore, not surprising that they volunteered few ideas. This might have been due to teachers' professional opportunities being limited rather than their concept of professional development. Maybe their concept of professional development was based on the provision for professional development available.)

The picture of professional development painted by the 54 teachers who responded to this question was one of personal improvement and the acquisition of knowledge by teachers rather than school improvement. Professional development was achieved through teachers learning and there was little mention of external provision. This is actually a limited view of professional development and a more extended view would have included the school development potential and its link with ideas outside the institution.

5.2.1.3.3. Asking Teachers Whether They Agreed with Five Aims of Professional Development

Not too many of the respondents thought that professional development should aim to stimulate organizational growth for the school or aim to change the school as a learning organization. Though the difference between the first two most popular aims chosen by the teachers is not significant, their discrepancy in percentage, 73.1% versus 56.8%, is great enough to distinguish one choice from the others (Section 4.3.2, p. 165). In addition, since teachers were allowed to have more than one choice in answering this question, the differences among the scores of all five options would not be too drastic.

In this question of asking teachers about the aims of professional development in their own schools (Question No. 15), teachers' answers could be used to confirm that teachers sought personal improvement and that the development of their skills was an outcome, rather than school development. This kind of seeking personal development with the involvement of external provision have nothing to do with the self-directed or other-directed approach suggested in the analysis of the Question No. 14 and No. 14m.

On the other hand, the lack of attention to the organization growth among a certain group of teachers may mean that they might have very narrow perspectives on professional development. The present author admitted that the list of the aims of professional development in Question No. 15 for the respondents to choose was not sufficiently extensive to show extended professionalism. Another part of the questionnaire, Question No. 16m, which asked the respondents to suggest other methods of professional learning, could, however, make up any inadequacy.

5.2.1.3.4 Fulfilling the Requirements from the Principal as an Aim of <u>Professional Development</u>

One of the options that teachers could have chosen in answering Question 15 on the aims of professional development for teachers in their present school was to "fulfill the requirements from the principal or a group of senior management team". The interview data shed some light on why only 61, about 27% of teachers thought that this should be an aim of professional development in their school (Figure 11, p. 166).

Under the current system of ICT teacher training, the school principals are authorized by the government to determine whether a teacher can pass in his/her teacher portfolio. It became apparent during the interviews that some teachers thought that it was inappropriate to have the school principal as the final evaluator of teachers' ICT teacher training (Case 2 and Case 6 of Appendix XIX). Besides the subjectivity of the process and its dependence on the individual personal view (Kremer-Hayon, 1993, p. 234), some teachers questioned the ICT competency or qualification of their principals in making such decisions, despite so-called objective criteria to be applied. Even though some of the principals delegated the decision to their IT co-ordinators or their IT team leaders, some respondents reported that the situation was still very 'political' as it involved many human relationships with bias and prejudice.

Some teachers pointed out that there are few examples of principals, in anywhere outside Hong Kong, acting as final assessors in teacher training courses including school-based or off-campus teacher training. It was recognized that some principals might be sympathetic to colleagues who lagged behind and that this was not fair to other teachers. For the system to be fair, it is necessary to have the involvement of an external agent or reference system for authentic assessment.

The lack of a broad view model of professional development in schools, which is due to the poor school management or a backward education system, and the teachers' unchanged mind set is to be blamed. Together with principal's leadership, the school ethos and the working culture among teachers which also relates to collegiality all attribute to bringing about change and possible school improvement.

5.2.1.4 Findings in the Concept of Professional Development

Throughout this study, there are some important findings about the concept

of professional development which need to be summarized. They can be concepts taken from literature about the improvement of teachers and school, the confused concept about the Hong Kong's model of ICT in-service teaching training and the limited concept of professional development possessed by the teachers in Hong Kong on the recent policy of IT in Education.

5.2.1.4.1 Literature Revisit of Concept of Professional Development

The concept that professional development is capable of improving teachers and school development is unquestionable but different researchers quoted in the literature review chapter (Chapter 2) may place a different degree of emphasis on the two types of development. In one hand, Huges (1991, p. 54) thinks that professional development is the responsibility of individuals and it aims to promote individual staff development. On the other hand, however, both Schmuck (1980) and Holly and Southworth (1989) agree that effective professional development can encourage individuals and groups to engage in problem solving within the school or college environment and that leads to school improvement. Moreover, Dean (1991) considers the influence of professional development at the school level where it can result in improvement in the experience of pupils and everyone in the school as well as the teachers concerned (Dean, 1991, p. 8).

A second issue concerns the teachers as professionals. Though Eraut admits that teachers of some countries may not require a long period of initial training, nor do they have a complete code of ethics, he still accepts teaching as one of "the less powerful professions" (Eraut, 1997, p. 39). Hence Dean would claim that professional development is making "teachers become more professional" (Dean, 1991, p. 5) while Burke encourages the teachers as a professional to be aware of the characteristics that "make schools an effective place for students to learn" (Burke, 1993, p. 75).

For the third comment, professional development can also be perceived as a process for developing individual's knowledge and skills for practice and change (Hoyle, 1982, p. 164). An example is given by Bellanca (1995) who defines professional development as an "individual's selection to expand his or her repertoire of knowledge and skill" (pp. 5-6). Kirk also recognizes that a teacher needs professional enrichment not only for enriching and acquiring skills but also for keeping abreast of developments in pedagogy and knowledge (Kirk, 1988, p. 16; ibid., p. 45). This is also the interpretation of Too (1987, p. 11), that the meaning for professional development includes the upgrading of knowledge and skills, and even more than that, the fostering of personal and interpersonal growth (Lee, 1993, p. 122).

5.2.1.4.2 Concept of Hong Kong's Model

The idea that teachers should become change agents suggested by Hong Kong's IT in Education initiative was regarded as a confused concept as there has not been enough peripherals supporting the needed facilities. Whether teacher training can bring about "changes to the mind set and culture among teachers" depends very much on the provision of a series of supporting facilities which includes the availability of computers, a user-friendly system, the connectivity to the Internet and most importantly, a stable working platform. Insufficiency in any of these means would militate against giving teachers the necessary ownership and autonomy to become change agents.

5.2.1.4.3 Limited Concept of Professional Development

It is found in the study that teachers of Hong Kong aspired for teacher-led professional development as they could have more autonomy in choosing their own ways of in-service teacher training. This group of teachers under survey, however, were discovered to have a limited concept of professional development which means their concepts in professional development are much confined. This confinement can be shown in two ways, the aims and the objective association of the term 'professional development'. As shown in Figure 11 (p. 166), among the five choices, this group of sampled teachers liked to choose the aims with stronger approach towards personal development than those with more tendency towards organizational growth (p. 166). Moreover, the first thing came to the teachers' mind when they thought of professional development also reflected the teachers' limited perspective as most of them thought of personal improvement rather than school development (referring to Figure 11 and Appendix IX). Other possible evidence supporting this claim includes the teachers' preference on the meanings of professional development which after statistical treatments in factor analysis and reliability test has shown the dominance of the items with higher self-centredness (p. 154).

In practice, respondents would rather put the improvement of practical skills

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in a higher priority than the acquisition of theoretical knowledge. This preference can be considered as having a limited concept of professional development centering on the importance of individual development rather than organization development and, choosing the aims of professional development with more self-centred approach. This idea can be compared with Lomax's (1986) 'restricted professionality' to the extent that Lomax restricted the professionalism to "the knowledge, skills and procedures employed by teachers in the process of teaching" centering mostly on the classroom skills (p. 124), while the present author focuses on the self-centredness.

5.2.2 Teachers' Practice of Professional Development

The practice of professional development refers to the issues regarding the implementation of the activities of the professional development programme. Those issues including modes of professional learning, the learning models or approaches of meanings and aims of professional development and the growth or development gained by the individual learner or organizations were the main ways that practice was described in the literature. On the other hand, popularity, enjoyment and effectiveness of the different modes of professional learning were considered. The 'practice' of professional development in Hong Kong's ICT in-service teacher training initiative implies different modes of professional learning learning and their effectiveness. The best practice of professional development in ICT, quoted in the recent literature, would be the workshops if only popularity in times of frequency is considered.

The discussion of practice of professional development focuses on three issues: modes of professional learning, the two learning models and the implication of best practice, as they are all listed in the literature about the practice of professional development.

Firstly, data concerning modes of professional learning taken from the literature are very different from those obtained from the local actual practice described by the present study. The discrepancy is mainly due to the diversification of the training formats and the understanding of the aims of professional development (Question No. 16j and No. 15 were addressed). The second issue would be the driving forces of development whose concepts arose from the two learning models of self-directedness and other-directedness. The last issue worth discussing is the implications of the popularity and effectiveness of the teacher development programmes (Question No. 16a-i were addressed).

5.2.2.1 Differences in the Practices between the Data from Literature and the Findings from the Present Study

There were one similarity and two differences found when the modes of professional learning from two different sources, literature reviewed and the present research study, were compared. As for similarity, the same format of activities for professional learning were found, though the actual number of programmes practised by schools nowadays may be far less than that of the theoretical ones quoted by the literature (Section 2.2.2, p. 51). Compared with the possible activities for staff development given by O'Sullivan *et al.* (1997, pp. 186-7), the modes of teacher professional learning suggested by the teachers and IT co-ordinators in the survey were very confined. For example, the actual practice of professional learning in Hong Kong seems monotonous and lack of diversification (referring to the percentage of respondents opting for 'Yes' in the experience column of Question No. 16 and was supplemented by the suggestions in Question No. 16j). Unlike the activities in the Western countries, the pattern of professional learning activities in the local context does not show any trend or fashion in this age or era. The main reason may be lack of role model in this or its related disciplines. Still there is a certain group of teachers providing very creative thoughts on the mode of professional learning and they were put under different categories for the sake of simplicity (Answers to Question 16j in Appendix XI).

Other differences included the interpretation of the meanings and aims of the term 'professional development' given by the teachers or IT co-ordinators and the academic experts quoted in the literature respectively.

5.2.2.2 Self-driven and Outside-driven Development

The statistics of the teachers and IT co-ordinators' choice on meanings and aims of the professional development show that most of them joining the staff development activities were driven by their internal needs. The reasons why they chose those items may be due to the thought that those aims or meanings are close to their daily lives and genuine experience. The results agree with what Brown (1993) observed as much of factors of the professional development in the literature is administrator-driven and less is teacher-driven (p. 13). These two kinds of driving force are equivalent to what are described as outside-driven and self-driven.

Among the three purposes suggested by Joyce and Showers (1988), the one "enhancing teaching and learning" (p. 6) when ranked by the 227 respondents of this study scored at a higher position than other purposes such as 'school improvement'. This is quite coincident with the ultimate goal of the Hong Kong's IT in Education quoted in the 'Five-Year Strategy'. Moreover those items receiving relatively higher scores belong to what were classified as self-driven rather than outside-driven factors. The result may mean that most of the teachers under survey are self-driven to improve themselves through staff training. According to the motivation-hygiene theory proposed by Herzberg and his colleagues (Herzberg et al., 1959, p. 72), people possessing certain factors called motivators will experience increased job satisfaction. In the other words, people who are self-driven will work with marked improvement, while those motivated by hygiene factors, which are also known as job dissatisfiers, would produce significant job dissatisfaction and negative attitude towards their job (Hoy and Miskel, 1991, p. 174). In fact, this theory can also be applied to the attitude of the teachers in their professional development when motivators and hygiene factors are compared to the self-driven approach and the outside-driven approach respectively.

5.2.2.3 Popularity and Effectiveness of Professional Development Activities

The results of the popularity and effectiveness of different professional learning activities expressed in this study and those from the literature such as the Final Report of the evaluating study on IT in Education Project conducted between December 2000 and August 2001 are very different (Law *et al.*, 2001).

In this research carried out for ICT teacher training in the school year of 2000/01, the most preferred training mode for teachers was 'workshop and demonstration sessions' while the least preferred mode was reported to be conferences and seminars (Law et al., 2001, p. 65). Law concluded that teachers' preference on knowledge development over the pedagogical approach was thoroughly exposed (ibid.). In this study, most of the respondents felt that the most effective training mode for teachers in ICT was 'participating in a workshop' which was nearly the same as what Law and her co-workers found in 2001 in reviewing the progress of the policy of IT in Education (Law et al., 2001, p. 65), but their data showed that seminars and conference ranked the last. Maybe the respondents did not think of the effects caused by the single variable, seminar or panel discussion in 'Listening to a seminar or panel discussion' and ranked it in the middle of their list (Table 22, p. 170). Reasons may be due to the different scopes of professional development covered by each investigation. What Law et al. undertook in 2000/01 was an interim evaluation on the professional development focussing solely on the ICT teacher training while the present research was mentioning the staff training in secondary schools for general purpose. The preferred training mode was thus equivalent to the most effective but not the popular training mode in this study. In fact a seminar was not that good in

conveying some kind of message to both teachers and students.

5.3 PROVISION STAGE

This section concerns the discussion of an evaluation of all levels of Hong Kong's ICT teacher training courses by the learners who were asked to evaluate each of the IT courses they had attended, using the criteria devised by the present author from the course aims and other components. These criteria were formulated into statements about the courses which the learners were asked to consider in terms of how accurately they reflected on the courses and what actually had occurred. This section starts with giving a brief introduction to the provision stage of Hong Kong's IT in Education initiative. The introduction is then followed by the discussion of two cases: one is the phenomenon that the basic level of the training courses (BIT) was well received by the learners and the other is about the contribution of the school-based teacher training by referring to their course variables and their future development respectively.

5.3.1 The Basic Level ICT Training Course being Well Received by Teachers

It was mentioned in the previous chapter that the courses of basic level of IT competency (BIT) are mostly welcomed by the learners as the total mean score of all attributes under the grouped variables of 'curriculum' and 'pedagogy' within this level is found to be the highest among those of other levels (Table 33 in p. 196). Moreover, the overall mean score of basic level (BIT) was found to be the highest (by referring to Table 40 in p. 216 which is the combination of total mean scores of 'curriculum' and 'pedagogy' in Table 33 in p. 196 and scores of 'learning effectiveness' in Table 37 in p. 208) while those of intermediate level (IIT) and upper intermediate level (UIT) were nearly the same (Table 40 in p. 216). The overall mean score of advanced level (AIT) was the lowest (ibid.).

Another evidence is provided by the additional comments on the courses of different levels. The questionnaire survey received 30 comments for the course of the basic level (BIT) in which only three respondents provided negative comments such as 'Messy', 'Too simple', 'Too easy' and 'No comment' while the rest are good comments (Appendix XVIII). Compared with BIT, comments for the IIT courses were more neutral. Examples of negative comments included 'Too difficult for me', 'Irrelevant to teaching', 'Too difficult', 'A bit too demanding' and 'No comment' (Appendix XVIII). One will find that the comments for IIT courses are going to be more harsh. The number of comments decreases with the increase in level of IT competency. For example, there are 25 comments for IIT compared with 12 comments in UIT and even 4 in AIT (Section 4.6.3.4, p. 213). Therefore, the total amount of negative feedback in the courses adds up to only a very small proportion. According to these two pieces of evidence, it can be concluded that courses in BIT are more welcomed and well received among teachers.

The reasons why most teachers like to give good response to the basic level of ICT training courses are three-fold. For some teachers, the course content was too easy to master and they have already gotten used to it before the training course commenced. The second reason is that the application software used are all common software and useful in that teachers are using them in their daily lives. The third reason may be due to the fact that nearly all the respondents have accomplished the course at the basic level (BIT) so that they could easily recollect the details of the classes, the instructors and the course content when evaluation was made. Again, they are all positive to the achievements made in the basic level of IT competency. Though the BIT course can be described as a success to a certain extent, IT in Education is still far from a total success since it is just a starting point in the teacher training scheme of the 'Five-Year Strategy'. The higher-level courses, however, were not liked by the learners because some of the course content was not applicable in their daily teaching work and did not lead them to enhancing their students' learning motivation. After all, it was not the problem of the learning needs but the learning content and the way of delivery, according to the information collected from interviewing the informants.

5.3.2 School-based Teacher Training is Very Much Welcomed

When teachers were asked to identify their actual and preferred providers of the ICT teacher training courses under Hong Kong's IT in Education initiative, school-based training was found to be the most common type of the actual course provider in ICT teacher training accounting for over 61% of the total man-course (Table 26 in p. 181). It was also taken as the most preferrable type of ICT teacher training as more than 46% of the respondents showed their preference to the school-based training at various levels of IT competency (Table 27 in p. 185). The phenomenon was more prominent in both basic (BIT) and intermediate (IIT) level of teacher training courses (ibid.).

The percentage of teachers attending courses run by school teachers dropped to less than 20% for upper intermediate level (UIT) courses. The most likely explanation for this was that the techniques and skills required at the higher levels were unavailable in the schools. This also probably explained why the higher-level courses were mainly provided by private business firms and the local tertiary institutions.

Hence, the respondents' preferences for course providers showed that school-based training was the most popular. It was particularly preferred by teachers attending courses at basic (BIT) and intermediate (IIT) level (Table 27, p. 185). Although the popularity for school-based training declined for teachers attending the higher-level courses, more teachers said that they preferred school-based training in the upper intermediate level of IT competency (UIT).

The above finding has been mentioned by Law *et al.* (2001) during a review of the IT in Education where school-based training seemed to be the most popular among teachers in secondary schools (p. 59). This study furthermore confirms the claim made by Law and her colleagues on the popularity of the school-based teacher training in ICT. The advantages of school-based training, as quoted by Henderson, is that the content of the training course can be closely matched with the individual needs of teachers (Henderson, 1979, p. 18) which is also one of the factors mentioned by the present author why this type of teacher training is gaining ground.

The argument that if most teachers have only experienced school-based training, they will not have sufficient experience to comment on non-school based training might not stand up in this situation as most of the respondents reported receiving more than one type of training during their ICT teacher training. In that case they must have enough experience in comparing the different pros and cons of various types of teacher training in ICT. Impartial judgment could never be made by those teachers who experienced ICT teacher training provided by only one type of course provider throughout his/her life-span of teacher training in ICT.

5.4 OUTCOME STAGE

The following will discuss the meaning of the 'outcome stage' which refers to the impact and effectiveness of the courses on the learners. In addition to dealing with the issue of pre-course expectation, the main theme of this research project is *whether Hong Kong's ICT teacher training scheme is a success* which will be answered based on the evidence drawn from the data collected from both questionnaire and interviews. There will also be a last paragraph exhibiting the issues raised by the interview but not covered in the questionnaire survey.

5.4.1 Meaning of Outcome Stage

'Outcome' in this model does not only mean results of the data collected but also implies the impact of learning. It sometimes refers to the immediate learning effectiveness produced by a certain kind of teaching approach or teaching curriculum. The outcome here refers to the effects and influence of Hong Kong's ICT teacher training course on the learners. The part of questionnaire to be covered by this stage includes the learners' expectation from the training courses (Question No. 8), the after-the-course impact on the learners (the After-the-course part of Question No. 9 to 12) and the post-course evaluation of the ICT teacher training courses of Hong Kong's IT in Education initiative (Question No. 13).

5.4.2 Dealing with the Issue Arising from the Pre-course Expectation

Teachers were asked to recall their expectation on the training course some time prior to the administration of the questionnaire. Since the practice of the procedure violated the original design of this question which anticipated the respondents' expectation in advance of the teaching training, the findings and analysed result related to this question must be taken with caution though most of the respondents have completed this part without difficulty.

If Question No. 8 is considered as any ordinary question with its data being analysed in a pure statistical way, the findings of this part shows that teachers have a strong preference towards knowledge-skill orientation and less emphasis in using ICT to support teaching as all options containing using IT / computer for any purpose such as preparing lesson, teaching with technology or using more technologies in classroom teaching were rated at the lower half of the list (Table 36, p. 204). This finding is very close to what has been found in the meanings and aims of the professional development in questions No. 14m (Section 4.3.1.2 in p. 161) and No. 15 (Figure 11 in p. 166) of the questionnaire in this study respectively in that both results were knowledge- and skill-oriented rather than emphasizing teaching and learning with ICT. Special attention was drawn to the frequent association of upgrading of knowledge and skills to professional development found in Question No. 14m.

5.4.3 Is Hong Kong's ICT In-service Teacher Training A Success?

The ICT teacher training system under the policy of Hong Kong's IT in Education can be regarded as one of the largest projects in the history of education in Hong Kong. No other initiative on such a large scale with the involvement of so many teachers and IT co-ordinators from public sector schools has been implemented in Hong Kong before. The current study is important because it provides teachers' views about the teacher training programmes that are crucial to the successful implementation of the initiative. The findings from the survey provide useful evidence for policy makers to assess whether the teacher training requirements proposed by the 'Five-Year Strategy' are being implemented effectively.

In the following sections the success of the ICT teacher training scheme proposed by the 'Five-Year Strategy' is reviewed under the following three headings:

- 1. Has the 'Five-Year Strategy' been successful in achieving its targets for teachers trained at different levels of IT competency?
- 2. Have the ICT in-service teacher training courses led to any immediate learning

outcomes for the teachers? and

3. What is the actual role of an IT co-ordinator?

5.4.3.1 Has the 'Five-Year Strategy' Been Successful in Achieving its Targets for Teachers Trained at Different Levels of IT Competency?

According to the 'Five-Year Strategy' (EMB, 1998, p. 13), it was proposed that by the school year 2000/01 all teachers should reach at least the *basic* level of IT competency (BIT) and that by the school year 2002/03 about 75% of teachers should reach at least the *comfortable* level (IIT), about 25% of teachers should reach at least the *competent* level (UIT) and one to two teachers in each school should reach the *creative* level (AIT).

The survey showed that these targets have largely been met by teachers in aided secondary schools under the governance of the Po Leung Kuk sponsoring body. As 99.4% of teachers in Po Leung Kuk secondary schools have completed the basic level (BIT) in 2001, 73.3% of sampled teachers had completed the 'comfortable' level (IIT) and 60.3% had achieved the competent level (UIT), the figures far exceeded the actual IT competency statistics of teachers in the academic year of 2001/02 (EMB, 2003, p. 8). The only disappointing figure was the number of teachers reaching the 'creative' level target. Only 8 teachers, which amounted to 3.5% of the sample population, had completed AIT level in the sampled schools by October 2002. In fact the percentage of all teachers completing the advanced level at the end of August 2002 was recorded as 4.8%. Since these data only apply to the year 2001/02, it can be projected that all schools

will probably meet the requirements without any difficulty by the end of the school year 2002/03. These findings were reinforced by the interview data as nearly all the interviewees accepted that the requirements were 'reasonable' and that there would be 'no problem' (Case 1, 2, 3, 5 and 7 of Appendix XIX) for their schools to meet the training requirements proposed by the 'Five-year Strategy' (Section 4.7.3, p. 223). After all, it is believed that all schools in the public sector would be successful in achieving their targets set in teacher training before the end of the school year 2002/03 when the concept of quantitative education is considered.

5.4.3.2 Have the ICT In-service Teacher Training Courses led to any Immediate Learning Outcomes for the Teachers?

The immediate learning outcomes for the teachers who took the training courses were best reflected by the results of the after-the-course evaluation in the course of each level of IT competency (referring to Section 4.6.2.1. in p. 206) because of its source and the results of the data. Since nearly all the components of the after-the-course evaluation were based on the learning objectives of the training course of that level, the result of this part in the questionnaire survey can fully represent the immediate learning outcomes of the teachers who took these courses. Besides the source of the question, the results also proved that the findings in this part of the survey agreed with the results of similar research conducted previously. The only problem is that the data only showed which type of skills teachers can master easily in the courses within the same level of IT competency but not the depth of the knowledge and expertise they can exhibit.

The extent to which the IT teacher training courses can lead to the immediate outcome depends on the availability of the courses and the quality of trainers. The high mean score in the basic level of IT training (BIT) means the teachers felt that they could master those basic ICT skills. Comments from the interview also reflected that some teachers described the BIT as 'easy' or 'simple'. It was why they regarded the courses in the basic level (BIT) as the most welcomed level of courses.

Another piece of evidence supporting the success of the ICT teacher training programmes was the application of skills learned in the courses into the learners' working environments. Over 80% of the surveyed teachers said they had applied their ICT knowledge in their school, and over 60% said they had confidence to use ICT in their teaching and to achieve the target of 25% of subject curriculum being supported by ICT. They also said that they had observed other colleagues demonstrating what they had learned in the ICT teacher training courses (Table 38, p. 210). The above figures were encouraging but the actual practice of applying ICT skills in teaching was still very limited and mainly confined to preparing teaching notes and/or setting examination papers. These data were drawn from interviewing the teachers and IT co-ordinators as it was one of the questions pre-set in the interview schedules (Appendix VI). This finding is similar to that of other Hong Kong researchers such as Law *et al.* (2001, p. 68), Leung (1998, p. 31) and Fung (1997, p. 67).

5.4.3.3 The Actual Role of IT Co-ordinator

According to the 'Five-Year Strategy', the establishment of an IT co-ordinator in each school was to "develop and roll-out school-based IT plan" but their most important job was to "tailor general software to meet the needs of the teachers and students" (EMB, 1998, p. 14). But in actual practice, these roles were not well performed as most IT co-ordinators were engaged in the practical work of maintaining the school intranet and servers, installation of software and repair of the computers. Little support was rendered to colleagues of various subjects in teaching and learning. Interview data also revealed that very few teachers had sought assistance from their IT co-ordinators (Section 4.7.4.2, p. 225). The job of promoting IT in education or integrating IT into school curriculum was rarely heard in both survey and interview. Without the proper functioning of the IT co-ordinators, how can the two stages of development proposed by the 'Five-Year Strategy' be achieved as

Stage 1: Enhancing the level of awareness and use of IT in the existing curriculum

Stage 2: Full integration of IT in the new curriculum (EMB, 1998, pp. 16-7)?

If these two stages are not reached, the strategy of IT in Education could never be achieved. However, only one IT co-ordinator during the interview claimed to have provided the 'IT culture and readiness' to teachers while others have not (Appendix XIX, Case 8). Hence, this indicator has not yet been achieved by at least the sampled nine schools let alone the other secondary schools all over Hong Kong. Though the total number of IT co-ordinators in this study only amounted to 8, which is about 3.5%, still there are at present over 1200 of them in Hong Kong with one in each school. Therefore, their influence upon the success of the IT in Education is considerably great. If the development of the role of the IT co-ordinator is one of the indicators for the success of Hong Kong's ICT teacher training scheme, then the scheme can be concluded as insufficient.

5.4.3.4 Paradigm Shift among the Teacher Population

Paradigm, according to Zeichner (1983), can be thought of as a "matrix of beliefs and assumptions about the nature and purposes of schooling, teaching" in shaping of the teaching practices (Zeichner, 1983, p. 3). In Hong Kong, the curriculum reform document requires teachers in the new age to have a paradigm shift to their mind set and change from a knowledge transmitter to a facilitator in the process of learning to learn. The shift should be more drastic in the age of using ICT in education. Therefore, the role of teacher must change with the new age. However, the scene in some classrooms showed that most teaching still stays in the tradition way of one-way transmission with no interaction and no facilitation. Most teachers are still in favour of the presentation pedagogical approach (Law *et al.*, 2001, p. 56). The change in teaching practices has been minimal. Rote learning, meaningless drill and practices, and reciting are included in most of the students' learning. No expectation is made for their students.

The paradigm shift in the level of teachers includes the change in the belief of the importance of and the deployment of ICT in teaching and learning. Unless a

teacher is aware of the value of IT in Education, he would not apply any ICT in his daily teaching work. However, most respondents during the interview were found to perceive their role as providers of new knowledge but not the facilitators in disseminating new materials for enhancing students' understanding (Law et al., 2001, p. 57). On the other hand, the change relating to school culture or school ethos in the use of ICT could be considered as the paradigm shift at school level which was formed resulting from the aggregation of the change in individual teachers. However, the paradigm shift in any of these two levels has not reached its maturity. This is because, as reflected in the section of changes in teaching methods (Section 4.7.2.2 in p. 222), the course content of Hong Kong's ICT in-service teacher training did not include the element of paradigm shift on teaching approach both in concept and practices parts. A similar claim was supported by one of the interviewees on the job specification of an IT co-ordinators (Appendix XIX, Case 5). Chan et al. (2002) also questioned the ability of the ICT in-service teacher training courses in helping teachers and IT co-ordinators initiate any paradigm shift in their teaching styles (p. 85). Similarly, if there is no change in the mind set of the members of an association, there will not be any organizational change at institutional level.

In a nutshell, the ICT in-service teacher training course was observed to change the teachers in enriching their knowledge and skills in basic operation of ICT. But it did not provide them with the skills and examples in how to integrate ICT in their teaching, let alone the paradigm shift in the belief of using or integrating of ICT in teaching and learning for the students' sake. Therefore, it was observed that the change in pedagogy, teaching approach and methods because of the introduction of ICT has in fact been minimal, according to the observations of the teachers.

As mentioned before, an extensive evaluation of the IT in Education in Hong Kong would be conducted at the end of the year of 2003 (Section 2.4.2.1 in p. 81), though the evaluation methodology has not yet been designed. The scale of evaluating the whole policy of IT in Education may be too much for this research because of limited manpower and resources. Evaluation of the ICT teacher training under the provision of the same policy, on the contrary, seems more suitable in this scale. If an interim report is to be prepared on the progress of the teacher training of the IT in Education, the government could proudly present the number and percentage of the teachers who have completed the courses of different levels of IT competency. After all, the IT in Education initiative since its implementation in 1998 could be regarded as a success in terms of quantity but could fail in quality.

CHAPTER 6 CONCLUSION AND RECOMMENDATIONS

This chapter consists of three sections. The first section summarizes all the findings from this study which include the information inferred from data analyzed from both questionnaire survey and interviews. Second section contains the limitations observed by the researcher as the shortcomings which the present author was fully aware of but unable to rectify in the study. Finally, the last section deals with the recommendations which not only contain the practice-based recommendations but also identify the key issues or principals contributing to the knowledge generated by this research study on Hong Kong's ICT in-service teacher training for further researchers to explore.

6.1 SUMMARY OF FINDINGS

This study aims to evaluate the new ICT teacher training under the provision of the policy of IT in Education proposed in 1997 by the government of Hong Kong Special Administrative Region. The whole evaluation process was based on the framework of a 'Concept-Provision-Outcome' model in which teachers' and IT co-ordinators' perception and views on the teacher training scheme under the IT in Education initiative were presented in three different stages: concept and practices stage, provision stage and outcome stage. The summary of findings follows the sequence of the research questions.

In the concept and practices stage, teachers and IT co-ordinators of secondary school have very little understanding of the meanings and aims of teacher professional development or their perception of them was too confined. The teachers prefer their professional development be more self-directed than directed by others. Their views on the aims of professional development are limited to knowledge and skills upgrading while enhancement of attitude and belief was seldom found. As for the practice part, among the different types of staff training, attending a seminar was found to be the most popular mode of teacher training which was followed by participating in a workshop. The most effective training mode suggested by teachers was participating in a workshop which was then followed by attending short term courses. Some teachers, however, found pursuing higher degree the most enjoyable activity which was seconded by visits and excursions too.

In the provision stage, teachers were asked to evaluate the courses of Hong Kong's ICT in-service teacher training scheme based on the criteria of curriculum, pedagogy and learning effectiveness. The courses of basic level of IT competency (BIT) were found to be the most attractive and received the greatest response and highest mean scores. In general, the impression given by the teacher learners on the ICT in-service teacher training course was that, firstly, most of the courses were too skill-oriented; secondly, the requirements for passing were easy to reach but they lacked the opportunity for the teacher learners to share ideas. School-based teacher training, on the other hand, was the most popular type of teacher training in ICT especially in the basic (BIT) and intermediate level of IT competency (IIT). It was also expected to continue to be popular in the future. Training provided by government at any level was the least preferred.

There are many concerns in the outcome stage. First, after considering the

percentage of the trained teachers in each level of IT competency, the immediate learning outcomes of the learners, the teachers' agreement to the policy of IT in Education, the role of IT co-ordinator in promoting the IT in Education and the paradigm shift among the teacher population, the ICT in-service teacher training under the provision of the policy of IT in Education was assessed to be merely a pass but not a success. More time and effort, in terms of resources, are still needed to be invested in the implementation of the policy in the future. The teachers' views on the government's policy in IT in Education could be observed through two issues: expenditure and the division of the teaching training into four levels. Only half of the voices from the survey agreed with the vast expenditure spent in the ICT teacher training in the past three years. In addition, about three quarters of the teachers had no problem with the four-level training system with some of them suggesting a combined level of the basic (BIT) and intermediate level of IT competency (IIT). Last but not least, there were two issues raised by the interviewees, one was the principal being the final evaluator of the teachers' portfolio work and the other was the unauthorized assistance obtained by some learners in completing their own portfolio assignments. This must receive the public's attention in due course. In order that the strategy can be properly implemented in the future, government must see into these problems in the next five years' project.

When all the items contributing to the effectiveness of Hong Kong's ICT teacher training project are taken into consideration, it is reasonable to judge the government scheme a modest success. There are grounds for satisfaction with the target percentage of teachers trained in different levels of IT competency; the immediate learning outcomes of those trained; and the consensus of teachers to the ICT policy. On the other hand, the role of IT co-ordinator is not considered to have been developed satisfactorily and many teachers have not altered their basic pedagogy. The hope for paradigm shift has not yet taken place in many teachers' minds. The implementation of the ICT in-service teacher training scheme has not therefore achieved all that was hoped. The overall quality of the training programme was below expectations. More concrete and intensive training and greater time are needed to achieve lasting change in the attitudes and approaches adopted by many teachers.

6.2 LIMITATION OF THE STUDY

There were three limitations observed by the researcher of this study. First, since the study was carried on for more than two years' time, starting from planning through data collection to the stage of writing up, the data may have become stale. Theoretically it is important in this era of data explosion to update every piece of information in this research project but in practice it is not possible because of the time-lag. The present author admits that there are some recent related literature missing while all other data and knowledge generated are still valid and hold true.

The second limitation is the problem of generalization. Though the number of subjects in the questionnaire survey of this study amounts to 227, the data elicited from this group of subjects still cannot be generalized to all secondary school teachers of Hong Kong because the sample is unable and not supposed to represent the whole teacher population. It is not because of sample size but the sampling method which determines whether the data drawn can be generalized or not. Although the sampled schools were not taken from any traditional sampling methods such as random sampling or probability sampling, its representativeness was still recognized to the extent of within their own group. The same principle can be applied to the qualitative study of the eight respondents of the interviewees. The information obtained from this group of interviewees also cannot be generalized to schools outside this scope nor to teachers in other schools but is useful in finding certain patterns in teachers' perceptions towards the teacher training.

Thirdly, the data obtained from interviewing the eight teachers or IT co-ordinators did not reflect one hundred percent verbatim of the interview as the dialogue of the conversation was jotted down in note form with key words only. Transcription of the interviewing data only depended on the hints given by the key words jotted and the memory of the researcher afterward. Due to lack of recording instruments, no interviewing records could be made. Thus the interview summary would inevitably be misunderstood as composed of made-up data.

6.3 RECOMMENDATIONS

As the final section in this thesis, this part of recommendations tries to share about the contributions of this research study to the community and schools at policy and practices level of the ICT teacher training. Some of the findings of this research is able to help the various stake-holders in different levels of the IT in Education initiatives to understand the present situation of the ICT in-service teacher training. Those stake-holders include the policy makers, the central vendors, the school principals and the teachers. The areas covered by the key issues for further studies include the improvement of quality of the training course and the reshuffling of the four-level hierarchy of the teacher training system.

This research study can alert the policy makers of Hong Kong's IT in Education for improving the quality of the implementation of the policy, especially the part of ICT in-service teacher training. This can be accomplished through making appeals to the course providers to strengthen the elements of integration of ICT into the school curriculum by presenting them the results of this study. Students are believed to be more benefited in their learning if teachers' paradigm can be shifted in their teaching pedagogy in government's next IT in Education strategy. It will surely be a good research topic on the continuation of the study of the policy and practices of IT in Education in any future research project.

There are four recommendations for the ICT in-service teacher training obtained from this study. First of all, the course content of the courses of all levels of IT competency should be less skill-oriented. The curriculum of all training courses must be inspected by a team of curriculum officers from the Education and Manpower Bureau to make sure that the content in some levels of IT competency will not be too skill-oriented. They are also responsible for holding evaluation meetings with different course providers after the courses are completed. When the offering of tendering for the next contract mainly depends on the remarks of these evaluation records, the quality of the teacher training courses will be guaranteed. Secondly, introduction of an objective assessment

scheme is badly needed, especially with the participation of external agents. The bringing in of external assessors is able to minimize the disadvantages caused by the injustice arising from assigning principals as final judges. This act will somehow help to stop some principals from being prejudiced towards any of his/her subordinates. Moreover, a comprehensive and systematic assessment scheme will also prevent someone from obtaining unauthorized assistance from other people in completing his/her portfolio assignment. Thus lots of resources in terms of money and time can be saved for those teachers who really need that. To couple with all these measures, a re-training system in ICT, as the third recommendation, must be set up to provide continuous professional development to those teachers who passed at certain level three years later to make sure that they can keep abreast of the changes in technology. Lastly, specially designed and tailor-made courses must be provided to the IT co-ordinators of the secondary schools to equip them with the knowledge of curriculum development and skills of integrating ICT into the school curriculum. More scenarios and experience sharing sessions are provided for them to conceptualize the experience of using ICT in teaching and learning effectively. Thus the IT culture in school will be fostered with the effort and help from the government and other professional bodies in education.

Another recommendation is on the reshuffling of the existing four-level hierarchy of the teacher training levels in ICT. To reduce the complexity and redundancy of course content, the present four levels in ICT teaching training is suggested to reduce to three levels by either combining the first two levels into one or simply cancelling the second level of IT competency. If the government accepts this suggestion together with the previous proposal of re-training teachers' ICT technique every three years, the education field will have a team of teachers well-equipped with IT knowledge and skills as well as new paradigm in teaching and learning. Students' learning outcome will greatly be enhanced following a comprehensive teacher-centred professional development in ICT and with their full readiness in accepting paradigm shift in the concept and practices of teaching pedagogy.
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Appendix I

Reply Letter from the Superintendent of the Educational Affairs of Po Leung Kuk

TEL: 2277 8888 • TAX: 2576 4509



NU

Dear Mr. Sun-wai Leo FUNG,

Thank you for your letter dated 16 January 2002. Owing to the tight schedule of the school, our teachers and IT co-ordinators could not afford an extra time to participate in your survey and interviews. Sorry for any inconvenience caused. I look forward to having further opportunity to serve you.

> Yours truly, MAK, Kwai-po (Superintendent, Education Affairs, PLK)

⁽English Translation)

Appendix II

Reply Letter from the Principal of one of the Proposed Pilot Schools Who Refused with Apology to Offer Help



Appendix III : Final Draft of the Questonnaire

Questionnaire on Evaluating Teachers' Training Courses on Information

and Communication Technology and Perceptions on Professional

Development

Instructions: Please fill in the following information by putting a ✓ in the appropriate box and write down any information in words wherever necessary.

Section A: Personal Data 1. Sex \square male \square female □ 25 or under □ 26-50 2. Age □ 51 or above \Box 5 years or below \Box 6-9 years \Box 10-25 years \Box 3. Working experience above 25 4. Post held (please tick more than one box if appropriate) □ Non-computer teacher □ Computer teacher □ IT co-ordinator □ Others (Please specify: ____ 5. Please write down your highest academic qualification 6. Please write down your highest qualification or training in Computer / ICT / IT 7. Please tick for each level of competency in IT that you have attained (tick more than one box if appropriate) □ AIT (Advanced level) □ UIT (Upper Intermediate level) □ IIT (Intermediate level) □ expecting to finish BIT □ BIT (Basic level) \Box none of the above □ Others (Please specify 8. What did you expect from your training in IT before the courses commenced? Key:1. Does not at all reflect what went on. 2. Only marginally reflects what went on. 3. Neutral. 4. Describes rather well what went on. 5. Is a totally accurate reflection. I expected the courses could... 1 2 3

- a. help me be familiar with the use of computer for general purpose.
- b. help me enhance my skills in computer operation.
- c. help me increase my knowledge in IT and its application.
- d. teach me how to use some common application software.
- e. help me in teaching with IT or computer.
- f. help me prepare the lessons with IT and its resources.
- g. help me use more technologies in classroom teaching.



Section B: Evaluation of the Teachers Training Courses

Evaluation of Basic Level of Information Technology Competency (BIT)

9. How do you evaluate the BIT course?

Only answer this question if you have completed the BIT course

Please evaluate the BIT course by putting a \checkmark in the appropriate box.

Key: 1. Does not reflect what went on. 2. Marginally reflects what went on. 3. Neutral.

4. Describes rather well what went on. 5. Is a totally accurate reflection what went on.

a. The teaching schedule of the course was carefully designed.

b. All instructions given by trainers or tutors were clear.

- c. The curriculum content was appropriate for the level of BIT.
- d. The technical content was useful in equipping learners in ICT.
- e. The skills offered were beneficial to future classroom teaching.
- f. Use of media was appropriate in amount.
- g. The course provided sufficient hands-on practical elements.
- h. Trainers and tutors provided sufficient on-the-spot help.
- i. Choices of methods of delivery were appropriate in the course.
- j. The course provided opportunities for learners to share ideas.
- k. Trainers' or tutors' feedback on questions was appropriate.

1. Requirements for passing this level were easy to meet. After the course

m. I knew how to perform simple windows-based operations

- n. I knew how to receive and send e-mail.
- o. I knew how to search and browse in the internet.
- p. I could recognize the ethics of using computers.
- q. 18 hours were enough to achieve all the course objectives above.

s. Who provided your BIT course? (You can tick more than one box)

□ colleagues of my own school

□ trainers from a software house or business organization

□ trainers from a local university or tertiary institution

□ others (Please specify _

t. Who are your preferred course provider(s)? (You can tick more than one box)

□ school teachers

□ central training vendors

□ trainers from government (e.g. ITSD or ED)

□ others (Please specify_

u. What else would you like to add into the curriculum of BIT? _

□ 2002

2 3 4 5

p. Year of completion:

q. Who provided your IIT course? (You can tick more than one box)

trainers from a software house or business organization

□ trainers from a local university or tertiary institution

r. Who are your preferred course provider(s)? (You can tick more than one box)

□ trainers from government (e.g. ITSD or ED)

□ others (Please specify

s. What else would you like to add into the curriculum of IIT?

After the course □ 2000 □ 2001 □ colleagues of my own school □ others (Please specify \Box school teachers □ central training vendors

b. All instructions given by trainers or tutors were clear. c. The curriculum content was appropriate for the level of IIT.

a. The teaching schedule of the course was carefully designed.

Only answer this question if you have completed the IIT course

Please evaluate the IIT course by putting a \checkmark in the appropriate box.

Evaluation of Intermediate Level of Information Technology Competency (IIT)

Key: 1. Does not reflect what went on. 2. Marginally reflects what went on. 3. Neutral. 4. Describes rather well what went on. 5. Is a totally accurate reflection what went on.

- d. The technical content was useful in equipping learners in ICT.
- e. The skills offered were beneficial to future classroom teaching.
- f. Use of media was appropriate in amount.

10. How do you evaluate the IIT course?

- g. The course provided sufficient hands-on practical elements.
- h. Trainers and tutors provided sufficient on-the-spot help.
- i. Choices of methods of delivery were appropriate in the course.
- j. The course provided opportunities for learners to share ideas.
- k. Trainers' or tutors' feedback on questions was appropriate.
- 1. Requirements for passing this level were easy to meet.

m. I knew how to design web-page.

n. I could tell whether any software is good or bad.

o. 30 hours were enough to achieve all the course objectives above.

2 3 5

4

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Evaluation of Upper Intermediate Level of Information Technology Competency (UIT)

11. How do you evaluate the UIT course?

Only answer this question if you have completed the UIT course

Please evaluate the UIT course by putting a \checkmark in the appropriate box.

Key: 1. Does not reflect what went on. 2. Marginally reflects what went on. 3. Neutral.

4. Describes rather well what went on. 5. Is a totally accurate reflection what went on.

- a. The teaching schedule of the course was carefully designed.
- b. All instructions given by trainers or tutors were clear.
- c. The curriculum content was appropriate for the level of UIT.
- d. The technical content was useful in equipping learners in ICT.
- e. The skills offered were beneficial to future classroom teaching.
- f. Use of media was appropriate in amount.
- g. The course provided sufficient hands-on practical elements.
- h. Trainers and tutors provided sufficient on-the-spot help.
- i. Choices of methods of delivery were appropriate in the course.
- j. The course provided opportunities for learners to share ideas.
- k. Trainers' or tutors' feedback on questions was appropriate.
- 1. Requirements for passing this level were easy to meet.

After the course

- m. I could perform simple operations of school networks
- n. I knew how to integrate IT in teaching and learning.
- o. I could use authoring tools to develop interactive CBL package.
- p. I could use audio-visual devices and perform simple AV editing
- q. 30 hours were enough to achieve the course objectives above.

r. Year of completion: \Box 2000

- s. Who provided your UIT course? (You can tick more than one box)
 - \Box colleagues of my own school
 - □ trainers from a software house or business organization

□ 2001

- □ trainers from a local university or tertiary institution
- □ others (Please specify_

t. Who are your preferred course provider(s)? (You can tick more than one box)

- \Box school teachers
- □ central training vendors
- □ trainers from government (e.g. ITSD or ED)
- □ others (Please specify_

u. What else would you like to add into the curriculum of UIT?__

I	2	3	4	С



□ 2002

)

Evaluation of Advanced Level of Information Technology Competency (AIT)

12. How do you evaluate the AIT course?

Only answer this question if you have completed the AIT course

Please evaluate the AIT course by putting a ✓ in the appropriate box.
Key: 1. Does not reflect what went on. 2. Marginally reflects what went on. 3. Neutral.
4. Describes rather well what went on. 5. Is a totally accurate reflection what went on

a. The teaching schedule of the course was carefully designed.

b. All instructions given by trainers or tutors are clear.

- c. The curriculum content was appropriately designed for this level.
- d. The technical content equips learners as helpers for other teachers
- e. The skills offered is useful in managing school LAN & IT resources
- f. The enhancement modules are useful in training IT co-ordinators.
- g. The course provides sufficient hands-on practical elements.
- h. Trainers and tutors provide sufficient on-the-spot help.
- i. Choices of methods of delivery are appropriate in the course.
- j. The course provides opportunities for learners to share ideas.
- k. Trainers' or tutors' feedback on questions is appropriate.
- 1. Requirements for passing this level were easy to meet.

After the course

- m. I have confidence in managing the school's LAN and IT resources.
- n. I am well acquainted with the technology for web-based teaching
- o. I have confidence in designing the instructional materials with IT.
- p. 120 hours are enough for the learners to achieve the tasks set.

q. Year of completion: $\Box 2001$ $\Box 2002$

r. Which organization provided the course of AIT?

□ Hong Kong Polytechnic University

□ others (Please specify_

s. Who are your preferred course provider(s)? (You can tick more than one box)

- \Box school teachers
- □ central training vendors
- □ trainers from government (e.g. ITSD or ED)
- □ others (Please specify_

t. What else would you like to add into the curriculum of AIT?

1 2 3 4 5

)

Post-course Evaluation

13. Please could you evaluate the IT training you have completed so far in terms of its effect on your teaching and the policy related to 5-year IT in Education strategic plan Please evaluate the overall training by putting a ✓ in the appropriate box.

a. Did you apply what you have learned in the above IT competency course(s) to your teaching?
b. Do(es) the above course(s) enhance your own learning in IT, in terms of both knowledge and skills?
c. Do you have confidence to have 25% of the curriculum of the subject you are teaching to be taught with the support of IT?
d. Do you believe that the delivery of the existing curriculum can be improved with the assistance of IT?
e. Based on your observation, are your colleagues able to at any time demonstrate most of the skills learned in teachers training course(s) in ICT?
f. Is it worth for the government to spend an amount of money, say \$500m a year in ICT teachers training?

Yes

No

- g. Do you agree to the strategy of dividing the teachers training course of ICT into 4 levels (stages) of competency?
- h. Please provide additional comments on the IT courses below.

Type of Course	Please comment
Advanced Level of	
Information	
Technology	
Competency (AIT)	
Upper Intermediate	
Level of	
Information	
Technology	
Competency (UIT)	
Intermediate Level	
of Information	
Technology	
Competency (IIT)	
Basic Level of	
Information	
Technology	
Competency (BIT)	

Section C: Concept on Professional Development

.4. F	Iow far do you agree with the following meanin	gs of the term 'profes	sion	al			
a	levelopment suggested by a group of secondary	1 Strengly Dies	~				
L	Directions for Questions $14(a) - 14(1)$: Key:	I – Strongly Disa	gree				
		2 – Disagree					
		3 - Neutral / No c	opin	ion			
		4 – Agree					
		5 – Strongly Agre	ee				
			1	2	3	4	5
a	a. Teachers try their best to equip themselves.						
ł	b. "Learn to teach better and find opportunities for	or adversity"					
c	c. To be a well-prepared teacher.						
Ċ	d. To collaborate with colleagues to achieve school	ol's objectives.					
e	e. To provide teachers with the new trends education.	and development in					
f	f. To give insights and to enhance teachers' teachers enlighten teachers in the latest development in	ching practice; and to education.					
Ę	g. To enhance the teachers' competency and their	strategy in teaching.					
ł	n. "A day set aside for whatever input the sch	ool had arranged for					
	teachers; a day for teachers to do reflection on	what they have done"					
i	Knowing what is the trend in current or future	education system.					
i	. To gain more knowledge/skills in one's pro	fession to make one					
	more competent.		11-				
k	x. Teacher training, seminars for subject knowle	dge and new teaching					
	methods.	0					
1	. Enhancing the professionalism of teachers -	- subject knowledge,					
1	skills and attitudes.	,					
n	n What comes to your mind when you think of	professional develop	men	t'?			

15. Professional development for teachers in your present school should aim to

(you can have more than one choice)

- upgrade teachers in knowledge and skills of teaching
- □ stimulate organizational growth for the whole school (as a learning organization)
- □ have both personal and organizational growth
- □ fulfil the requirements from the principal or a group of senior management team
- □ meet the requirement of having three professional development days as one of the prerequisites of SMI schools according to the documents

16. According to your knowledge and past experience in staff development, please answer the following questions by writing **Yes** or **No** in each box.

Methods of	Have you	Have you enjoyed	Please rank each
professional	experienced any of	any of the following	method of
learning	the following	methods of	professional
	methods of	professional	learning from 1 to 9
	professional	learning	in terms of their
	learning?	19 Telce	effectiveness .
trading 2012 (g)		A DECTRONAL SAME	1 = most effective
		- The special states	9 = least effective
a. Listening to a		Annelson of Longe All	Part Incom
seminar or panel		 The second of the second s	
discussion		and a second second second	
b. Participating	and the set of the set	No. Protector Chief Dimension	
in a workshop			
c. Making visits		marine and an and	
and excursions	in a la substance in a substance	Less free Constructe of	
d. Attending short	CEREMENT University, Yes	ene of the frights in "Southers partnerships of inactions in	1
term courses			
e. Attending a meeting	y of teachers in avoardary and it you cours allow http:/	rehoute Law paler Drawing Status a guardom and but	
about a subject	and this work will be exited	need by tens with shifts all you'll have size present work of Base	
specialism	and productions manader president	land of the second	all design beach
f. Participating in	the loss of the last of the second	while a support of the second sub-	provinské se
a group discussion			
g. Engaging in			
professional reading			
h. Conducting			
library searching			
i. Pursuing a			
higher degree			

If you can be interviewed regarding the professional development of ICT in your

school, please leave you name and contact telephone number below.

Name: ______(Optional)

Name of School: _____(Optional)

Contact telephone number:

_____ (Optional)

End of Questionnaire

Thank you for your co-operation!

Appendix IV

Recommendation Letter to Principals of the Sampled Schools

8th May 2002



Educational Management Development Unit

Northampton Centre · Barrack Road Northampton NN2 6AF · UK Tel: +44 (0)1604 630180 Fax: +44 (0)1604 231136 Email: emdu@le.ac.uk

Director Professor Clive Dimmock

Dear Principal

Mr Fung Sun-Wai Leo is registered as a student on the Doctorate of Education Degree at Leicester University. The title of his thesis is 'Evaluating teachers' training in ICT in Hong Kong SAR: the perceptions of teachers and IT co-ordinators of secondary schools'.

As part of the survey of teachers in secondary schools, Leicester University would be most grateful if you could allow him to issue a questionnaire to the teachers in your school. His work will be conducted in line with ethical guidelines governing educational research so that the anonymity of the respondents and their institution would be maintained.

The University would be most grateful if you could support this research.

Yours sincerely

n PP. Professor Pamela Lomax





Appendix V Cover Letter to Principals of the Sampled Schools

Flat H, 15/F. ,Block 1, Sceneway Garden Lam Tin, Kowloon

June 13, 2002

Ms Yeung Mei Kuen Principal Po Leung Kuk Wai Yin College 2 Tin Wan Shan Road, Aberdeen Hong Kong

Dear Ms Yeung,

I am currently a student of the programme of the Doctorate in Education at the University of Leicester. In order to fulfill my requirements, I am conducting research relating to the perception of teachers on their ICT training. My work is being supervised by Professor Pam Lomax of the Department of Education in Leicester University.

I write this letter to invite your fellow teachers to help me in my study by taking about 10 minutes of their time to complete the enclosed questionnaire. It is also my pleasure if some of them including the IT co-ordinator can be interviewed. I would be grateful if you could put the completed questionnaire into the stamped envelope and return it to me by September 10, 2002.

Enclosed please also find a letter of recommendation from my supervisor, Professor Pam Lomax. Please be assured that every individual response will be treated with strict confidentiality. If you have any queries, please call me at 9340-1047 in the daytime and 2358-0592 after office hour.

Thank you very much for your kind attention and co-operation.

Yours sincerely,

FUNG, Sun Wai Leo (Chartered Biologist)

Appendix VI

The Final Draft of the Layout of the Interview Schedule

Interview Schedule : interviewing questions for IT co-ordinators and teachers

- A. More on the Training Courses
 - 1. Which level of IT competency have you completed? And which level are you attending? Who are the providers of the courses of all these levels in your school?
 - 2. Do your colleagues generally welcome these courses?
 - 3. What kinds of criticism have you heard from colleagues about the courses? (useful? dull? wasting of time? too difficult?)
 - 4. Can you give me examples of colleagues who have put into practice what they have learned on completion of an ICT course? (in the form of knowledge, skills or attitude)?
 - 5. Do you think the courses increase teachers' workload? How? How could this be lessened?
- B. Teachers' Changes
 - 6. Do any of your colleagues use computers in their work for:
 - a) preparing lesson notes;
 - b) setting students assignments and examination papers;
 - c) analyzing students' learning or
 - d) other uses?
 - 7. In your view, has there been an increase in the number of teachers in your school using ICT in their teaching compared with 1998 before the enforcement of IT in Education?
 - 8. Do you think it is the result of the new content in the teacher training courses?

- 9. In which subjects in the school curriculum do you think there has been most change? How do you know?
- 10. Do you think that using ICT in teaching has led to an enhancement in students' learning? Explain.
- 11. Which uses are most beneficial to students learning (e.g. for lesson preparation, for demonstrations or for setting students exercises etc.)?
- 12. Do you think that the greater use of ICT in teaching is the result of teachers' training in ICT or something else?

C. Policy

- 13. \$514 million was estimated to be the total cost for training all serving teachers from 1998 to 2002. What percentage of this do you think the government should spend on teacher training in ICT?
- 14. Do you think that it is useful to classify the teacher training in ICT into 4 different levels, from BIT to AIT? Can you suggest any alternative classifications?
- 15. The government policy was that all teachers should reach the level of BIT in the first two years, ie.1998-2000. Has this happened? Was it a reasonable aim?
- 16. Do you agree with the government goal that 75% of all teachers in Hong Kong should attain the intermediate level of IT competency (IIT), and that 25% should attain the upper intermediate level of IT competency (UIT)?

D. IT Co-ordinators

- 17. What are the most important aspects of IT co-ordinators work in your schools? (for those who are teachers) ORAs an IT co-ordinator, what do you think are your most important contributions? (for those who are IT co-ordinators)
- 18. What kind of training do IT co-ordinators need to perform their job more effectively?

Appendix VII

Information of Gender, Age Group and Teaching Experience of the IT Co-ordinators and the Computer Teachers of the Sampled Group being surveyed

Count

	sex		
	male	female	Total
No. of IT co-ordinators	28	5	33
or Computer teachers	(84.8%)	(15.2%)	(100%)

Count

	a			
	25 or below	26-50	51 or above	Total
No. of IT co-ordinator(s) or Computer teacher(s)	3 (9.4%)	28 (87.5%)	1 (3.1%)	32 (100%)

Count

	working	working experience (years of teaching)				
	5 or					
	below	6-9	10-25	above 25	Total	
No. of IT co-ordinator(s)	10	4	17	1	32	
or Computer teacher(s)	(31.3%)	(12.5%)	(53.1%)	(3.1%)	(100%)	

Appendix VIII

Results of Performing Factor Analysis on Meanings of 'Professional Development' perceived by Teachers (responding to Question No. 14 a-l)

	Initial	Extraction
teacher equip themselves	1.000	.843
learn to teach	1.000	.840
well prepared teacher	1.000	.799
collaborate with colleagues	1.000	.649
new trend and development	1.000	.691
give insight to teaching	1.000	.722
enhance teahers competency	1.000	.708
school arrange for teachers	1.000	.405
know the trend for education	1.000	.603
gain more knowledge and skills	1.000	.690
teachers training seminars	1.000	.738
enhance professionalism for teachers	1.000	.701

Communalities

Extraction Method: Principal Component Analysis.

Total Variance Explained

	Initial Eigenvalues		Extraction Sums of Squared				
	111						
		% of	Cumulativ		% of	Cumulativ	
Component	Total	Variance	e %	Total	Variance	e %	
1	7.238	60.319	60.319	7.238	60.319	60.319	
2	1.152	9.598	69.917	1.152	9.598	69.917	
3	.723	6.027	75.944				
4	.666	5.553	81.497				
5	.447	3.727	85.224				
6	.392	3.270	88.494				
7	.347	2.892	91.385				
8	.261	2.178	93.563				
9	.231	1.925	95.489				
10	.217	1.805	97.294				
11	.178	1.486	98.779				
12	.146	1.221	100.000				

Extraction Method: Principal Component Analysis.

Results of Performing Reliability Analysis on Items 'b', 'c', 'e', 'f', 'g' and 'j'

RELIABILITY ANALYSIS - SCALE (ALPHA)

Reliability Coefficients

N of Cases = 213.0 N of Items = 6

Alpha = .9140

Results of Performing Reliability Analysis on Items `a', `d', `h', `i', `k' and `l'

.

RELIABILITY ANALYSIS - SCALE (ALPHA)

Reliability Coefficients

N of Cases = 222.0 N of Items = 6

Alpha = .8449

Results of Performing Reliability Analysis on Items 'c ', 'f', 'l', 'e', 'j' and 'a'

RELIABILITY ANALYSIS - SCALE (ALPHA)

Reliability Coefficients

N of Cases = 221.0 N of Items = 6

Alpha = .8881

Results of Performing Reliability Analysis on Items 'b', 'g', 'd', 'k', 'i' and 'h'

RELIABILITY ANALYSIS - SCALE (ALPHA)

Reliability Coefficients

N of Cases = 215.0 N of Items = 6

Alpha = .8612

Results of Performing Reliability Analysis on Items 'c', 'f', 'l', 'e', 'j', 'a' and 'b'

RELIABILITY ANALYSIS - SCALE (ALPHA)

Reliability Coefficients

N of Cases = 220.0 N of Items = 7

Alpha = .9070

Appendix IX

Grouping of the Answers to Objective Thinking of Teacher 'Professional Development'

(responding to Question No. 14m)

Practical

Practical as opposed to theoretical development (School 3)

<u>Skills</u>

Catching up the information / knowledge and skills (School 8)

Develop any skill related to my profession (School 6)

Knowledge, skill and care about students (School 2)

More ways provided for teachers for refresh(ing) skills and knowledge in

teaching and learning (School 3)

Subject knowledge, skills, attitude (School 6)

Teaching skills (School 3)

Teaching skills and knowledge on teachers' own subject (School 4)

To enlighten teachers in the latest development in education and upgrade

teachers in knowledge and skills of teaching (School 6)

To upgrade our teaching skill and to be more professional (School 2)

Upgrading teachers in knowledge and skills of teaching (School 9)

<u>Knowledge</u>

Catching up the information / knowledge and skills (School 8)

Courses relating to subject knowledge, or other aspects relating to teaching

(School 4)

Expertise in subject knowledge (School 5)

Increase in subject knowledge / teaching methods (School 5)

Knowledge, skill and care about students (School 2)

Learning more about subject knowledge, attitude or our students (School 6)

Mastering required knowledge (School 7)

More ways provided for teachers for refresh(ing) skills and knowledge in

teaching and learning (School 3)

New knowledge (School 9)

Subject knowledge technology on teaching (School 7)

Subject knowledge, skills, attitude (School 6)

Teachers have professional development on his/her own specialism and

then expose themselves in other aspects (School 9)

Teaching skills and knowledge on teachers' own subject (School 4)

To acquire new technology in education and renew one's idea in education,

motivate ourselves (School 4)

To enlighten teachers in the latest development in education and upgrade teachers in knowledge and skills of teaching (School 6)

Understanding education (School 4)

Upgrade / Provide teachers with new skills / trends / insights / attitude in our preference (School 6)

Upgrading teachers in knowledge and skills of teaching (School 9)
Personal Improvement increased Competence

A chance to think and then do better in the future (School 2)

Able to do better in our own profession (School 1)

Be a good teacher (School 1)

Competency and personal growth (School 3)

Continuous learning and improvement (School 5)

Keep on improving (School 3)

More time and energy to achieve professional (School 1)

To be well prepared (School 5)

Well-prepared and equipped, value-added (School 3)

Make oneself more competent in their profession (School 6)

<u>Workload</u>

Every small piece of cake is good, but it would be too much to eat many in

a short period of time (School 4)

Good but more allowance of time required. Can't be too aggressive

(ambitious) (School 4)

Less and more reasonable workload (School 8)

Teaching work versus spare time (School 6)

Workload (School 4)

<u>Subject</u>

Advanced IT teaching (School 6)

Courses relating to subject knowledge, or other aspects relating to teaching

(School 4)

Expertise in subject knowledge (School 5)

Increase in subject knowledge / teaching methods (School 5)

Learning more about subject knowledge, attitude or our students (School 6)

Subject knowledge technology on teaching (School 7)

Subject knowledge, skills, attitude (School 6)

Teaching skills and knowledge on teachers' own subject (School 4)

<u>New knowledge or skills, expertise</u>

Expertise in subject knowledge (School 5)

New knowledge (School 9)

To acquire new technology in education and renew one's idea in education,

motivate ourselves (School 4)

To enlighten teachers in the latest development in education and upgrade teachers in knowledge and skills of teaching (School 6)

To upgrade our teaching skill and to be more professional (School 2)

Upgrade / Provide teachers with new skills / trends / insights / attitude in our preference (School 6)

Upgrading teachers in knowledge and skills of teaching (School 9)

<u>Upgrade</u>

To enlighten teachers in the latest development in education and upgrade teachers in knowledge and skills of teaching (School 6)

To upgrade our teaching skill and to be more professional (School 2)

Upgrade / Provide teachers with new skills / trends / insights / attitude in our preference (School 6)

Upgrading teachers in knowledge and skills of teaching (School 9)

Motivation and 'attitude'

To acquire new technology in education and renew one's idea in education,

motivate ourselves (School 4)

Subject knowledge, skills, attitude (School 6)

Learning more about subject knowledge, attitude or our students (School 6)

Upgrade / Provide teachers with new skills / trends / insights / attitude in our preference (School 6)

Professional development will be successful only if most teachers really want to improve their teaching and care about the development of their

students (School 6)

Ethics, responsibilities (School 8)

Teaching themselves (School 7)

Self study, not being forced (School 9)

<u>Continuous</u>

Lifelong learning (School 6)

A continuous process (School 7)

Life-long (School 9)

Teaching work versus spare time (School 6)

Students

Knowledge, skill and care about students (School 2)

Learning more about subject knowledge, attitude or our students (School 6) Professional development will be successful only if most teachers really want to improve their teaching and care the development of their students (School 6)

<u>Remedy</u>

Catching up the information / knowledge and skills (School 8)

Mastering required knowledge (School 7)

More ways provided for teachers for refresh(ing) skills and knowledge in

teaching and learning (School 3)

Training and courses

Courses relating to subject knowledge, or other aspects relating to teaching

(School 4)

Teacher training / strategies / philosophy (School 3)

Training courses (School 5)

<u>Schools</u>

Development of curriculum, teaching method and education ideology

(School 4)

Sharing with different schools (School 4)

<u>Other</u>

All of the above (School 2)

Same as 14(1) (School 5)

A common term without concrete elaboration (School 5)

It is the least important (School 8)

Appendix X

Results of performing cross-tabulation and correlation test between the teachers' highest level of IT competency and their filling of objective thinking of 'professional development'

A cross-tabulation between the teachers' highest level of IT competency and their filling of objective thinking of 'professional development'

Count				
		think of p develo		
		nil	filled	Total
highest level of IT	AIT	10	2	12
	UIT	29	15	44
competency	IIT	116	34	150
	BIT	12	2	14
	none of the above	6		6
	others		1	1
Total		173	54	227

Correlation test between the teachers' highest level of IT competency and their filling of objective thinking of 'professional development'

		highest level of IT competency	thinking of professional development
highest level of IT	Pearson Correlation	1.000	064
competency	Sig. (2-tailed)	l . '	.336
	N	227	227
thinking of	Pearson Correlation	064	1.000
professional development	Sig. (2-tailed)	.336	
	Ν	227	227

Appendix XI

Answers to 'Other methods of professional learning'

(responding to Question No. 16j)

- Travelling / Exchange Tour (School 2)
- Half-term leave for refreshment course in teaching (School 3)
- Keep up listening skills by watching English programme in TV (School 4)
- Class observation (School 4)
- Sharing with senior members of staff (School 5)
- Reflective journal (School 5)
- Nil (School 7)
- Paid study leave (School 8)

Appendix XII

Results of Performing Factor Analysis on All Items of Variables in All Four Levels of IT Competency

			Component		
		2	3	4	5
BIT teaching schedule	9.089E-02	.136	.120	.942	4.539E-02
BIT instructions clear	.411	.467	.532	.199	-8.55E-02
BIT curriculum appropriate	.257	.256	.811	.147	.126
BIT technical content	.290	.341	.788	2.135E-02	7.456E-03
BIT skills	.151	.439	.626	-1.99E-03	.298
BIT use of medium	.215	.508	.490	.258	.310
BIT hands on	.326	.662	.201	-1.77E-02	.185
BIT trainers help	.217	.832	.187	.111	-6.76E-02
BIT method of delivery	.249	.709	.316	.253	9.601E-02
BIT share ideas	.203	.698	.288	-2.72E-02	.114
BIT feedback on questions	.269	.690	.360	.136	.228
BIT requirement for pass	.327	.156	.148	5.015E-02	.862
BIT perform operations	.788	.237	.263	.175	.195
BIT send email	.870	.178	.258	.134	.148
BIT search and browse	.877	.154	.205	.132	.160
BIT ethics	.799	.313	.121	-3.41E-02	.148
BIT enough time	.693	.371	.167	-9.98E-02	2.405E-02

Rotated Component Matrix

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.



Scree Plot of the BIT course attributes

Component Number

			Component					
	1	2	3	4	5			
IIT teaching schedule	.305	.298	.132	.744	.161			
IIT instructions clear	.389	.453	.226	.624	-4.85E-03			
IIT curriculum appropriate	.326	.688	.127	.375	.113			
IIT technical content	.339	.774	.169	.241	7.028E-02			
IIT skills	.264	.841	.126	.143	.129			
IIT use of medium	.492	.613	2.400E-02	.147	.365			
IIT hands on	.628	.349	7.438E-02	.418	.263			
IIT trainers help	.712	.331	.196	.331	-4.72E-02			
IIT method of delivery	.748	.392	.174	.255	.104			
IIT share ideas	.728	.298	.219	1.045E-02	.293			
IIT feedback on questions	.804	.242	.163	.277	.155			
IIT requirement for pass	.207	.206	.327	6.394E-02	.810			
IIT design web	.183	4.261E-02	.606	.339	.523			
IIT sw good or bad	1.227E-02	.197	.814	.212	.223			
IIT enough time	.339	8.398E-02	.814	-3.56E-02	7.361E-02			

Rotated Component Matrix

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 7 iterations.



Scree Plot of the IIT course attributes

Component Number

			Component		
	1	2	3	4	5
UIT teaching schedule	9.002E-02	.704	.164	.116	.399
UIT instructions clear	.676	.353	.126	.385	138
UIT curriculum appropriate	.164	.863	.207	1.787E-02	-3.17E-02
UIT technical content	.259	.800	.243	-1.55E-02	-5.75E-02
UIT skills	.129	.836	130	.294	.162
UIT use of medium	.309	.656	3.185E-02	.374	.374
UIT hands on	.682	.507	3.750E-02	.203	191
UIT trainers help	.911	2.342E-02	9.959E-02	9.299E-02	.170
UIT method of delivery	.738	.361	.282	6.421E-03	.185
UIT share ideas	.485	.373	-4.21E-03	4.573E-02	.627
UIT feedback on questions	.883	.121	.128	7.140E-02	.170
UIT requirement for pass	.321	.188	.335	.671	.281
UIT school network	145	4.281E-02	.890	8.789E-02	.121
UIT integrate IT to T&L	.304	.223	.679	.223	-8.02E-02
UIT develop CBL	.199	3.626E-02	.738	.385	247
UIT audio visual	5.056E-02	.262	.566	.634	145
UIT enough time	.313	9.446E-02	.797	-6.39E-02	.196

Rotated Component Matrix

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 16 iterations.



Scree Plot of the UIT course attributes

			Component		
	1	2	3	4	5
AIT teaching schedule	.887	.145	.142	.268	244
AIT instructions clear	.504	.737	.223	.154	306
AIT curriculum appropriate	.367	.824	.135	9.915E-02	-4.56E-02
AIT technical content	2.720E-02	.962	4.124E-02	-6.06E-02	5.373E-02
AIT skills	.892	.187	.208	.160	9.116E-03
AIT use of medium	.355	.827	.196	3.522E-02	.212
AIT hands on	257	.598	5.449E-02	.158	.729
AIT trainers help	-7.03E-02	.741	-6.16E-03	.500	.357
AIT method of delivery	.896	.172	.153	.174	8.814E-02
AIT share ideas	.239	-6.41E-02	.395	.784	.361
AIT feedback on questions	.380	.236	-1.88E-02	.865	101
AIT requirement for pass	.345	115	.722	.222	.501
AIT lan	.400	.229	.874	-4.70E-02	3.773E-02
AIT web based technique	.516	.215	.771	1.948E-02	3.063E-02
AIT design instructional materials	.558	.313	.645	3.340E-02	.177
AIT enough time	337	2.137E-02	.865	.224	169

Rotated Component Matrix

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 16 iterations.



Scree Plot of the AIT course attributes

Appendix XIII

Result of Performing Repeated Measures of General Linear Model in ANOVA among the Means of the Three Group Attributes in All Four Levels

Effect		Value	F	Hypothesi s df	Error df	Sig.
BITCOMP	Pillai's Trace	.411	58.215 ^a	2.000	167.000	.000
	Wilks' Lambda	.589	58.215 ^a	2.000	167.000	.000
	Hotelling's Trace	.697	58.215 ^a	2.000	167.000	.000
	Roy's Largest Root	.697	58.215 ^a	2.000	167.000	.000

Multivariate Tests

a. Exact statistic

Multivariate Tests

Effect		Value	F	Hypothesi s df	Error df	Sig.
IITCOMP	Pillai's Trace	.052	4.981 ^a	2.000	183.000	.008
	Wilks' Lambda	.948	4.981 ^a	2.000	183.000	.008
	Hotelling's Trace	.054	4.9 81 ^a	2.000	183.000	.008
	Roy's Largest Root	.054	4.981 ^a	2.000	183.000	.008

a. Exact statistic

Multivariate Tests

Effect		Value	F	Hypothesi s df	Error df	Sig.
UITCOMP	Pillai's Trace	.052	1.451 ^a	2.000	53.000	.243
	Wilks' Lambda	.948	1.451 ^a	2.000	53.000	.243
1	Hotelling's Trace	.055	1.451 ^a	2.000	53.000	.243
	Roy's Largest Root	.055	1.451 ^a	2.000	53.000	.243

a. Exact statistic

Multivariate Tests

Effect		Value	F	Hypothesi s df	Error df	Sig.
AITCOMP	Pillai's Trace	.102	.510 ^a	2.000	9.000	.617
	Wilks' Lambda	.898	.510 ^a	2.000	9.000	.617
	Hotelling's Trace	.113	.510 ^a	2.000	9.000	.617
	Roy's Largest Root	.113	.510 ^a	2.000	9.000	.617

a. Exact statistic

Appendix XIV

A. Correlations of the Attributes of 'Curriculum' in All Four Levels of IT Competency

		BIT	BIT	BIT			BIT	BIT
		teaching	curriculum	technical		BIT hands	share	requirement
		schedule	appropriate	content	BIT skills	on	ideas	for pass
BIT teaching schedule	Pearson Correlation	1.000	.290**	.222**	.218**	.164*	.180*	.1 52*
	Sig. (2-tailed)		.000	.004	.004	.033	.019	.049
	N	169	169	167	169	169	169	169
BIT curriculum appropriate	Pearson Correlation	.290**	1.000	.726**	.595**	.472**	.491**	.355**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000
	N	169	169	167	169	169	169	169
BIT technical content	Pearson Correlation	.222**	.726**	1.000	.628**	.447**	.532**	.320**
	Sig. (2-tailed)	.004	.000		.000	.000	.000	.000
	N	167	167	167	167	167	167	167
BIT skills	Pearson Correlation	.218**	.595**	.628**	1.000	.535**	.518**	.394**
	Sig. (2-tailed)	.004	.000	.000		.000	.000	.000
	Ν	169	169	167	169	169	169	169
BIT hands on	Pearson Correlation	.164*	.472**	.447**	.535**	1.000	.519**	.339**
	Sig. (2-tailed)	.033	.000	.000	.000		.000	.000
	N	169	169	167	169	169	169	169
BIT share ideas	Pearson Correlation	.180*	.491**	.532**	.518**	.519**	1.000	.285**
	Sig. (2-tailed)	.019	.000	.000	.000	.000		.000
	Ν	169	169	167	169	169	169	169
BIT requirement for pass	Pearson Correlation	.152*	.355**	.320**	.394**	.339**	.285**	1.000
	Sig. (2-tailed)	.049	.000	.000	.000	.000	.000	
	N	169	169	167	169	169	169	169

**. Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

•

		IIT	IIT	IIT			IIT	IIT
		teaching	curriculum	technical		IIT hands	share	requirement
		schedule	appropriate	content	IIT skills	on	ideas	for pass
IIT teaching schedule	Pearson Correlation	1.000	.560**	.582**	.483**	.596**	.469**	.326**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000
	N	185	185	181	185	185	185	185
IIT curriculum appropriate	Pearson Correlation	.560**	1.000	.717**	.659**	.630**	.514**	.352**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000
	Ν	185	185	181	185	185	185	185
IIT technical content	Pearson Correlation	.582**	.717**	1.000	.712**	.601**	.538**	.353**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000
	N	181	181	181	181	181	181	181
IIT skills	Pearson Correlation	.483**	.659**	.712**	1.000	.567**	.516**	.373**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000
	N	185	185	181	185	185	185	185
IIT hands on	Pearson Correlation	.596**	.630**	.601**	.567**	1.000	.621**	.411**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000
	N	185	185	181	185	185	185	185
IIT share ideas	Pearson Correlation	.469**	.514**	.538**	.516**	.621**	1.000	.466*'
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000
	N	185	185	181	185	185	185	185
IIT requirement for pass	Pearson Correlation	.326**	.352**	.353**	.373**	.411**	.466**	1.000
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	
	N	185	185	181	185	185	185	185

**. Correlation is significant at the 0.01 level (2-tailed).

		UIT	UIT	UIT			UIT	UIT
		teaching	curriculum	technical		UIT hands	share	requirement
		schedule	appropriate	content	UIT skills	on	ideas	for pass
UIT teaching schedule	Pearson Correlation	1.000	.574**	.595**	.576**	.424**	.494**	.412**
	Sig. (2-tailed)		.000	.000	.000	.001	.000	.002
	Ν	55	55	55	55	55	55	55
UIT curriculum	Pearson Correlation	.574**	1.000	.666**	.736**	.504**	.363**	.327*
appropriate	Sig. (2-tailed)	.000		.000	.000	.000	.006	.015
	Ν	55	55	55	55	55	55	55
UIT technical content	Pearson Correlation	.595**	.666**	1.000	.572**	.604**	.423**	.367**
	Sig. (2-tailed)	.000	.000		.000	.000	.001	.006
	N	55	55	55	55	55	55	55
UIT skills	Pearson Correlation	.576**	.736**	.572**	1.000	.551**	.513**	.381**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.004
	Ν	55	55	55	55	55	55	55
UIT hands on	Pearson Correlation	.424**	.504**	.604**	.551**	1.000	.460**	.459**
	Sig. (2-tailed)	.001	.000	.000	.000		.000	.000
	N	55	55	55	55	55	55	55
UIT share ideas	Pearson Correlation	.494**	.363**	.423**	.513**	.460**	1.000	.365**
	Sig. (2-tailed)	.000	.006	.001	.000	.000		.006
	N	55	55	55	55	55	55	55
UIT requirement for pass	Pearson Correlation	.412**	.327*	.367**	.381**	.459**	.365**	1.000
	Sig. (2-tailed)	.002	.015	.006	.004	.000	.006	
	N	55	55	55	55	55	55	55

**. Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

		A 177	AIT	A 17	· · · · ·			
		AII	AIT	AIT			AII	AIT
		teaching	cumculum	technical	A 177 - 1 111 -	All hands	share	requirement
	Designed Completing	schedule	appropriate	content	ALISKIIS	on	ideas	for pass
All teaching schedule	Pearson Correlation	1.000	.496	.121	.847**	271	.386	.322
	Sig. (2-tailed)		.121	.724	.001	.419	.241	.334
	N	11	11	11	11	11	11	11
AIT curriculum	Pearson Correlation	.496	1.000	.862**	.588	.365	.214	.193
appropriate	Sig. (2-tailed)	.121	.	.001	.057	.269	.527	.569
	Ν	11	11	11	11	11	11	11
AIT technical content	Pearson Correlation	.121	.862**	1.000	.263	.612*	056	042
	Sig. (2-tailed)	.724	.001		.434	.045	.870	.902
	Ν	11	11	11	11	11	11	11
AIT skills	Pearson Correlation	.847**	.588	.263	1.000	077	.417	.516
	Sig. (2-tailed)	.001	.057	.434		.823	.202	.104
	Ν	11	11 [11	11	11	11	11
AIT hands on	Pearson Correlation	271	.365	.612*	077	1.000	.293	.264
	Sig. (2-tailed)	.419	.269	.045	.823		.382	.432
	N	11	11	11	11	11	11	11
AIT share ideas	Pearson Correlation	.386	.214	056	.417	.293	1.000	.752**
	Sig. (2-tailed)	.241	.527	.870	.202	.382		.008
	N	11	11	11	11	11	11	11
AIT requirement for pass	Pearson Correlation	.322	.193	042	.516	.264	.752**	1.000
	Sig. (2-tailed)	.334	.569	.902	.104	.432	.008	
	N	11	11	11	11	11	11	11

**. Correlation is significant at the 0.01 level (2-tailed).

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* Correlation is significant at the 0.05 level (2-tailed).

B. Correlations of the Attributes of 'Pedagogy' in All Four Levels of IT Competency

ſ						BIT
		BIT		BIT	BIT	feedback
		instructions	BIT use of	trainers	method of	on
		clear	medium	help	delivery	questions
BIT instructions clear	Pearson Correlation	1.000	.595**	.588**	.631**	.617**
	Sig. (2-tailed)		.000	.000	.000	.000
	Ν	168	168	167	168	168
BIT use of medium	Pearson Correlation	.595**	1.000	.532**	.627**	.687**
	Sig. (2-tailed)	.000		.000	.000	.000
	Ν	168	169	168	169	169
BIT trainers help	Pearson Correlation	.588**	.532**	1.000	.673**	.659**
	Sig. (2-tailed)	.000	.000		.000	.000
	Ν	167	168	168	168	168
BIT method of delivery	Pearson Correlation	.631**	.627**	.673**	1.000	.663**
	Sig. (2-tailed)	.000	.000	.000		.000
	Ν	168	169	168	169	169
BIT feedback on	Pearson Correlation	.617**	.687**	.659**	.663**	1.000
questions	Sig. (2-tailed)	.000	.000	.000	.000	
	N	168	169	168	169	169

**. Correlation is significant at the 0.01 level (2-tailed).

						liT faadbaak
						reedback
	,	instructions	IIT use of	IIT trainers	IIT method	on
		clear	medium	help	of delivery	questions
IIT instructions clear	Pearson Correlation	1.000	.553**	.661**	.641**	.623*1
	Sig. (2-tailed)		.000	.000	.000	.000
	N	185	184	185	185	185
IIT use of medium	Pearson Correlation	.553**	1.000	.546**	.668**	.635**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	184	184	184	184	184
IIT trainers help	Pearson Correlation	.661**	.546**	1.000	.767**	.713**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	185	184	185	185	185
IIT method of delivery	Pearson Correlation	.641**	.668**	.767**	1.000	.763**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	185	184	185	185	185
IIT feedback on questions	Pearson Correlation	.623**	.635**	.713**	.763**	1.000
	Sig. (2-tailed)	.000	.000	.000	.000	-
	N	185	184	185	185	185

**. Correlation is significant at the 0.01 level (2-tailed).

		UIT instructions clear	UIT use of medium	UIT trainers help	UIT method of delivery	UIT feedback on questions
UIT instructions clear	Pearson Correlation	1.000	.559**	.669**	.612**	.607*
	Sig. (2-tailed)		.000	.000	.000	.000
	N	55	55	55	55	55
UIT use of medium	Pearson Correlation	.559**	1.000	.437**	.604**	.395*
	Sig. (2-tailed)	.000		.001	.000	.003
	N	55	55	55	55	55
UIT trainers help	Pearson Correlation	.669**	.437**	1.000	.738**	.791*
	Sig. (2-tailed)	.000	.001		.000	.000
	Ν	55	55	55	55	55
UIT method of delivery	Pearson Correlation	.612**	.604**	.738**	1.000	.719*
	Sig. (2-tailed)	.000	.000	.000		.000
	Ν	55	55	55	55	55
UIT feedback on	Pearson Correlation	.607**	.395**	.791**	.719**	1.000
questions	Sig. (2-tailed)	.000	.003	.000	.000	
	Ν	55	55	55	55	55

**. Correlation is significant at the 0.01 level (2-tailed).

						AIT
		AIT		AIT		feedback
		instructions	AIT use of	trainers	AIT method	on
		clear	medium	help	of delivery	questions
AIT instructions clear	Pearson Correlation	1.000	.799**	.509	.565	.539
	Sig. (2-tailed)		.003	.110	.070	.087
	N	.11	11	11	11	11
AIT use of medium	Pearson Correlation	.799**	1.000	.663*	.440	.371
	Sig. (2-tailed)	.003		.026	.176	.262
	Ν	11	11	11	11	11
AIT trainers help	Pearson Correlation	.509	.663*	1.000	.168	.534
	Sig. (2-tailed)	.110	.026		.621	.091
	Ν	11	11	11	11	11
AIT method of delivery	Pearson Correlation	.565	.440	.168	1.000	.504
	Sig. (2-tailed)	.070	.176	.621		.114
	Ν	11	11	11	11	11
AIT feedback on	Pearson Correlation	.539	.371	.534	.504	1.000
questions	Sig. (2-tailed)	.087	.262	.091	.114	
	Ν	11	11	11	11	11

** Correlation is significant at the 0.01 level (2-tailed).

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* Correlation is significant at the 0.05 level (2-tailed).

Appendix XV

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A. Total Mean Score of Variable 'Curriculum' of All Four Levels of Competency

	N	Mean	Averaging the Total Mean
BIT teaching schedule	169	3.47	3.42
BIT curriculum appropriate	169	3.59	
BIT technical content	167	3.39	
BIT skills	169	3.34	
BIT hands on	169	3.35	
BIT share ideas	169	3.11	
BIT requirement for pass	169	3.70	

Averaged Total Mean Score of Variable 'Curriculum' of BIT

Averaged Total Mean Score of Variable 'Curriculum' of IIT

-			Averaging the Total
	N	Mean	Mean
IIT teaching schedule	185	3.35	3.37
IIT curriculum appropriate	185	3.48	
IIT technical content	181	3.42	
IIT skills	185	3.43	
IIT hands on	185	3.38	
IIT share ideas	185	3.14	
IIT requirement for pass	185	3.41	

Averaged Total Mean Score of Variable 'Curriculum' of UIT

			Averaging the Total
	N	Mean	Mean
UIT teaching schedule	55	3.36	3.36
UIT curriculum appropriate	55	3.38	
UIT technical content	55	3.56	
UIT skills	55	3.38	
UIT hands on	55	3.45	
UIT share ideas	55	3.04	
UIT requirement for pass	55	3.38	

	N	Mean	Averaging the Total Mean
AIT teaching schedule	11	3.27	3.21
AIT curriculum appropriate	11	3.00	
AIT technical content	11	2.91	
AIT skills	11	3.27	
AIT hands on	11	3.00	
AIT share ideas	11	3.45	
AIT requirement for pass	11	3.55	

Averaged Total Mean Score of Variable 'Curriculum' of AIT

B. Total Mean Score of Variable 'Pedagogy' of All Four Levels of Competency

Averaged Total Mean Score of Variable 'Pedagogy' of BIT

	N	Mean	Averaging the Total Mean
BIT instructions clear	168	3.48	3.43
BIT use of medium	169	3.43	
BIT trainers help	168	3.49	
BIT method of delivery	169	3.40	
BIT feedback on questions	169	3.36	

Averaged Total Mean Score of Variable 'Pedagogy' of IIT

	N	Mean	Averaging theTotal Mean
IIT instructions clear	185	3.36	3.41
IIT use of medium	184	3.46	
IIT trainers help	185	3.43	i
IIT method of delivery	185	3.42	
IIT feedback on questions	185	3.36	

Averaged Total Mean Score of Variable 'Pedagogy' of UIT

	N	Mean	Averaging the Total Mean
UIT instructions clear	55	3.51	3.44
UIT use of medium	55	3.55	
UIT trainers help	55	3.40	
UIT method of delivery	55	3.35	
UIT feedback on questions	55	3.40	

Averaged Total Mean Score of Variable 'Pedagogy' of AIT

	N	Mean	Averaging the Total Mean
AIT instructions clear	11	3.18	3.18
AIT use of medium	11	3.00	
AIT trainers help	11	3.27	
AIT method of delivery	11	3.09	
AIT feedback on questions	11	3.36	

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Appendix XVI

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Correlations of the Attributes of 'Learning Effectiveness' in All Four Levels of IT Competency

		BIT	DIT	BIT search		BIT
		operations	BII seno email	browse	BIT ethics	enougn time
BIT perform operations	Pearson Correlation	1.000	.853**	.833**	.700**	.586**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	169	169	169	169	169
BIT send email	Pearson Correlation	.853**	1.000	.923**	.758**	.600**
	Sig. (2-tailed)	.000	•	.000	.000	.000
	Ν	169	169	169	169	169
BIT search and browse	Pearson Correlation	.833**	.923**	1.000	.745**	.578*'
	Sig. (2-tailed)	.000	.000		.000	.000
	Ν	169	169	169	169	169
BIT ethics	Pearson Correlation	.700**	.758**	.745**	1.000	.661*'
	Sig. (2-tailed)	.000	.000	.000		.000
	Ν	169	169	169	169	169
BIT enough time	Pearson Correlation	.586**	.600**	.578**	.661**	1.000
	Sig. (2-tailed)	.000	.000	.000	.000	•
	Ν	169	169	169	169	169

**. Correlation is significant at the 0.01 level (2-tailed).

		IIT design web	IIT sw good or bad	IIT enough time
IIT design web	Pearson Correlation	1.000	.607**	.552**
	Sig. (2-tailed)		.000	.000
	N	184	184	183
IIT sw good or bad	Pearson Correlation	.607**	1.000	.506**
	Sig. (2-tailed)	.000		.000
	Ν	184	184	183
IIT enough time	Pearson Correlation	.552**	.506**	1.000
	Sig. (2-tailed)	.000	.000	
	Ν	183	183	183

**. Correlation is significant at the 0.01 level (2-tailed).

			UIT	UIT		UIT
		UIT school	integrate	develop	UIT audio	enough
		network	IT to T&L	CBL	visual	time
UIT school network	Pearson Correlation	1.000	.550**	.551**	.489**	.635**
	Sig. (2-tailed)		.000	.000	.000	.000
	Ν	54	54	54	54	54
UIT integrate IT to T&I	Pearson Correlation	.550**	1.000	.642**	.596**	.473**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	54	54	54	54	54
UIT develop CBL	Pearson Correlation	.551**	.642**	1.000	.700**	.566*
	Sig. (2-tailed)	.000	.000		.000	.000
	Ν	54	54	54	54	54
UIT audio visual	Pearson Correlation	.489**	.596**	.700**	1.000	.420*
	Sig. (2-tailed)	.000	.000	.000		.002
	N	54	54	54	54	54
UIT enough time	Pearson Correlation	.635**	.473**	.566**	.420**	1.000
	Sig. (2-tailed)	.000	.000	.000	.002	•
	N	54	54	54	54	55

**. Correlation is significant at the 0.01 level (2-tailed).

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				AIT design	
			AIT web	instruction	AIT
			based	al	enough
		AIT lan	technique	materials	time
AIT lan	Pearson Correlation	1.000	.893**	.824**	.615*
	Sig. (2-tailed)		.000	.002	.044
	N	11	11	11	11
AIT web based technique	Pearson Correlation	.893**	1.000	.970**	.456
	Sig. (2-tailed)	.000		.000	.159
	Ν	11	11	11	11
AIT design instructional	Pearson Correlation	.824**	.970**	1.000	.288
materials	Sig. (2-tailed)	.002	.000		.390
	N	11	11	11 .	11
AIT enough time	Pearson Correlation	.615*	.456	.288	1.000
	Sig. (2-tailed)	.044	.159	.390	
	Ν	11	11	11	11

** · Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Appendix XVII

Total Mean Score of Variable 'Learning effectiveness' of All Four Levels of Competency

	N	Mean	Total Mean Score	Averaging the Total Mean Score
BIT perform operations	169	4.01	19.74	3.95
BIT send email	169	4.07		
BIT search and browse	169	4.09		
BIT ethics	169	3.81		
BIT enough time	169	3.76		

Total Mean Score of Variable 'Learning effectiveness' of BIT

Total Mean Score of Variable 'Learning effectiveness' of IIT

	N	Mean	Total Mean Score	Averaging the Total Mean Score
IIT design web	184	3.58	10.26	3.42
IIT sw good or bad	184	3.40		
IIT enough time	183	3.28		

	N	Mean	Tota Mean Score	Averaging the Total Mean Score
UIT school network	54	3.33	16.81	3.36
UIT integrate IT to T&L	54	3.72		
UIT develop CBL	54	3.26		
UIT audio visual	54	3.41		
UIT enough time	55	3.09		

Total Mean Score of Variable 'Learning effectiveness' of UIT

Total Mean Score of Variable	'Learning effectiveness' of AIT

	N	Mean	Total Mean Score	Averaging the Total Mean Score
AIT lan	11	3.00	12.90	3.23
AIT web based technique	11	3.36		
AIT design instructional material	11	3.45		
AIT enough time		3.09		

Appendix XVIII

Additional Comments on the IT Training Courses

A. Additional Comments on BIT

Interesting Comments

- Content of the courses is appropriate but it is not easy to use such skills in teaching because the preparation of IT teaching is too long and it would become boring if teachers all use IT in their teaching (School 6)
- Many teachers have already had knowledge in this area. Handing in assignments without attending courses is a way of saving money (School 6)
- The knowledge acquired did not come from the courses provided but colleagues of my school (School 6)
- Sufficient for teachers to apply IT in classroom. The most useful resources are found in the web; thus teachers should be able to use the searching engines. It is such simple skill that a few hours training is sufficient (School 7)
- Too easy for teachers in general, should first inform the teachers that they can be exempted from taking this course if they think they can achieve a higher level! Waste time (School 8)

Negative Comments

- The trainer was new in his career; he hasn't got enough experience to teach the teachers and so the training course wasn't useful (School 3)
- Too easy to cope with (School 3)

- More practice will be required (School 4)
- *Mess (School 4)
- Many teachers have already had knowledge in this area. Handing in assignments without attending courses is a way of saving money (School 6)
- *Too simple for secondary teachers (School 6)
- *To simple (School 6)
- To simple (School 6)
- Too easy for teachers in general, should first inform the teachers that they can be exempted from taking this course if they think they can achieve a higher level! Waste time (School 8)

Positive or Neutral Comments

- Okay (School 1)
- Highly relevant (School 3)
- Quite easy to cope with (School 3)
- Fine (School 4)
- No comment (School 4)
- It's okay (School 4)
- Useful (School 4)
- Okay (School 4)
- To provide opportunity to know more about computer operation (School 6)
- Content of the courses is appropriate but it is not easy to use such skills in teaching because the preparation of IT teaching is too long and it would become boring if teachers all use IT in their teaching (School 6)
- The knowledge acquired did not come from the courses provided but colleagues of my school (School 6)
- Good (School 8)
- Good (School 9)
- Enough training (School 9)
- To promote the interests of teachers in learning computer software and develop their generic skills through the BIT courses (School 9)

B. Additional Comments on IIT

Interesting Comments

- No comment (School 4)
- Revision courses may help (School 4)

Negative Comment

- Some instructors didn't provide appropriate solution (or response) to our questions. Some of the courses can be conducted in a shorter time (School 2)
- Relevant but the training was too rush (School 3)
- A bit too demanding (School 4)
- Too difficult. Some skills will not be used in teaching and daily life (School 4)
- Irrelevant to teaching needs (School 4)
- Too difficult for me (School 4)
- More practice on webpage (School 6)

Positive or Neutral Comments

- Useful and "must-go" training (School 2)
- Another trainer was responsible for this; his appropriateness could meet the needs of the teachers making the learning at IIT level much easier (School 3)
- Containing many skills, passing the IIT helps me familiar with many software and it is useful in teaching in the future (School 3)
- Content of the course is appropriate but it is not easy to use such skills in teaching because the preparation of IT teaching is too long that students would be bored if teachers kept using the same presentation technique in the classroom (School 6)
- Good (School 6)
- Fair (School 6) (x2)
- Quite good (School 6)
- Sufficient for teachers to apply IT in classroom. The most useful resources are in the web. Thus teachers should be able to use the searching engines. IT is a simple skill that a few hours' training is sufficient (School 7)
- Appropriate (School 8)
- Enough training (School 9)
- A good chance for teachers to elevate their techniques in using the computer software (School 9)

C. Additional Comments on UIT

Negative Comments

- As I prefer practical courses, I missed out some of the theoretical topics. However, I have to write some documents when handling my profile. If the time of the course can be enhanced, my problem may be solved (School 1)
- Very technical, I would rather have more practical knowledge or using various teaching software (School 2)
- Network training is not enough at all. It needs more longer and in-depth practical training on network (School 2)
- Too much emphasis on the computer in networking technology but less on the education or instructional technology; we are teachers, not network administrators or IT co-ordinators (School 5)
- Not necessary for general use of IT in classroom, government can save money (School 6)
- Too unrealistic and theoretical; little value to teaching in practice (School 6)
- The skills are not necessary for teachers to use IT in classroom (School 7)
- Too much emphasis on authoring tools and techniques; it should provide more topics on applications on education, say, internet system, web-based learning system (School 7)
- Course content too much; progress too fast and hasty (School 9)

Positive and Neutral Comments

- Meaningful but not useful (School 4)
- Good and well-structured (School 6)

D. Additional Comments on AIT

Negative Comments

- It should have more practice in LAN system (School 1)
- The course is too loose for learners (School 1)
- The assessment cannot reflect the actual ability (School 2)
- The skills are not necessary for teachers to use IT in classroom (School 7)
- Syllabus not deep enough; not sufficient practical exercises at time allocation

(School 7)

E. Other Cross-level Comments

- I can't tell the differences between these levels, and the point for dividing teachers into different levels (School 7)
- No clear instructions and no reasons why teachers need to attain these levels (School 7)
- It seems to me that teachers need to hand in assignment so as to meet the requirements (School 7)

(Note: Repeated comments will not be recorded twice or thrice.)

Appendix XIX

The Interview Summary of Eight Cases

Case 1

Name of interviewee: Mr. A Post: Mathematics Teacher Organization: School 8 Time taken: 14 minutes

Mr. A teaches mathematics. He has accomplished the intermediate level (IIT) of ICT teacher training. Both courses of BIT and IIT were run by teachers of his school as a form of school-based teacher training. His overall comment on the courses of both levels was quite short, but still useful. The levels of difficulty were okay or up to his ability, though the course content was too skill-oriented. Nearly all teachers welcomed this type of teacher training in ICT and they never considered it to be extra workload beyond their normal teaching duties. From his observation, he found that quite a number of colleagues put what they learned in the training courses into practice. Most of these practices were in the form of producing teaching aids and typing the examination paper scripts. He conceded that most of his colleagues were still textbook-oriented and that nearly nobody would develop any alternative curriculum using ICT let alone use computers in assessment of students' learning. Integrating of ICT into curriculum was quite rare among teachers in his school and the teaching effectiveness due to ICT still needed more time to nurture.

As for the policy of IT in Education, Mr. A thought that it was worth it for the government to spend \$500M in ICT teacher training with the existing achievement at least up to the level of IIT. He had no problem with the requirements of teacher training proposed from the 'Five-Year Strategy' as all his colleagues had met the minimum requirements.

The IT co-ordinator of his school was one of his colleagues. Mr. A reported finding little help from this IT co-ordinator as he always spent his time in taking care of the server. Integrating ICT into the curriculum seemed not to be easy in his school as the IT co-ordinator was not equipped with such ability. Therefore, the training need of the IT co-ordinator would be to be taught ICT.

Case 2

Name of interviewee: Miss B Post: Science Teacher Organization: School 4 Time taken: 25 minutes

Miss B is a Science teacher teaching junior forms. She completed the basic level of teaching training (BIT) two years ago and would not consider going further. The course was provided by a central vendor approved by the Education Department at that time. She and most of her colleagues found the course useful as they had no preliminary knowledge in those areas of computer knowledge. Some teachers felt only part of it was useful. All of them had no complaint about the course except for the poor quality of the tutor such as their poor delivery, which made the subject difficult to understand. Miss B was also not satisfied with the assignment submission system. At all levels, whether a teacher would meet the requirements and pass the course was totally dependent on the principal who had the supreme authority to determine whether a teacher could pass or fail. There were both pros and cons, according to Miss B. The disadvantages were that the principal's lack of ICT knowledge would surely affect his judgment. Yet the advantage lay in the flexibility of the principal himself who could adjust the passing requirements by taking individual teacher's ability into consideration. Even under this circumstance, teachers still took the training as part of the extra workload because most of the course time was on Saturday morning. One way to lessen their burden might be through the use of self-learning packages as suggested by Miss B.

Miss B also observed that some colleagues started to make use of what they had learned in the ICT course in their teaching, mostly in social science subjects and Art. Mathematics was a subject using the least ICT. The usage included preparing lesson notes and setting assignments. The typing of examination papers was all done by teaching assistants in her school. Use of ICT in analyzing students' performance in learning or assessment was nearly none. Miss B saw the increased use of ICT facilities in her school since 1998 as a kind of trend in the society. She did not intend to correlate the increased use of ICT facilities to attending the training courses in ICT. Change in school curriculum was common in some subjects, but not the teaching approach. She also agreed with the claim that using ICT could lead to enhancement in students' learning. This was quite common in some practical subjects, like commerce. Students usually browsed the internet to search for useful materials, prepared presentation using PowerPoint and used floppy disks to hand in their assignments.

Miss B did not feel the need of using over \$500 million dollar to train all the teachers in Hong Kong to acquire a certain level of IT competency. Instead, she suggested using the methods of influencing each other in the same working environment. Not all teachers could apply the skills because there was lack of practice immediate after the training courses. Her solution was that teachers alone provide ideas to the teaching assistant or IT technician and let them develop the teaching software. As for the four levels of teacher training, Miss B had no objection to the system as she agreed with the different ability of teachers attending different levels of study. She, however, projected the development of the ICT teacher training. Miss B and all her colleagues had no problem in fulfilling the requirements of BIT within first two years but she knew that some female teachers in her school had their assignments done by their friends or husbands in order to pass the basic level of IT competency.

The work of the IT co-ordinator of her school was shared by two teachers. The school used that amount of resources saved to hire an IT technician for all the routine work for the ICT, such as maintaining the school intranet, websites, installation and repairing work. The two IT co-ordinators were responsible for planning and supporting teachers by finding more resources. She did not think of any training needs for the two IT co-ordinators as the demand from the teachers was still very little.

Case 3

Name of interviewee: Mr. C Post: Native English-speaking Teacher Organization: School 3 Time taken: 16 minutes

Mr. C was a NET teaching English Language in junior forms. Though he was a foreigner, he managed to accomplish the basic (BIT) and intermediate (IIT) level of ICT training courses. Both of them were reported to be school-based. He was pleased to discover that nobody complained about the courses so far as everybody understood that it was their obligation to take it. They, therefore, would not take such training as extra workload beyond their normal teaching duties. They all thought the courses useful but some felt they were too skill-oriented. The challenges of integrating ICT into the curriculum were very few but he treasured the chance for sharing ideas. The problem of attending these courses, Mr. C thought, would be the individual differences among learners. His confidence in using ICT was reported to be increased by attending more courses. Mr. C found learners putting those skills into practice very common in his school. He thought ICT was just another tool for teaching.

Considering the use of ICT in teaching and learning, as Mr. C mentioned before, the frequency of use of ICT among teachers in his school was high. He used to have a video-clip and PowerPoint presentation in teaching English, but he was not sure whether the use of ICT in teaching could lead to any enhancement in students' learning. Again, he thought that this was another tool and another method for teaching. His colleagues usually used ICT devices for preparing notes, teaching students e-mail and typing examination papers but never in analyzing students' performance in learning. Mr. C commented that the course content in both levels was appropriate, knowledgeable and useful. He, for the time being, could not think of any amendment for the content. After all, he concluded that the greater use of ICT in his school could be attributed to the result of teacher training in ICT.

As for the policy of the IT in Education, Mr. C would say 'yes' to the vast expenditure on teacher training in ICT because he thought it was worth and for the students' sake. However, he did not agree with dividing the training into four different levels, but suggested combining them into two levels only. Regarding the government's requirements for different percentages of teachers passing BIT, IIT and UIT, Mr. C had no problem as all his colleagues felt comfortable in being able to achieve the proposed goal from the 'Five-Year Strategy'

The IT co-ordinator in his school was employed from outside. He was reported by Mr. C to be supportive. He always provided courses to teachers for their enrichment in certain software applications. This nice guy was always responsive to the teachers' need. His greatest contribution was to provide confidence to colleagues according to Mr. C. His training need, as suggested by Mr. C, was some actual teaching experience so that he could support colleagues with integration of ICT into curriculum of various subjects. Case 4 Name of interviewee: Mr. D Post: Science Teacher Organization: School 1 Time taken: 15 minutes

Mr. D is the Science panel chairman and teaching junior form Science. He had completed both basic (BIT) and intermediate (IIT) level. Both of them were provided by external vendors recommended by the Education Department. Though the quality of the instructors was unsatisfactory, Mr. D was so understanding that he agreed that it was difficult for one instructor to take care so many learners at the same time. He also felt that the effectiveness of the courses depended very much on the perseverance and the comprehensive power of the individual learner. The only thing he was sorry about was the shortage of time while the level of difficulty of the courses was okay. Compared with the period before 1998, the use of the computer in his school was more frequent. He also discovered that very few of his colleagues put the learned skills into practice because the ICT facilities in his school were insufficient for them to use. Still some of them used ICT in preparing lesson notes and students' assignments. There were some subjects using ICT in assisting teaching, though the scale was still very small. It was wonderful that nearly all teachers did not think this kind of teacher training increased their workload as all of them were organized in summer vacation. Mr. D also agreed that the use of ICT in teaching could lead to certain degree of enhancement of students' learning but the school itself needed to make some improvement in the ICT facilities and adjustments in the existing curriculum so that more ICT elements could be infused.

As regard to the policy of IT in Education, Mr. D felt that the vast amount of expenditure in the ICT teacher training was worthwhile as they were all useful to teachers provided that more integration of ICT into school curriculum took place. He accepted that the classification of teacher training into four levels was appropriate as it suited the needs of different learners. Though there would be some overlapping in the course content among different levels, Mr. D took that as a kind of revision. He totally agreed with the training requirements proposed in the 'Five-Year Strategy' that all teachers must complete BIT and 75% completing IIT within the first three years from 1998 to 2001.

The IT co-ordinator of his school was formerly one of the teachers of his

school. He was responsible for the IT for the whole school, such as networking, but not too much in assisting teaching. The support provided by this IT co-ordinator was not too much as very few teachers were asking for help. He also provided some training courses for the teachers which had very high attendance because those courses were run during staff development days. This was equivalent to compulsory as there would be no excuse for absence. Lastly, Mr. D did not see any need for retraining of the IT co-ordinator as he was attending the AIT in the mean time.

P.S. : Mr. D was very cautious. He emphasized at the end of the interview that the opinions given during the interview was purely his personal view. Perhaps he was afraid that his points of views would be interpreted or transferred to his principal which would cause him inconvenience.
Name of interviewee: Mr. E Post: Computer Teacher and IT Co-ordinator Organization: School 7 Time taken: 25 minutes

Mr. E shared half of the workload of an IT co-ordinator in his school while another teacher shared the rest. He was responsible for the routine work, such as maintenance of the server and network and installation work, while his counterpart took care of planning and emergency. He was well-equipped and had accomplished all four levels of the teaching training in ICT. His training in BIT was through school-based training while IIT through the training scheme of a software house. Teachers of his school needed to seek for a suitable software vendor for their UIT while the provision of AIT was restricted to several tertiary institutions. His overall comment on the value of the courses was above average. Most of them were useful but too skill-oriented. He appreciated the course content and tutors but was not satisfied with the assignment submission system. Some course requirements might not be so clear, such that learner did not know what was to be submitted. The system that the principal could determine whether a teacher could pass or not created lot of political problems, especially when the principal delegated this right to one or two teachers, mostly IT co-ordinators or IT team leaders. Problems of perception, fairness, and prejudice would be raised as conflicts among colleagues.

Though all of the teachers in his school had received the basic level of teacher training a long time ago, their use of ICT in teaching was only limited to PowerPoint presentation. Use of other application software was still rare. Among the subjects using ICT in teaching were English Language, Science, Chinese Language and Computer Studies. Some of them built a data-bank for the students to retrieve data from the school's intranet. Most of the teachers in his school were aware of the requirements of the policy such that no one regarded the teacher training as an extra workload. Mr. E felt that whether the use of ICT in teaching could lead to enhancement of students' learning was debatable because the learning motivation and the self-control of individual students were playing an important role. He was not sure whether the increased use of ICT in teaching was because of the teachers' attending the training courses or not.

When Mr. E knew the amount of money spent in teacher training in ICT from

1998-2002, he felt that was worth. However, the effect of the training, he admitted, was very difficult to measure. One thing he could be sure was that there had been wastage in the hardware and the infrastructure compared to the cost of teacher training. As for the classification of the four levels, Mr. E would consider them as appropriate. The BIT was too easy. Some course content in UIT was too difficult and needed further elaboration while some could not be applied or used in the school environment. Video-editing was one of the examples, as this job could be done by technicians or even students. There was some suggestion that all the courseware were better developed using the same platform or computer language so that every teacher at a certain level was capable of amending the programme or addition of data. Mr. E disagreed with the above suggestion, as he thought that not all teachers would be interested, and that diversification in using different language was encouraged. The most important objective in introducing ICT into the school curriculum, he added, was the paradigm shift in the teacher but not the change in computer or software. He also found no problem in his own school for 75% of teachers meeting the requirements of IIT and 25% of them meeting requirements of UIT. He further suggested that on-the-job teacher training after a certain interval of years might be a better solution than the requirements proposed by the 'Five-Year Strategy'.

As an IT co-ordinator, Mr. E had to face lots of problem in promoting ICT in education in his school. The first problem he encountered of course was the insufficient ICT knowledge or awareness possessed by his principal. Under such circumstances, he was handicapped and allowed to do some practical work which rightfully belonged to a technician. However, he tried to help the teachers in all subjects to integrate ICT into their curriculum. The frequency depended on the enthusiasm of each individual teacher on using ICT in teaching. Lastly, Mr. E had a strong desire to know more about curriculum and its attributes such as cross-curriculum studies. He was also aware of the standing of an IT co-ordinator which would affect the effectiveness of his work. Say, if the IT co-ordinator was a member of the senior management team of a school, his proposal would be more influential and his work be more effective because of the authority furnished by the school.

Name of interviewee: Mr. F Post: Chinese Language Teacher Organization: School 5 Time taken: 16 minutes

Mr. F is a vice-principal in School 5 and teaching senior form Chinese Language. He received the teacher training up to the upper intermediate level (UIT) but he skipped the IIT. Commenting on the courses, Mr. F was very observant. He said he was clear about the real situation and limitations of the existing teacher training in ICT. He simplified the whole situation of ICT teacher training into two areas, too skill-oriented and non-uniformity of the standards required. The former problem lay with the inexperienced formulation of the policy of IT in Education by the Hong Kong government. There was lack of experience and no theory to back up the policy. Everything seemed to be 'school-based' or in the sense of trial-and-error resulting in over-emphasis of skills in course content but not in ICT assisting teaching and learning. The latter problem could be attributed to the large individual difference in the knowledge and skills in ICT among learners in the same class. It was difficult to use one set of teacher materials to suit the need of all the learners in a class. Then it appeared that elite learners went too far ahead leaving the 'slow learners' quite far behind. Therefore, asking someone to finish the portfolio assignment, or copying other learners' assignments for submitting was quite common among some female teachers in his school. It was inevitable for the tutors or instructors to give guidance but not be a 'collaborator' in the process.

Mr. F reported on the situation of how his colleagues looked at the teacher training courses from BIT to UIT. Most of them felt it as a burden beyond their normal teaching work. They were all interested in the BIT but could not feel IIT useful. This was because some of them were not able to follow the schedule. Their need for attending UIT was comparatively less. There were only 30-40% of the learners using what they had learned in their teaching, mostly in preparation of lecture notes, setting assignments or keying in examination papers. Software like Microsoft Office was quite common, especially the PowerPoint and Excel for presentation and calculating of students' marks respectively.

In his opinion, Mr. F did not think that the vast amount of money invested in ICT teacher training so far was worth because he observed most of the teachers who claimed to meet the requirements of a certain level of IT competency could not master what they had learned. Nor did they know the concept behind certain operations. It was surely wastage. On the other hand, he did not feel comfortable about the way that the ICT teacher training was divided into the existing four levels. He thought three levels would be enough. There was so much overlapping that he proposed abandoning the upper-intermediate level (UIT). Moreover, as a vice-principal of an IT pilot school, he did not see any problem for all his teachers to pass the requirements in BIT, and 75% of them to pass the IIT, even 25% of them to pass UIT.

He praised the IT co-ordinator of his school for his unfailing support to other teachers. His IT co-ordinator was able to lead the whole school into the trend of ICT development. His ability in maintaining the network and helping the promotion of ICT in education was greatly appreciated by other colleagues. Mr. F attributed the success of integrating ICT into the school curriculum in his school to the effort of the IT co-ordinator. He stressed that it was not the post but the personality who played the role with sincerity. To be more perfect, he hoped that the IT co-ordinator could take some courses in IT in Education offered by some local universities which would be beneficial to his work and to the development of the school as well.

P.S.: The above-mentioned IT co-ordinator was the interviewee in Case 8, Mr. H.

Name of interviewee: Mr. G Post: Mathematics Teacher Organization: School 6 Time taken: 19 minutes

Mr. G teaches both junior and senior Mathematics. He has completed the upper intermediate level (UIT) which he thought was okay, except some classmates could not stand for the heavy burden on computer programming. Both BIT and IIT were school-based training while UIT was provided by a commercial software company approved by the Education Department. Most colleagues participated in the IIT training which were described as useful. The same response was received in the BIT training. UIT was filled with Authorware programming which might not be welcomed by all the learners. On the other hand, Mr. G felt that the courses in all school-based training contained very little about teaching with ICT but none was found in the courses provided by the external vendors. The courses were, however, still evaluated as useful. It was lucky that most of their teachers were not aware of the burden of attending some ICT teacher training courses. Some teachers were observed to use what they had learned in teaching. Website and video-clips were widely used in certain subjects such as Christian Ethics or Mathematics. Besides preparing notes and typing examination paper, teachers also used computer to calculate the students daily and examination marks. However, teachers' skills in managing some computer software might not be acquired through the ICT training course. Moreover, Mr. G did not think that there was any correlation between the use of ICT in teaching and the enhancement of students' learning.

Regarding the policy in IT in Education, Mr. G did not have a strong consensus on the expenditure of the vast amount of money in ICT teacher training so far. He discovered that the expenditure of the course provided by the vendors was higher than those provided by school teachers. In another instance, he had a strong feeling that absentia was a waste of resources when he saw some 30-person workshops in UIT were always occupied by less than 20 learners. Mr. G found that the four-level system of the teacher training was no problem and that it was reasonable for the school to have all teachers passing the BIT level within the first three years of implementation.

The IT co-ordinator was chosen from one of the teachers in his school. He

was responsible for the installation and repairing of computer system. Maintenance of the school network was also part of his work, In Mr. G's eye, the IT co-ordinator was always willing to help, but most of the those problems were about hardware and facilities. He also understood that it was difficult for one single teacher to offer help in subject areas beyond his major studies. Curriculum studies and experience in using IT in teaching and learning were two issues the IT co-ordinator needed to learn according to Mr. G.

Name of interviewee: Mr. H Post: Computer Teacher and IT Co-ordinator Organization: School 5 Time taken: 20 minutes

Mr. H is the IT co-ordinator of a school, but at the same time he had to take up about 20 periods (normal teaching loading is 30) per week. He had gone through the four levels of teacher training of ICT in which BIT was provided by school teachers, both IIT and UIT external vendors (partly from Chinese University of Hong Kong and partly from another commercial software house) and AIT through Hong Kong Polytechnic University. His overall comment on the teacher training was that all of them were skill-oriented while the content in AIT could be applied. Most learners in these courses were willing to learn. Some of them even applied them in their teaching but this is limited to preparation of teaching materials. Mr. H found that it was inevitable that most of his colleagues would have the feeling that this kind of training added an extra workload for them. Even then, nearly all teachers managed to finish their own assignment with the assistance from Mr. H. Hence, the use of ICT facilities this year was significantly more than that before 1998, mainly because his school was chosen as one of the 20 IT pilot schools in Hong Kong which received extra resources from government to build up as a model IT school. Another reason may be due to the system of one-teacher-one-computer in which the accessibility of ICT facilities was getting high enough that teachers were more willing to use them. Mr. H also believed that the using of ICT in teaching could surely lead to enhancement in students' learning.

As an IT co-ordinator of a secondary school, Mr. H did not feel easy with the expenditure of over \$500 million in teacher training over the past three years. It was not worth, he thought, as it would be cheaper if the training could be done in the form of school-based teacher training. It was okay but may not be useful to divide the ICT teacher training into four different levels as different learners looked for different targets in ICT training. A flexible system may help teachers in achieving their goals. The suggestion made by Mr. H was that besides the required core course, there should be some elective courses for the learners to choose which must be provided by the central institutes. He thought that everybody would have his own goal. For instance, some teachers liked to go for AIT while some just stopped at the level of BIT. Flexibility, therefore, was very important in

encouraging teachers to develop themselves in ICT teacher training. The task-oriented approach, suggested by Mr. H, may work too. He added that the effectiveness of the teacher training would be better if some of the courses were co-ordinated by the central government. Moreover, Mr. H felt that the requirements for the percentage of teachers achieving certain levels of IT competency proposed by the 'Five-Year Strategy' was too rigid. Quantification, he added, was just for reporting purpose. Talking about the jobs of an IT co-ordinator, Mr. H conceded that he lacked the theory of integrating ICT into teaching and learning but was still learning. Being aware of the needs in various subjects, Mr. H would prepare some teaching aids, software and even hardware for the sake of different teaching purposes. Since most IT co-ordinators had the training of technical support but lack the educational theory of IT in Education, he suggested that the government should identify more scenarios in the local context for successfully using ICT in teaching and learning. He found that this was better than to encourage schools to compete for the most advanced and updated hardware and software through giving them money.