

CHAPTER 4.2 RECOMMENDATIONS

4.2.1 Reviewing Achievements and Deficiencies

From the findings of this study, it is fair to conclude that the government has clear priorities and focus in its implementation: providing high computer:student ratios in schools in the form of centralized computer rooms with good connectivity, getting teachers to reach minimum levels of IT competency and be able to use the computer facilities in their teaching and to provide sufficient technical and human resource supports to schools to ensure that teachers can make use of these facilities. Efforts were also made to provide curriculum resources to teachers and schools for classroom use. Further, the government has also put in place effective strategies for dissemination of these various resources to schools to take account of different school preferences so that generally there is a relatively smooth execution for the massive operations involved.

However, the findings from various sources also point out that while teachers have started to make use of IT in teaching, it has been predominantly in the form of expository teaching. Principals and teachers embraced the terms paradigm shift and life-long learning did not realize that to achieve these in the context of ITed requires that this should go hand-in-hand with curriculum reform and pedagogical innovation. The understanding of the nature of change as reflected by the school plans and teaching and learning activities were one of technologizing education. Thus while the individual implementation strategies were very successful, the implementation did not make any noticeable progress in terms of its impact on teaching and learning in achieving the government's vision of developing "in our students the attitude and capability for independent life-long learning" and hence "become more motivated, inquisitive and creative learners" (Education and Manpower Bureau, 1998). In fact, the lack of noticeable progress in achieving these goals can be attributed to the fact that the 5-year Strategy document's description of "paradigm shift" was rather amorphous and the strategies employed in the implementation were in fact implicitly much more supportive of expository modes of teaching than other modes of pedagogy.

On the other hand, the research also revealed in some schools where the leadership has clear vision and understanding of the nature of the ITed initiative as one of promoting curriculum and pedagogical reform, innovative pedagogies have successfully emerged. In these pedagogical practices, students engaged in productive, relatively open learning tasks where they contribute to the definition of the learning goals and the learning pathways while teachers take up the role of a facilitator. These practices often involved extended collaborative project-based learning, some of which also allowed students to collaborate with and learn

from people outside of the school, some of whom may be outside of Hong Kong. These innovative pedagogical practices found in Hong Kong are on a par with similar practices that are very much valued elsewhere in the world. Thus vision and leadership are the elements that are crucial and have been deficient in the implementation process.

4.2.2 Need to Clarify to the Community the Meaning of Paradigm Shift

In view of the above summary of achievements and deficiencies, we recommend that the government need to review and formulate a clear understanding of what Paradigm Shift means and what it should translate into, in terms of teaching and learning practices in schools (for details, refer to 3.4.3 & 3.4.4). The government should also make serious efforts to communicate to school principals, teachers, parents and other members of the education community an appropriate understanding of the goal and nature of this initiative, that this should go in tandem with the curriculum reform that the government is trying to bring about and that the process requires a fundamental change in the role of the teacher and the learner. The government machinery has been very effective in promoting the technologizing of education. It would be very desirable that it now shifts its focus to promote the technology-supported re-engineering of education. The following two sections will detail policy recommendations to achieve this.

4.2.3 Policy Adjustments Necessary

The findings from this Study reveal that while access, connectivity, teacher enablement, curriculum resources and support are all enabling factors for the implementation of IT in Education, the specifications and priorities in each of these domains are inextricably associated with and influences the curriculum priorities and pedagogical approach to be adopted in using IT for learning and teaching. It is recommended here that policy adjustments be made in each of these areas to promote and support the emergence of more innovative pedagogical practices.

In the area of access and connectivity, priorities should be given to distributed access around the school, especially for students. Internet-connected computers should, as far as possible be made available in classrooms, libraries, and other areas where students can access during and after class to support their use of ICT for various kinds of learning activities other than simultaneous access under teacher control in whole class teaching situations. Ways of promoting and guiding students' self-directed use individually and in group work, including use after school hours, should be strongly encouraged.

Further, the government needs urgently to formulate a strategy for the maintenance and continual upgrading of the ICT infrastructure in schools that is clearly linked to curriculum and usage priorities. This is especially imminent in the case of pilot schools and others that started the substantial establishment of the ICT infrastructure in their schools around 1998. Expenses on access and connectivity will no longer be “non-recurrent” but needs to be built into the recurrent funding structure of schools. Schools, including teachers and students, should understand that the curriculum impact and potential of the computers in a school is not directly proportional to the processing power and multimedia capabilities of the machines. In fact, this study reveals that how far computers and internet access are distributed and made available for students are much more important for supporting learning activities that aim to develop students’ lifelong learning abilities. It is recommended here that a consultancy/working group be setup to draw on the experience of pilot schools and schools with innovative pedagogical practices to make recommendations on the priorities, strategies and implementation guidelines for the continuing upgrade and maintenance of the ICT infrastructure such that funds could be used most effectively in ways that will promote the pedagogical practices and learning gains that are most desired.

The term “teacher enablement” should be changed to “teacher professional development”. This former term is misleading in that it gives the impression that what teachers need is simply the acquisition of technical skills. Teacher professional development should focus on helping teachers to develop deeper understanding of the nature of the challenge that the information era is bringing to education, the kind of curricular and pedagogical change that are necessary to face this challenge and the kinds of technologies and uses that would be supportive of such change. This kind of professional development is also much needed for school principals. Another kind of professional development that teachers need is more discipline-based to allow them to understand and make use of technology-based cognitive tools that are available. There are a lot of learning environments designed on the basis of much cognitive research on learning and teaching in many of the discipline areas. However, to make successful use of these, teachers have to be introduced to and be fluent with the learning theories that such tools build on.

In terms of curriculum resources, the emphasis should move away from the introduction and sharing of expository demonstration materials closely mirroring the textbooks to the introduction of resources that are well-grounded on sound cognitive/educational research. Teachers should be discouraged from spending time on the production of demonstration/expository materials to putting their efforts on learning about computer supported tools and environments that help to extend the kinds of learning activities available to students or to help students to learn concepts and skills that would otherwise be inaccessible. The SITES

M1 case studies on good practices in the use of IT in education and the SITES M2 case studies on Innovative Pedagogical Practices Using Technology (IPPUTs) reveal that the software used in most of these teaching practices were general application software and that these practices did not require any sophisticated IT skills. None of the IPPUTs involved the use of teacher generated multimedia curriculum resources. More specialized hardware and software were sometimes found in IPPUTs at the senior secondary level, and these were generally discipline specific hardware and software developed for specialized usage in those particular disciplines, for example, dataloggers in science and geographic information systems in geography. It is recommended here that curriculum resource development efforts should be organized in tandem with the promotion of specific curriculum innovation and curriculum ideas, preferably supported by appropriate teacher professional development initiatives as well.

In terms of resource support, they should be organized to support the kinds of development detailed above. In particular, ITCs and subject panels should be provided with professional development support to help them take on their roles in curriculum leadership that incorporates the effective use of ICT. Findings from the current study reveal that IT teams in schools generally do not perceive their role as one of leadership but rather one of providing support and training to colleagues. However, experiences from the SITES case studies as well as the education research literature on curriculum innovation and change show that leadership is of paramount importance in the implementation of change. Schools should be helped to review and align their visions and goals and to establish school-based strategies for implementation. In this regard, system level support for the sharing of change strategies and goals, organization and management as well as ways to assess the impact of various strategies would be very helpful. Curriculum planning and development experiences in conjunction with the use of ICT to bring about new learning goals and activities would be important.

In terms of community-wide culture, the public should also be made aware of the nature of the innovation involved in the introduction of IT. In particular, community-wide culture should be fostered to break down the classroom walls so that students may learn with and from people outside of the school and to develop a more global perspective. Findings from this study reveal that teachers in general are reluctant to share or collaborate with others beyond curriculum resources. So far, activities in this area are mostly competitions for students or conferences and exhibitions. The impact of such activities only extended the exposure of students and teachers. Opportunities should be created to encourage cross-school collaboration within and outside of Hong Kong both for teachers and students that would allow them to work with and learn from each other.

4.2.4 Building Multi-level, Cross-sector Leadership for ITed Implementation

As explained in chapter 1.1, there are three levels of factors contributing to the implementation of IT in Education, namely system, school (including classroom) and individual (including family) levels. In order to support schools to implement the kind of education innovation and change required, the government should support schools in the development of curriculum leadership at the school level and collaborate with schools and school organizations to develop effective change strategies. Research on exemplary practices using ICT reveal that best practice arises in schools that have visionary leaders who are able to inspire, support and guide the innovation. Leadership at school level operates within the context of and in tandem with national implementation policies and strategies. Leading schools into the information age is not simply a process of technological adoption but one of innovation and change. The greatest challenge is for different levels of leadership in a nation, from the ministry, district education boards, through to school principals, department heads in schools to individual teachers to establish a common vision as well as effective implementation strategies at the various levels that can be dynamically adjusted during the course of innovation ([Law, 1998 #229], [Fullan, 2001 #228]). Efforts to bridge the digital divide must emphasize issues of leadership, change management and good pedagogical practices – in short, the focus should be on *partnership in leadership*.

To achieve the above goals, a territory-wide leadership team comprising key government officials, principals, teachers from different key learning areas and teacher educators should be established to identify specific priorities, needs and mechanisms for promoting a common vision and to advise on and monitor progress. Regional leadership teams could also be established as further support structures in helping schools to establish school level leadership teams. As the main goal of implementing IT in Education is to develop students' capacities for self-learning, problem-solving, information seeking and analysis and critical thinking as well as the ability to communicate, collaborate and learn from each other, the leadership teams at all levels must comprise personnel who are in charge of curriculum planning and development as well as those in charge of professional development initiatives at the respective levels. The establishments of these various levels of leadership can be supported by appropriate facilitation and training. An example of such support structure in the form of e-Educational Leadership Workshops is attached in Appendix 4.2.1.

Also, it is noted that the ITed initiatives have been implemented mostly through the efforts of the Information Systems Division of the Education Department. This might be appropriate if the change we are interested in is one of technologizing education only. However, if this initiative is to be implemented as an integral part of the wider curriculum reform, then this

implementation should be conducted through coordinated leadership and that the CDI should play an important role in providing the link between IT implementation, curriculum reform, teacher professional development and leadership development.

4.2.5 Planning for the Review of ITed Implementation by 2003

In making recommendations on preparations for the review of ITed implementation by 2003, we would like to put this in the context of how this exercise should be conducted if the Education Department is to be a learning organization that is capable of making data-driven, research-based policy decisions.

Structures to plan and implement the review

In the current preliminary study, detailed research design could only begin after the award of the research contract, leaving only 9 months from kick-off to the final submission of report. This posed serious limitations on the scope and depth of the study. In terms of planning specifically for the review exercise, it is important that the ED sets up a clear focus for the review and to begin the design process as soon as possible as some of the questions asked, especially those questions related to process rather than outcome, could only be answered if data collected can begin early. In fact some of the monitoring and evaluation documents provided by the ED to the research team helped to provide some of the process information and is thus valuable. Also, early planning could also facilitate better collaboration between the research team and ED.

It is recommended here that a working team be established as soon as possible to identify the objectives for the overall review of the 5-year ITed strategic plan. Secondly, some of the objectives identified may involve finding out about the process of implementation which requires coordination efforts (e.g. the establishment of a knowledge management system described in the next paragraph) and/or the collection of data as early as possible. It is thus also recommended here that on the basis of the review objectives identified by the working team, a consultancy be established to make specific recommendations on research design and methods and to advise on actions that need to be taken in order that some of the coordination and data collection necessary could start at appropriate times as required.

Establishing a knowledge management system

As mentioned in chapter 3.2, various groups and sections within the ED have put in place a number of mechanisms to monitor and evaluate the implementation process. However, the lack of coordination and planning in the design, analysis, reporting and dissemination of such findings greatly limit the potential benefits that such efforts can bring about. There is no

system in place for the collation and documentation of the various ITed initiatives. Thus while the ED colleagues have been trying their very best to collate documents for the research team, there was no way to assess the completeness or value of the different documents collected. It is recommended here that there is a great need for the ED to develop a ***knowledge management system*** so that the information and efforts made by different groups at different times can be well organized and accessible in useful forms for various purposes by relevant sectors of the education community. This is particularly important in the context of ED internal documents that aim to collect information about various aspects of implementation for review of progress and monitoring purposes. These efforts were typically the initiatives of different sections within the Education Department for identified information needs within each section. However, such information may also be very valuable to other sections when they make decisions or plans. The usefulness of such information may also be much enhanced if they can conform to particular structures during collection, collation and storage. Effective systems for Education Department officers and members of the wider education community to access such a knowledge base should also be an important component for this ITed knowledge management system. It is recommended here that a consultancy be commissioned to develop such a knowledge management system.

Evaluation of student achievement & SITES M3

Another recommendation that the research team would like to make is that the review by 2003 should include an evaluation of student achievement, which could assess the achievement of students in terms of information skills, information technology skills and their ability to assess, evaluate and make use of information to solve problems. In particular, it is recommended that this evaluation should best be conducted as part of the SITES M3 Study (details about the research goals and design are enclosed in Appendix 4.2.2) which is a continuation of SITES M1 and M2 and is an international comparative study that focuses on student achievement in the areas listed above. Thus if Hong Kong were to take part in this SITES M3 Study, we would be able to find out not only what achievements our students have made in these crucial areas, but also how our students' achievements compare with those from other countries, their relative strengths and weaknesses. This will help us to improve on our ITed implementation policy and strategies. In terms of timeline, there may be some mismatch between the SITES M3 international study and the Hong Kong ITed overall review. SITES M3 planning and development work has already started. The first international meeting for the National Research Coordinators on this Study will be held in February 2002. Data collection for the pilot study will be in late 2003 and for the main study in late 2004. It is strongly recommended here that Hong Kong take part in this study as Hong Kong can then benefit from being able to take advantage of the research design and instrumentation which is being carried out by a strong team of international experts from several continents, on top of

being able to compare our students' learning outcomes with their international counterparts. The SITES M3 study, similar to all IEA studies conducted in the past, will also collect curriculum and curriculum process data, allowing us to relate different student achievement to the curriculum in different education systems. This will help us in the further improvement of our IT in education implementation across the school curriculum. In view of the need for the government to conduct a review by 2003, it is recommended here that the survey part of the review that cannot be delayed to 2004 be conducted as a local extension of the SITES M3 pilot study in Hong Kong.

Reviewing ITed in special schools

In the present preliminary review, it was found that the problems and issues faced by special schools are very complex and often quite different from the mainstream schools. There are different categories of special schools catering for children with different special education needs. Use of IT in special schools includes the integration of assistive technologies, which often differ greatly across different categories of special schools. Further, the specific educational objectives often differ greatly across different special school categories to take into account the students' special contexts. It is recommended here that a separate component of the review study be commissioned to address the specific evaluation questions, methodology and instrumentation necessary for conducting a proper review of IT implementation in special schools.