Executive Summary

Background of the Study

This study aims to review and evaluate the HKSAR Government initiatives for the implementation of Information Technology in Education (ITEd) as stated in the *Information Technology for Learning in a New Era: Five-year Strategy 1998/99 to 2002/03* document. A comprehensive framework for conceptualizing the factors influencing the implementation of ITEd at the system (macro), school (meso) and individual (micro) levels is used to provide a basis for the research design and analysis. This framework takes the view that the main objective for the ITEd implementation is to promote the development of desired learning outcomes in students, in which the three levels of factors contributing to the quality of the learning outcomes. In order to investigate these issues, quantitative and qualitative methods were used in the study.

Summary of Findings

1. 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 basic 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.
2. The government has 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.
3. The hardware, software and networking infrastructure provisions in Hong Kong schools have been greatly improved in comparison to the situation in 1998.
4. Pilot schools have an exceptionally high availability of hardware and peripherals and wide diversity of hardware deployment and resources distribution was found in these schools as well. However, the hardware and resources configuration in other schools was found to be quite homogeneous, indicating that the experimentations made by the pilot schools and possible consequent modeling effect in this area was limited.
5. While the computer:student ratio has improved greatly, the computers made accessible to student outside of formal teaching time by schools were often limited.
6. Most teachers surveyed in the study have participated in some form of training related to IT techniques and school-based training seems to be the most popular format particularly in the secondary schools. In terms of training format, the most preferred mode was

"workshops and demonstrations" and the least preferred mode was "conferences and seminars".

7. There has been a noticeable improvement in the teachers' and students' IT skills since 1998. Most teachers have already reached the basic IT level of IT competence as specified by the Education Department (ED). Many teachers had doubts about the need for teachers to reach more advanced levels of IT technical competence for the purpose of IT integration across the curriculum.
8. The major obstacles or difficulties affecting the use of IT in teaching and learning as reported by the IT coordinators and teachers have changed from support and resources to instructional software and teacher competence since the SITES M1 study (late 1998 to early 1999). Useful web-based resources and technical support services were seen to be important by teachers, who also appreciated the efforts made by the ED in these regards.
9. Although there are clear behavioral differences in computer usage among students of different category of schools, we do not see a marked difference in their attitude.
10. Many teachers still perceive their role mainly as providers of knowledge, rather than as facilitators guiding students to identify their own knowledge needs and to search for and evaluate information for themselves as would be necessary to achieve the vision of achieving paradigm shift and helping students to develop lifelong learning abilities, as advocated by the Five-year Strategy.
11. Activities to promote a collaboration culture in the community have mainly been local ones, often involving schools and tertiary institutions as well as other organizations in the community. Secondary schools have been more actively engaged in such collaborations than primary schools. Teachers had more reservations towards collaboration and the impact of IT while students were found to be more open and positive.
12. The meaning of paradigm shift in relation to the implementation of ITEd was not clear to schools. Many schools regarded implementing IT in education as a move to technologize education – finding ways of replacing or enhancing current activities with technology, such as replacing chalk and board by multimedia presentations/animations, instead of an opportunity to re-engineer education, which involved fundamental reforms in curriculum and pedagogy.
13. While there is no noticeable paradigm shift in teaching practice across the general population of schools, innovative pedagogies have successfully emerged in some schools where the school leadership has a clear vision and understanding of the ITEd initiative as one of promoting curriculum and pedagogical reform. The innovative pedagogical practices found in Hong Kong are on a par with similar practices that are very much valued elsewhere in the world. Vision and leadership are the elements that are crucial and have been deficient in the territory-wide implementation process in Hong Kong.

Recommendations

Establishing a Community-wide vision: the Meaning of Paradigm Shift

We recommend that the government, especially within the various sectors and ranks in the ED, to review and formulate a clear understanding of what "paradigm shift" means and what it should translate into, in terms of IT-related teaching and learning practices in schools. The ED 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 must establish a clear focus in promoting the technology-supported re-engineering of education and not simply technologizing education.

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 influence 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.

1. In the area of access and connectivity, priorities should be given to distributed access around the school, especially for students. Ways of promoting and guiding students' self-directed use individually and in groups, 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 IT infrastructure in schools that is clearly linked to curriculum and usage priorities. Expenses on access and connectivity would no longer be "non-recurrent" but needs to be built into the recurrent funding structure of schools. 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 IT infrastructure such that funds could be used most effectively in ways that will promote the pedagogical practices and learning gains that are most desired.
2. The term "teacher enablement" should be changed to "teacher professional development". 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.

3. 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.
4. Resource support should be organized to promote curriculum reform and changes in teaching practice. Thus IT coordinators 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 IT.
5. 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, a 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.

Building Multi-level, Cross-sector Leadership for ITEd Implementation

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. Leadership at school level operates within the context of and in tandem with territory-wide implementation policies and strategies. It is recommended here that:

1. 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.
2. Regional leadership teams could also be established as further support structures in helping schools to establish school level leadership teams.
3. 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.

Planning for the Review of ITEd Implementation by 2003

Recommendations on preparations for the review of ITEd implementation by 2003:

1. A working team should be established as soon as possible to identify the objectives for the overall review of the 5–year ITEd strategic plan.
2. On the basis of the review objectives identified by the working team, a consultancy

should 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.

3. The ED needs 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.
4. 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 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. This will allow us to understand 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.
5. 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 such that the review can take account of the integration of assistive technologies and the special contexts of the children in the different categories of special schools.