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Implementing Information Technology in Malaysian Schools: Issues and Problems

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In the last decade, Malaysia has experienced a period of rapid economic growth accompanied by parallel developments in the information technology industries. In line with the national aspiration of transforming itself into a developed country by the year 2020, much effort in education has been focused on making the nation IT-literate, beginning with the schoolchildren. Since 1986, numerous IT pilot projects have been initiated in Malaysian schools. This article describes these various projects and discusses the related issues and problems, as well as their implications for successful IT implementation in the near future.

Introduction

Since the mid-1980s until now, Malaysia has experienced a period of rapid and sustained economic growth that is transforming the country into an industrialized and urbanized economy. This rapid economic growth is matched by equally impressive developments in the information technology (IT) arena. Signs of impending change abound as exemplified by the latest Multimedia Super Corridor[1] (MSC) Project. To a greater or lesser extent, what propels IT to the forefront is perhaps the Prime Minister's speech to the inaugural meeting of the Malaysian Business Council in 1991, entitled Malaysia—the Way Forward. Exhorting a concept now widely known to Malaysians as Vision 2020, this document declares for the first time that Malaysia's objective is to be a fully developed nation by the year 2020. The Vision 2020 plan undertakes, in one generation, to transform the entire nation from a developing country into a developed country. To achieve this ambitious goal, many begin to look to IT to provide efficient education for meeting new manpower demands.

IT Projects in Malaysian Schools

Computer Labs and Computer Literacy Pilot Project

As far back as 1981, schools in Malaysia, especially secondary schools, started setting up computer clubs to teach students computing skills as part of the schools' extracurricular activities. Most of these clubs were supported by funding from the parent-teacher associations or fees collected from club members. At the same time, in an attempt to keep abreast of the worldwide computer literacy movement, the Ministry of Education (MOE) embarked on creating a computer literacy curriculum for schools (Gan, 1992). The Com-

puter Literacy Pilot Project (CLPP) was launched in April 1986 in 20 pilot schools, where form 4 pupils were taught a subject called Computer Literacy. This project was rather abruptly discontinued the following year.

The Computers-In-Education (CIE) Policy

In the same year, the MOE set up a joint committee with the Malaysian Institute of Microelectronics System[2] (MIMOS) to study and make recommendations for IT implementation in schools. A report, the Computers-In-Education (CIE) Policy, was subsequently prepared by MIMOS and presented to the MOE in early 1989. To begin with, this report noted that computer literacy was no longer the major issue in education. What was perceived as needed was the widespread use of computers as an integral part of teaching-learning across the curriculum. The assumption was that with such an approach, computer literacy would be naturally acquired (CIE Policy Proposed, 1989).

At the root of the recommendation is the recognition that information and knowledge will increasingly manifest themselves in electronic form, requiring that IT systems be made widely available in schools so that students can become familiar with them and acquire the skills to apply them effectively in their work. By introducing computers into the school curriculum through this means, the process of education would not only introduce new skills. It would also fulfill a pressing obligation of preparing the foundation for the development of an information society, a concept that was later to become the cornerstone of the Vision 2020 Plan. Following the CIE Report, a Learning With Computers Pilot Project, the result of one and a half years of planning by the MOE's Educational Planning Committee, was launched in April 1989.

The MOE-MIMOS Projects

In summary, here are some of the projects/programs that resulted from the MOE-MIMOS joint report. First, the Atom-1 PC compatible that was designed and produced locally was officially launched in December 1990. This project provided for the first time a cost-effective and functional school computer. Encouraged by this breakthrough, the MOE went on to launch its Computer-In-Education (CIE) Pilot Project in July 1992, which introduced a new Computer Literacy syllabus designed to introduce forms 1 and 2 students to computing concepts (Computer Literacy Syllabus, 1992). Each of the 60 project schools in the rural areas was equipped with 20 Atom-1s networked together with a powerful server. The MOE also promised that more powerful machines could and would be used in schools when justifiable by functional needs and cost.

At the same time, MIMOS and the MOE set up a Computer Technology Laboratory to embark on a joint project to design a software system for use in schools nationwide. A group of education consultants from the various local universities, including this writer, were appointed to work out the blueprint.

The objective of the project was to formulate fundamental ideas, concepts, and strategies toward effectively integrating computers, including software and telecommunications, as a tool for teaching and learning in Malaysian schools (A Computer-Integrated Learning System [ComIL], 1990).

The blueprint of the ComIL system was completed by mid-1990. After that, a group of computer software consultant engineers and programmers took over and began work on the development of the ComIL System. In its present form this system has basic tools and functions for generating educational materials for teaching and learning. It is believed that such a system is essential to draw the vast pool of talent in education to participate actively in creating local courseware. The most compelling reason, however, is that the dearth of courseware that addresses local curriculum objectives—and written in Bahasa Malaysia (the medium of instruction)—is a problem that must be solved before computer-assisted instruction (CAI), as recommended in the CIE Policy, can be implemented in schools (Gan, 1990).

To complement the role of the ComIL System, work was also started to design a computer network for educational applications. To facilitate this, MIMOS already has an ongoing project, JARING[3] (Joint Advanced Research Integrated Networking), which would act as the foundation for an educational network. This wide-area network is anticipated to stimulate communication and information-sharing between individuals and institutions, thereby enabling students, teachers, and administrators alike to do their job more effectively and productively. Plans were also made to create the information to be carried by this network. Indeed, such an education database is envisaged to be the most important component of the information system. It was hoped that with the creation of the educational computer network and the educational database, networked database applications would be incorporated into the ComIL System. The ComIL System will then not only be useful for the development of educational materials, but will become a truly integrated system for teaching, learning, and assessment based on IT. In line with this plan, teachers in schools—especially those in the CIE program—and student teachers in universities and teacher training colleges were selected for participation in courseware development.

More Recent Projects

In 1993, a private company, Rangkaian Tenaga Sdn. Bhd., with the blessing of the MOE, initiated another project known as the PSi (Knowledge Resource Center) Project. This project involved setting up an electronic library system in each of the secondary schools with a minimum of 700 subscription-paying students (ICL Wins Rangkaian, 1994). Today, this project is deemed a failure and shelved indefinitely.

Another project, the Computer-Assisted Instruction/Learning (CAI/L) Project was launched in 1994 in 15 primary schools to help raise the achieve-

ment level of pupils in arithmetic and English through CAI. Courseware for use in this project is developed by the MOE using Linkway or the ComIL System.

In 1995, the MOE announced that the CIE Project would be extended to all primary and secondary schools in the country under the Seventh Malaysia Plan, 1996-2000 (Ministry to Extend CIE Program, 1995). To date, implementation has not started.

Internet Projects in Schools

About two years after the launch of JARING in 1991 by MIMOS, the country's pioneer Internet service provider, the popularity of the Internet in Malaysia began to increase steadily. This new bandwagon has since captured the fancy of many students and young computer enthusiasts. In 1994, the MOE launched a new pilot project, Jaringan Pendidikan (Education Network) to install Internet connection in 50 pilot schools in the country. The objectives of the project are to enhance communication and information exchange among teachers and pupils, and to provide the opportunity for teachers and pupils to retrieve information from various sources around the world. In 1996, the MOE launched yet another Internet project, Pusat Sumber Elektronik (PSE) in 14 other selected pilot schools. In this project, Rangkaian Munsyi, the computer network contributed by Telekom Malaysia, is expected to enable schools to access the Internet and use multimedia applications. So far, all that is known of these two Internet projects is that some of the project schools have created their home pages, a favorite activity of computer clubs in schools throughout Malaysia today.

The Trend Toward IT Integration: Smart Schools Project

An announcement was made in September 1996 that the government will be embarking on the Smart Schools Project, where IT is extensively incorporated as a teaching and learning aid. This project is expected to kick off with a hefty expenditure of RM144.5 million for a high-tech complex to be built near the MSC, housing two primary schools, two secondary schools, and one kindergarten (Gan, 1996a). Although, at this juncture, the MOE has not provided any details about the project, it would not be wrong to say that the Smart Schools are schools well equipped with suitable resources (including instructional media such as the computer and Internet facility) that can be utilized by teachers (who incorporate appropriate instructional methods) to facilitate and maximize development (such as higher-order thinking skills, multiple intelligences, etc.) and learning of subject matter in their pupils. Clearly, IT-across-the-curriculum would be the emphasis. The latest announcement is that the Smart Schools project will be expanded to cover all primary and secondary schools by the year 2010 (Smart Schools to go Nationwide, 1997).

Issues and Problems

By and large, all the IT projects mentioned above are pilot projects meant for testing viability and feasibility before any wide-scale implementation. To date, of these various pilot projects that took off since 1986, some are still ongoing, but none has developed into a nationwide project as intended originally. More than a decade after the launch of the first IT pilot project in 1986, schools (mostly those in and around the more affluent capital city of Kuala Lumpur and its suburbs) are still carrying on with their own brand of IT education in the schools—computer clubs managed by computer companies. Needless to say, using computers in the classroom for instructional purposes to support or assist teaching and learning, as recommended by the CIE Policy, is still rare, confined only to the pilot project schools. The following is a discussion of issues and problems associated with the slow uptake of IT in Malaysian schools, and their implications for successful IT implementation in the near future.

The Basic Problems

For a start, the earliest project, the CLPP, was aborted due mainly to two reasons. Firstly, the MOE felt that the project was duplicating the role of the computer clubs (Warning, 1987). Second, the cost of supplying an adequate number of computers for a nationwide implementation involving about 8,000 schools was a hefty RM 126 million (Why Low Priority? 1987). Although not officially or explicitly stated, cost is still a major problem and consideration to this day.

Although it was true that a large-scale computer literacy program would not be feasible without an abundant supply of microcomputers to schools, it was a mistake to think that the clubs could provide a long-term solution to the computer literacy program. This was because computer clubs had a limited number of computers and only benefited a small portion of students who could afford to pay a fee to become members. Even though the clubs did familiarize some students and teachers with the PC, in reality, they were not the most efficient or effective vehicle for the implementation of any CIE program nationwide.

General Lack of Direction

It was the quest for a long-term and sustainable program that prompted the inception of the CIE Policy in 1989, which advocated that students acquire computer literacy through CAI in an IT-across-the-curriculum approach. However, the vacillation of projects from teaching computer literacy to form 4 students (1986) to CAI across-the-curriculum (1989), and back to teaching computer literacy (1992)—this time to forms 1 and 2 students—clearly shows a general lack of direction in CIE planning and implementation (Gan, 1996b). This lack of general direction is a major problem area that has to be attended to if IT is to make an impact in schools and the society at large.

Teacher Training is the Key Factor

The absence of a well-thought-out and comprehensive long-range plan for teacher training in IT is undoubtedly another contributory factor to the slow uptake of IT in schools (Gan, 1993, 1996c). Teacher training colleges across the country that train non-degree teachers for primary and lower secondary schools have already started offering a compulsory IT course to all teacher trainees. The faculties of education in various local universities, on the other hand, seem to be lagging behind in such an endeavor. To date, some are still offering IT courses only as electives. So it is not surprising if teachers graduating from these programs are IT illiterate at the time they start their teaching career in schools. The more serious problem lies, however, in the large corps of some 280,000 inservice teachers, most of whom have had little or no exposure to computers when they were in universities or schools. Teachers need training in computing, in CAI, and in the latest tool, the Internet, to be functional in the CIE projects in schools. Formal training is a must, as results from an international study have shown that one of the main reasons for teachers not using computers in the classroom is the lack of knowledge and training in computers (Pelgrum & Plomp, 1991). A long-range plan for inservice training should be worked out, starting systematically from national-level training, through multiplier or cascade effect, to state, district, and finally school-level, in-house training. For this, a well-thought-out comprehensive teacher training curriculum also needs to be drawn up (Gan, 1996c).

The Need for a Paradigm Shift

Next, judging by the reluctance of teachers to use courseware that emphasizes cognitive skills other than subject matter (Gan, 1996b), it is clear that a paradigm shift is needed in the Malaysian education system if IT implementation is to produce positive results. The education system should no longer regard the acquisition of knowledge as the sole or main goal of education in schools. In this era when knowledge is changing so rapidly, teaching an established body of facts is of little value. It is more important now to teach students the skills to go on learning throughout their lives. Indeed, someone has gone so far as to say that the ever-changing and evolving work force in the world economy of today does not need knowers, it needs learners. So teaching students thinking skills, including information-processing skills, should be placed high on the education agenda to ensure that students are well equipped to cope with new changes and challenges through lifelong learning. Learning outcomes in the cognitive domain should be evaluated in the examinations, but within that domain, more emphasis should be directed to the higher levels of application, analysis, and synthesis. These are the levels where students' thinking skills can be evaluated. In addition, social skills and values such as those promoted by

cooperative learning are indispensable in this age of increasing global interdependence. Evaluation of students' learning outcomes should, therefore, give due emphasis to the affective domain as well.

This paradigm shift is a prerequisite for the successful implementation of IT in the classrooms. Computer technology has a wide range of capabilities that can be harnessed to achieve learning goals that are otherwise difficult to attain. For example, the Internet is an empowering tool that can be used to facilitate discovery and exploratory learning through information search. But as long as teachers retain the mindset of teaching knowledge—a result of demands placed on them by the school examination system—exploratory learning activities on the Internet will not be the preferred mode of classroom instruction. Lest we forget, education is not just about coming to know, it is also about learning to think. The computer technology can be utilized to provide the kind of stimulating learning environment that develops young minds. But this will happen only under the guidance of competent and confident teachers who are ready to relinquish their traditional role of a sage on stage, to learn and explore together with their students.

Curriculum Issues

The implementation of IT in schools will eventually be based on the Smart Schools concept, employing an IT-across-the-curriculum approach. A new curriculum is required to meet the dual goal: using various resources (including computers and IT) to enhance the teaching-learning process, and providing students the opportunity to acquire computer and IT literacy. As such, some revamping of the existing school curriculum is in order. The subject matter or content may not be changed. What is new in the syllabus is perhaps the element of information technology, which has to be cleverly integrated into the teaching and learning of different subject matter, across the curriculum. The integration of this technology element, coupled with appropriate instructional media and methods, is what constitutes the new curriculum. With this new curriculum, there is hope that pupils of different learning abilities, needs, and interests will have the opportunity to learn better, maximize their potentials, and at the same time become computer- or technology-literate.

Courseware Development Approach

Whether it is implementing CAI as advocated by the earlier CIE Policy, or the IT-across-the-curriculum approach as promoted by the current Smart Schools Project, schools need application software and subject-specific software or courseware. Yet in spite of the availability of the ComIL System and the various courseware development projects carried out by the MOE, the dearth of courseware addressing local curriculum needs is still a problem (Gan, 1995). In fact, this could well be the main reason why the PSi or Knowledge Resource Center Project mentioned above (which provides only

imported software like Microsoft Encarta and Bookshelf) did not do well. Over the years, the MOE's software and courseware development approach of training teachers to design and develop courseware using various authoring tools, including the ComIL System, clearly did not pay off. This lack of success is borne out by the MOE's track record of not having produced any educational software for wide-scale implementation and usage in schools since the inception of the CIE Policy. Ironically, the only educational software that has been produced and disseminated to all secondary schools in Malaysia since then is an individual effort (Gan, 1996d). It is imperative that the MOE review its courseware development approach now and explore the possibility of collaborating with education experts and private software development companies, especially those to be set up in the MSC.

Conclusion

Admittedly, implementing IT in schools nationwide is a mammoth task. Even developed countries like the United Kingdom and the United States have their share of problems. However, in the Malaysian context, it is pertinent that the authorities take cognizance of the fact that without a solid, long-term strategic plan backed by a corps of IT-literate and committed educators to manage and implement IT projects in schools, all the national goals conceived so far to exploit IT in education are unlikely to produce results. As articulated by Tengku Azzman, one of Malaysia's top IT figures, IT diffusion must be planned in a holistic and integrated manner, recognizing its multidimensional nature and impact (Tengku, 1991). Although this statement does not imply that IT will not diffuse into education, it certainly means that it will do so, but in such a haphazard, uncoordinated, and incoherent manner that it will be grossly lacking in efficiency and direction, as reflected by the present scenario. In short, the successful implementation of IT projects in Malaysia demands the emergence of a new culture and a paradigm shift in education. Not only must the curriculum change to integrate IT, teachers and educators, as well as managers and administrators, must all become IT-literate through preservice and inservice training.

Notes

[1]The MSC is an area, 15 km by 40 km, encompassing the Kuala Lumpur City Center, Putrajaya, and the new Kuala Lumpur International Airport (KLIA) which will be developed as a multimedia catalyst center. World-class multimedia corporations will be invited to locate their business units and research and development facilities in this area, which is to be used as a high-tech testing area and springboard to serve the local, regional, and world market for multimedia products and services.

[2]MIMOS started its operation from January 1, 1985 as a unit in the Prime Minister's Department. Its main objective is to undertake and conduct research and development activities in the field of microelectronics systems and related areas. It was privatized in November 1996.

[3]JARING is a computer network developed by MIMOS that links to other networks around the world via 3.584 Mbps dedicated leased-line connection to the US. All these networks form a huge data communication network known as the Internet.

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