

# Teaching and Learning Process with Intergration of ICT A Study on Smart Schools of Malaysia

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*Abstract* :- The mission 2020 basically is to develop a world class quality educational system which will realize the full potential of the individual and fulfil the aspiration of the 'One Malaysian nation'. This will only happen if education departs from the disinterested rote learning mode, and explores how information technology can be used to encourage active, creative, and independent learning. Therefore, Malaysia needs to make the critical transition from an industrial economy to being a leader in the Information Age. In order to make this vision a reality, Malaysian Government took a strategic project through smart school. Smart Schools were identified as having a key role to increase the number of ICT-skilled to meet the demand of industry that would be intergrating ICT into their process. It is a need to make a fundamental shifts towards a more technologically literate and thinking workforce, able to perform in a global work environment and use the tools and technology available in the Information Age.

*Keywords*:- Smart school, technology in education, ICT-Skilled people, Malaysia experience, classroom and technology, learning process

## 1 Introduction

The information age poses a whole new set of challenges and questions to Malaysian schools. The quality of our nations's political, social and economic future will depend on the ability our young generation to become functioning members of society who understand how to access information (and determine its significance), handle data, draw independent rational conclusions and communicate findings.

Students today need a higher level of academic, technical, communication and information-processing skills in order to function effectively in society. The contemporary workplace requires that employees be adaptable team players with strong problem-solving and decision-making skills. Schools will have to accommodate a variety of learning styles, interests and life experiences if they are to educate today's students. Leading experts have suggested that an organization's ability to learn, and to keep improving the way it learns, may be the ultimate competitive advantage. With our interest in the goals for students in Vision 2020, we are beginning to look at what it takes to educate our

children for the world of the future and what skills they will need to acquire to become productive citizens. It is interesting to explore the wide range of skills in communication, critical thinking, and even problem solving that the world of work would ask educators to consider when planning curriculum, as well as the advanced technical skills associated with the information society we are going to become.

For today's children, the information age is already a reality. Students are taking more responsibility for specifying and initiating some of the learning tasks, including team-oriented investigation. A new pedagogy, supported by a set of widespread classroom practices, is emerging that encourages individual and small group investigation of student-generated questions. The teacher becomes a consultant, guide and facilitator as students seek answers and develop skills. As a mechanism of accomplishing these tasks, technology becomes a most important enabling asset.

Technology can make the learning process more efficient without detracting from established

educational objectives. Once the individual is proficient in the basics of reading, writing, computations and oral communication, then the learning experience can be further enhanced by calculators, distance learning, computer-assisted instruction using integrated learning systems, microcomputer-based labs, presentation software and telecommunications. IT is coming rapidly to Malaysian schools and these can be observed through the growing number of software and homepages available for the public today. Schools are not longer alien to the new technology and so are teachers. The government and private sectors are helping in providing the infrastructures of IT environment in schools throughout the country.

The world today is getting smaller, the pace of rapid change, as information technology is set to change the lives and the work culture of Malaysians. As Vision 2020 has made the entire nation realize the need for the pursuit of excellence, it is time therefore to bring down the constraining towers of self-doubt and insecurities Malaysians have built around them. There needs to be enough flexibility to be able to adapt and take on new challenges when necessary. It has become necessary, with the life cycle of knowledge being shortened, for the trend in education to change towards promoting learning rather than just plain teaching. This new learning paradigm can be attributed to the realization that man learns more from meaningful experiences.

To make this shift, the education system under the guidance of the National Philosophy of Education, must undergo a radical transformation. The schooling culture must be transformed from one that is memory-based to one that is informed, thinking, creative and caring. One way to make this happen is through the use of leading-edge technology.

## 2 Literature Review

### 2.1 The Challenges of The New Millennium

The challenges of the new millennium such as the rapid globalization, the tremendous impacts of information technology, the international transformation towards knowledge-driven economy, the strong demands for societal developments, and the international and regional competitions have driven numerous educational changes in the different parts of the world (Cheng & Townshend, 2000)[1]. Policy-makers and educators in each country have to think how to reform education for

preparing their young leaders to more effectively cope with the challenges in the new era (Armstrong, Thompson, & Brown, 1997[2]; Hirsch & Weber, 1999[3]). In facing the fast changing environment, many policy-makers and educators get confused with uncertainties and ambiguities and lose their directions in the rapid globalization. There is an urgent need of a comprehensive framework for understanding the impacts of rapid developments and advancing implications for innovations in education.

In the new education, the development of Contextualized Multiple Intelligence (CMI) of students and the processes of globalization, localization, and individualization in education will be the core to create unlimited opportunities for teaching and learning and to develop a new generation of CMI leaders and citizens in both local society and global village. It is hoped that the proposed new paradigm of borderless education will provide innovative ideas and possibilities for reforming education in different parts of the world, including Malaysia, to meet the challenges for the future.

Unlike the traditional era, in the emerging new thinking (Cheng, 2000)[1], it assumes that the world is in multiple globalization including technological, economic, social, political, cultural, and learning globalizations. The world is moving very fast to become a global village, in which different parts of the world are rapidly networked and globalized through internet and different types of IT, communications, and transportation (Albrow, 1990[4]; Naisbitt, & Aburdence, 1991)[5]. All countries and areas have more and more common concerns and sharing. They become more and more mutually dependent with international collaborations, exchanges, and interflows.

In the new thinking, the human nature in a social context of the new millennium is assumed to be multiple, as a technological person, economic person, social person, political person, cultural person, and learning person in a global village of information, high technology, and multicultures. Both individuals and society need multiple developments in the technological, economic, social, political, cultural, and learning aspects. Life-long learning individuals and a learning society are necessary to sustain the continuous multiple developments of individuals and the society in a fast changing era (Drucker, 1993) [6], 1995)[7]. The society has to become towards a multiple intelligence society that can provide the necessary knowledge and intelligence base and driving force to support the multiple developments. And the

individuals have to become multiple intelligence citizens who can contribute to the development of a multiple intelligent society.

The traditional thinking assumes that the education environment is mainly characterized by the needs of local community, of which is slowly changing with moderate uncertainties and complexity. Thus, the boundaries of schools and the education system are assumed to be relatively stable and certain. Teachers and students rarely interact with the "real world" in their teaching and learning. Students enter the 'real world' only after graduation or leaving schools. Education reforms are often limited and superficial mainly as a reaction to the raised public accountability and local concern. From this paradigm, the aim of education is to equip students with the necessary skills and knowledge to survive in a local community or to support the development of a society particularly in the economic and social aspects at a certain stage.

## 2.2 New Paradigm in Information Technology Environment

Due to the tremendous developments in IT, internet, and global networking, recently there has been a great demand for developing an IT environment in order to support paradigm shift in learning and teaching. Computer technology makes it possible for multiple learners to be networked and participate in the learning task, thus greatly enhancing the social interactions, sharing of learning experiences and resources in a very convenient way. Information technology can also facilitate and accelerate the monitoring, assessment, and feedback processes in a very fast and efficient way. It is now possible, with development in IT, to network the learner with the teacher, parents, peers and other adults or professionals in the community such that influence of the human environment on self-learning can be maximised.

The paradigm shift in learning inevitably requires corresponding paradigm shift in teaching and teachers' role. In the new triplization paradigm, teachers' teaching should be triplized: individualized, localized, and globalized. Teachers and their teaching are facilitated in a way such that their potentials can be maximised to facilitate students' learning in an optimal way. Teaching is considered as a process to initiate, facilitate, and sustain students' self-learning, self-exploration and self-actualization; therefore, teachers should play a role as a facilitator or mentor who supports students' learning.

How to build up such a networked human and technological environment for borderless education is very challenging to both educators and reformers. According to Cheng (2000) [1], the development of a networked human and technology environment can be supported by the school-based platform and central platform. With the support of the school-based platform as well as the central platform, the key elements in effective learning and teaching are students and teachers' commitment, motivation and efficacy to promote and achieve learning as continuous self-actualization and self-learning and create unlimited opportunity for learning, developing learning groups, and evolving learning culture among students and teachers.

Teachers can maximise the opportunities to enhance effectiveness of their teaching from local and global networking and exposure through Internet, web-based teaching, video-conferencing, cross-cultural sharing, and different types of interactive and multi-media materials (Holmes, 1999)[8]; (Ryan, Scott, Freeman, & Patel, 2000)[9]. With their help, students can learn from the world class materials, experts, peers, and teachers in different parts of the world such that teaching can become world-class teaching. Through participation in local and international development and research programs, teachers can achieve global and regional outlook and experiences beyond institutions. In other words, all schools should be transformed into smart schools. We simply cannot avoid that.

## 2.3 National Policy

The Malaysian government has introduced various initiatives to facilitate greater integration of information and communication technology (ICT) to enhance the effectiveness of education and training programmes. This was outlined in the country's ICT Master Plan, finalized in 2001. The long-term vision of the plan, Vision 2020, calls for sustained, productivity-driven growth, possible only with a technologically literate, critically thinking workforce, prepared to participate fully in the global economy of the 21<sup>st</sup> century. At the same time, Malaysia's National Philosophy of Education calls for "developing the potential of individuals in a holistic and integrated manner, so as to produce individuals who are intellectually, spiritually, emotionally and physically balanced and harmonious."

The Ministry of Education sees as a tool to revolutionize learning, to produce richer curricula, to enhance pedagogies, to lead to more effective organizational structures in schools, to produce

stronger links between schools and society and empower learners. The ministry's articulation of the vision for ICT in education focuses on three major areas: (i) ICT provided to all students so that it is used as an enabler to reduce the digital gap between schools; (ii) ICT used in education as a teaching and learning tool, as part of a subject and as a subject by itself; and (iii) ICT used to increase productivity, efficiency and effectiveness of the management system.

Malaysia ranks 17<sup>th</sup> in the top 25 countries of Internet users. The growth of ICT users in Malaysia over the last five years was over 60 per cent increasing the number from around 3.7 million to about 6 million users. One likely factor that contributes to the greater Internet use in Malaysia is the high fixed telephone connection with the 66 per cent of Malaysian household having phones (ITU 2002). As of 2001, Singapore ranked first without any charge for an Internet service provider (ISP) subscription. The annual cost of 20 hours of monthly Internet access in Malaysia is approximately 4.85 per cent of the country's GDP per capita.

### **3 Smart School And Implementation on ICT as a Tool and an Enabler in Education**

Malaysia has 7,404 primary schools and 1,794 secondary schools. Infrastructure development for schools includes the installation of ICT facilities to all schools in Malaysia. Planning for the 9,198 schools is carried out in phases as follows: 2,400 schools, 2,000 schools, in the year 2003 onwards. The rest of the schools: 9,198 schools. The need to integrate ICT in teaching and learning at all levels of education is deemed essential. Therefore, the Ministry of Education has earmarked 30 per cent of its annual budget (approximately MYR 4.2 billion) to connect another 230 rural schools to the Internet. As of early 2003, almost all educational institutions had at least one computer laboratory equipped with one server terminal to manage the internet line supply and central processing unit (CPU) for Pentium or Intel PCs. Specifically, almost 75 per cent to 90 per cent of schools and 100 per cent of universities have access to the Internet through either dial-up, high-speed broadband; refers to a signaling method that includes or handles a relatively wide range (or band) of frequencies, which may be divided into channels or *frequency bins* connections, leased line or cable-broadband

connection and Wi-Fi (Wireless communication is the transfer of info. over a distance without the use of electrical conductors or wires) technology. With these facilities, it is expected that the usage of ICT in teaching and learning as well as in education management will be increased.

It is against this background that Smart Schools have been made one of the flagship applications in the Multimedia Super Corridor (M.S.C.). When Malaysia launched her Multimedia Super Corridor (MSC) project, Sekolah Bestari (Malaysian Smart School) is on the top priority of one of its flagships. Since then, the Bestari concept in education is one of the most talk-about topic among educators and trainers in Malaysia. The Malaysian Smart School Flagship was premised on the strong belief that information and communication technology is a key enabler to imparting the learning desire to all. In its Seventh National Plan (1996-2000), Malaysia outlined its strategy to develop the labour needs of the nation, particularly in the fields of science and technology. The Malaysia Smart School is a learning institution that has been systematically reinvented in terms of teaching-learning proactise and school management in order to prepare children for the Information Age. A Smart School will evolve over time, continuously developing its professional staff, its educational resources, and its administrative capabilities. This will allow the school to adapt to changing conditions, while continuing to prepare students for life in the Information Age. To function effectively, the Smart School will require appropriately skilled staff, and well-designed supporting processes. This will allow the school to adapt to changing conditions, while continuing to prepare students for life in the Information Age. To function effectively, the Smart School will require appropriately skilled staff, and Well-designed supporting processes.

The Plan identified one of the objectives of education and training as to produce an adequate number of highly skilled workers and gave high priority to reorienting the education and training system so that by 2020 Malaysia would have workers with the knowledge, skills and expertise necessary to support a knowledge-based society and economy. Malaysia saw innovations in ICT as an opportunity to review the country's public education system. Schools were identified as having a key role to increase the number of ICT-skilled people to meet the demands of industries that would be integrating ICT into their processes.

The concept of Smart Schools is no longer a fashionable luxury but the only way forward. Currently, there are about 635 schools undergoing

the Computers-in-Education programme and 87 schools under the Smart Schools programme. Whereas the comprehensive computerisation programme is mainly aimed at bridging the digital divide, the smaller Computers-in-Education programme is dual-pronged, i.e. aiming at both ICT literacy and use of ICT as an enabler in teaching-learning. The smart schools programme is a total solution targeted at improving not only teaching-learning but also school management and external relations and involves an even smaller number of schools (Rohani Abdul Hamid, 2002)[10]. The advent of Smart Schools, where computers with appropriate software offer tremendous scope and potential for self-paced and interactive learning. The Smart School will not be elitist in nature, but will be innovative, creative and stimulating, coupled with extensive usage of computers along the areas covered by the multimedia super corridor. Smart Schools are not only intended to produce knowledge workers who possess the requisite technological skills but also aim to inculcate critical thinking skills through intelligent learning consistent with the tenets of the National Education Philosophy. A Smart School is an educational establishment that adopts instructional processes and educational management practices that foster systemic changes that are intended to enable learners to surmount the challenges posed by the information technology era. The Smart Schools Pilot Project was implemented in 87 schools nation-wide; located in all 15 states of Malaysia including Sabah and Sarawak and Labuan across the South Cina Selatan Sea from Peninsular Malaysia. The Smart School Pilot Project was carried out between 1999 and 2002 to test the components of the Smart School Integrated Solution. Among the aims of the pilot project was to determine how integrated telecommunications and computing infrastructures could help to improve teaching and learning as well as school management processes.

Beginning in 1998, the Teacher Education Division of the Ministry of Education, Malaysia was charged with the task of training teachers for the Smart Schools Programme. The effective training of teachers for these Smart Schools is a key factor impacting on the success of the Programme.

The Ministry of Education had launched the Smart Schools Programme in January 1999. Regarded this as milestone to introduce systemic changes in the school culture by using technology as a tool and an enabler in education. The implementation of the Smart Schools Programme is a major paradigm shift in the education system in

Malaysia (Mohammed Sani Ibrahim, 2002)[11]. Smart schools are designed to introduce technology and deliver education in a better way. The pilot application developed teaching/learning materials (first step was for four subjects: Bahasa Melayu, English, Science and Mathematics), a more accurate assessment system and an integrated management system. The government envisions that all schools will be converted into smart schools by the year 2010.

The general objectives of the Malaysian Smart School are to (i) Achieve the goals of the national education philosophy; and (ii) Develop a workforce for the information age.

Its specific objectives are to (i) Develop students physically, mentally, emotionally and spiritually; (ii) Provide opportunities for improving individual strengths and abilities; (iii) Produce a thinking and technology-literate workforce; (iv) Democratise education; and (v) Increase participation of stakeholders.

The primary teaching and learning components of the Smart Schools are (i) Curriculum; (ii) Pedagogy; (iii) Assessment; and (iv) Materials

Each of these components has unique features. The key features of the Smart School curriculums are: (i) Overall development; (ii) Knowledge, skills, values and language across curriculum; (iii) Explicit learning outcomes for different levels of ability; and (iv) Integration of knowledge, skills and values for the information age.

The key features of the pedagogy followed for the Smart Schools are: (i) Varied learning strategies to ensure basic competencies and overall development; (ii) Teaching that responds to different learning styles; and (iii) Classroom environment that is conducive for a variety of teaching and learning strategies.

Since assessment is an important component of the Smart schools, it consists of an on-line assessment system, a database and training and certification for assessors.

The materials used in Smart Schools are intended to: (i) Fulfill curriculum teaching and learning needs; (ii) Challenge thinking, motivate learning, encourage active participation.

There are also a variety of materials for networking between teachers and students. Conventional materials are complemented by electronic materials.

The Smart Schools' management system is comprised of: (i) Technology (system implementation, system maintenance etc.) (ii) Financial management (budgeting, reporting, accounting, purchasing etc.) (iii) Human resources

(teacher scheduling, hiring, staff training management etc.) (iv) Facilities (maintenance, asset management etc.) (v) External resources (database management, liaison with external resources etc.) (vi) Student affairs (student profiles, performance evaluation etc.) (vii) School governance (communication, public relations, curriculum management etc.) (viii) Security (Physical security, IT security etc.)

In the Smart School System, technology is used for the following purposes: (i) as an information processing and productivity tool; (ii) To enhance professional development; and (iii) To automate instruction.

There are three categories of Smart Schools, A, B and B+: (i) Smart schools type A (*Model Bilik Darjah Penuh*): Each classroom within the school will be equipped with six PCs. Every school will also be supplied with at least five notebook computers, six support service units, at least one unit terminal server, equipment for networking, A3-size laser printer, color laser printer, multimedia software and also multimedia presentation. Multimedia presentations are usually used to describe a topic and illustrate it using visualization of objects and processes. They mostly enable to test the explained matter using several prepared exercises as well[15], system software, video presentation equipment, a Local Area Network (LAN) for each school, and a Wide Area Network (WAN) to the Data Centre and a leased line connection to the national ICT superhighway. The government will supply at least 390 PCs for primary schools and 520 PCs for secondary schools in this category. (ii) Smart schools type B (*Model Makmal*): Each classroom within the school will be equipped with 20 PCs with central processing unit. Every school will have at least 37 PCs and will also be supplied with at least two notebook computers, six support service unit, one unit server support system, equipment for Local Area Network, an A3-size laser printer, an A4-size laser printer, color laser printer, An A3 colour scanjet, multimedia software and courseware and one of the software is Malaysia Smart School Mathematic courseware which use the Jalan Rentasan Kognitif (JRK). This evaluation technique was conducted on thirty-seven surrogate users that consist of courseware developers, teachers and university students using the Malaysian Smart School Mathematics courseware[14], video presentation equipment and a leased line connection to the national ICT superhighway. (iii) Smart schools type B+ (*Model Bilik Darjah Terhad*): 15 selected classrooms within the school will be equipped with five PCs.

Every school will have at least 81 PCs and will also be supplied with at least two notebook computers, six support service units, equipment for networking, an A3-size laser printer, an A4-size laser printer, color printer, multimedia software, video presentation equipment and a Local Area Network (LAN) for each school, and a Wide Area Network (WAN) linking to the Data Centre and a leased line connection to the national ICT superhighway

Teachers are the key to the successful integration of ICT into education. They manage the processes of teaching and learning. Without the active, enthusiastic and skilled participation of teachers, innovations to enrich education with the advantages offered by technology are doomed to fail. The full participation of teachers in adopting new technologies to enhance education requires commitment to ongoing professional development of teachers. All teachers who use ICT to enrich their teaching and their students' learning need to develop specific educational competencies to do so effectively. Teachers should be volunteer learners, motivated to learn to use ICT based on their interest in seeking out learning opportunities and in managing the changes taking place among their students, and in their classrooms, schools and profession. Teachers are motivated to learn when new knowledge or skills can be used to better their position or to make improvements.

Beginning in 1998, the Teacher Education Division of the Ministry of Education, Malaysia was charged with the task of training teachers for the Smart Schools Programme. The effective training of teachers for these Smart Schools is a key factor impacting on the success of the Programme. A 14-week INSET Course for Training Smart School Teachers was conducted in selected teacher training colleges/institutions in order to fulfil the staffing needs of Smart Schools. Teachers specializing in the teaching of the Malay language, English, Science and Mathematics participated in this course.

## 4 The Evaluation of Smart Schools Programme

How successful is the Smart Schools Programme? During the 2000/2001 academic year, the Faculty of Education of the National University of Malaysia had conducted a series of studies that investigated the effectiveness of training programmes intended to train Smart School teachers and evaluated their impact on student learning. The data for this study was collected through a questionnaire that was administered to 882 Smart School teachers. The

questionnaire was also administered to 2689 students in 70 Smart Schools throughout Malaysia. The findings of the study show that Smart School teachers acquired a diverse range of knowledge and skills related to smart instruction. These teachers reported that they had succeeded in mastering various aspects of the concept of smart instruction, planning smart teaching, managing smart instruction and managing the smart classroom. Smart School learners had a positive view of, and were receptive to Smart School instruction. On the whole, smart school instruction has had a moderate to high impact on smart school learners. But, in implementing smart instruction in schools, only 23.9% got the necessary support from their respective principals (Mohammed Sani Ibrahim, 2002)[11].

The same finding was obtained from another study conducted by Baharom Mohamad (2002) who had explored teachers' perception of instructional leaderships given by their respective Headteachers/Principals in computer literacy in their schools. A survey was conducted by using questionnaires administered among 380 teachers (selected randomly) in the State of Johor, Malaysia who had involved in the Computers-in-Education dan Smart School Programmes. The major findings from this study indicated that only 24.0% of the primary school teachers and 29.4% of the secondary school teachers were satisfied with the support they obtained from their school heads.

These two research projects had proved that school principals in Malaysia were not able to integrate technology in the teaching and learning processes in their respective schools. If we don't improve this, then the Ministry of Education, Malaysia would definitely unable to transform all schools into Smart Schools by the year 2010. Appropriate steps should be taken immediately to overcome this situation by infusing the technological culture among school principals first before trying to convert all schools to become Smart Schools.

In 2005, the Ministry of Education and Multimedia Development Corporation (MDec) published a report which documented a study of the changes brought about by SSIS (Smart School Integrated Solution) and the impact of the SSIS had on teachers, students and school administrators. The study also assessed the "first-of-its-kind" partnership between the Government and the private sector in the development, testing, installation and implementation of the SSIS. The study focused on initiatives undertaken between 1999 and 2002. It surveyed 33 of the 88 Smart Schools and found that around 90 per cent of students in the schools were

ICT literate and could use ICT facilities for learning. Although teamwork, peer learning and independent learning are valued by more than 50 percent of the students in the survey, the study report noted that there was reluctance among students to work in teams because this was seen as an obstacle to completing assigned exercises during lessons. The study also found that a high percentage (83 percent) of teachers were ICT literate. Furthermore, around 90 percent of teachers were using the computer laboratory for lessons and preparation of materials and most teachers (73 percent) found their productivity improved by using ICT facilities. The report noted, however, that there was a need to establish a minimum ICT competency level for teachers, particularly in terms of competency in the innovative and creative use of ICT in teaching. The report recommended further provision of training in teaching methods and recommended that the teacher training curriculum should incorporate competence in the use of specific ICT tools, competence in integrating ICT into subject teaching, and competence in utilizing ICT for planning, preparing, teaching, assessing and evaluating lessons. The report also recommended updating courseware to incorporate changes in the curriculum and in technology.

In 2007, consultants from the International Islamic University of Malaysia began evaluating the Teachers' Continuing Professional Development in ICT (*BPPT-Bimbingan Perguruan Profesional dalam Teknologi Maklumat dan Komunikasi*) which was implemented since 2004. The evaluation report was published on the BPPT website.

The major factors perceived to inhibit the growth of ICT use in Malaysian education is described by Lee Huei Min (2002), Senior Analyst with IDC Malaysia, are "the cost of Internet access, which includes the cost of hardware, access and knowledge ...Internet experience...as broadband Internet application are yet to be deployed." Another constrain that seems to hinder the actual use of ICT in classrooms is the lack of teachers' ability to integrate ICT-related skills they have learned into their teaching activities.

The incorporation of information and communication technology (ICT) in education is increasingly recognized as a priority for schools. New technologies are changing the teacher's role from information giver to facilitator, counselor, advisor, guide, coach, mentor, resource and technology managers, and mediator to the students. Teachers are now expected to undertake formal training to ensure they are proficient in the use of

ICT and are able to use it effectively within the classroom setting. Principals as school leaders have a major responsibility for initiating and implementing school change through the use of information and communication technology (ICT) and can facilitate complex decision to integrate it into learning, teaching and school administration. Hence, successful adoption of computers is important for school principals who must use computer and model their use for their staff. If this modeling is successful, the staff may then model the use of computers for students. What are the roles of principals in transforming their schools into Smart Schools?

## 5 An ICT Culture

The culture of a school is difficult to describe, being a combination of the realisation of relationships, beliefs, attitudes and ideologies of all those that work in the establishment. School cultures clearly do exist and can visualise through the norms and routines of the school day, the behaviour of the pupils, the range of academic and non-academic activities on offer and the ways in which the school relates to the community at large. Some schools have a culture that is open to change. Others have a culture that favours a traditional approach. There are positive and negative aspects to both of these cultural dimensions, but if a school is to move forward along with the changing nature of the world of work, it must be prepared to adopt a culture that prepares its pupils for change.

The principals and the senior management team play important roles in building a professional culture of teaching which is responsive to change. Information Communication Technology (ICT) is becoming an important facet of school culture. If a school is to move forward with its use of ICT, such a subculture must be embedded in the structure of the school.

“Clearly, cultural changes are difficult and time consuming, and may provoke considerable anxiety among all teaching staff”

(Schein 1997)[12]

The principal's role is vital in developing an ICT culture in school and he should ensure that financial support is available to maintain and update the equipment on a rolling programme. Teachers are encouraged to attend courses to learn new ICT skills and make them see the use of computers as just one of the many teaching tools available to them.

## 6 Smart Schools: An Essential Vision for the Future

In this section, we draw together the strands presented in the previous sub-topics and set out a vision of what it means for a school to be successful in developing ICT capability.

### 6.1 Developing ICT-capable pupils

We have to develop pupils to become ICT-capable pupils. It had found that several key points emerging from previous research: (i) Pupils gain a lot of their capability from sources outside school. Disadvantaged pupils lose out further from their lack of access to ICT at home; (ii) Not all teachers are capable of teaching the smart way. In the same school, some pupils may be given much greater opportunity to apply their ICT capability than others. And (iii) Pupils benefit from structured teaching at appropriate points in their development of capability. Many tasks set for pupils should be properly planned.

There is a role for ICT-based homework in bridging school and home culture; pupils who do not have adequate resources at home should be given opportunities to use school resources outside normal school hours.

### 6.2 Developing ICT-capable teachers

If schools are to improve the development of pupils' ICT capability, it is through the work of teachers and other staff who support learning that it will be achieved. Teachers should be given the opportunities to attend in-service training for ICT. They should get support from experienced colleagues and a sustained programme of curriculum-based training and development is vital. The level of ICT capability of the individual teacher is important, and is likely to influence classroom usage.

### 6.3 Developing ICT-capable classrooms

The ICT-capable classroom is a combination of (i) *Teachers* who are prepared to use technology as a model for pupils. (ii) *Pupils* who are disposed to use ICT and can judge when it is likely to be helpful in their work, rather than just using ICT for the sake of it; and (iii) *Resources* which are easily available – either in the classroom or in a nearby resource area.



Teachers need to provide help for pupils to link the learning located in the computer room with the activities in the subject classroom. The availability of an internet link has the potential to transform the culture of most classrooms. It makes a massive range and capacity of information and activities available, facilitates direct communication with people and organisations that were previously remote and perhaps uninteresting, and allows pupils to have new audiences for their work. In the ICT-capable classroom, pupils will learn by watching, discussing and evaluating ICT use by others, as well as by taking their opportunity for *hands-on experience*.

#### 6.4 Developing ICT-capable subjects

The role of subject leader is vital in developing a team of teachers who use ICT in the classroom. Subject leaders should keep up-to-date with ideas about links between ICT concepts and subject concepts, and should incorporate ICT into staff development activities in their subjects. It is vital for subject leaders to work with ICT co-ordinators.

In secondary schools, the head of a subject department has a key leadership role, but may delegate research and planning for ICT in the subject to a more junior colleague who can work with the ICT co-ordinator to ensure the department's use of ICT fits within the whole-school scheme for teaching and applying ICT capability. A network in school can help staff work together, formally and informally, in developing and sharing plans and materials. Using e-mail and the World Wide Web, co-operation with teachers in other schools is much easier.

#### 6.5 Developing capable ICT co-ordinators

The co-ordinator in an ICT-capable school will have a high level of understanding of the basic ICT concepts and good higher order skills. They must be able to work with colleagues who may have very different teaching styles. The co-ordinator may well be the ICT resource manager as well, but even if not he or she will help plan the development of a school intranet system which can support teaching, learning and curriculum management, and act as a gateway to the internet. The capable ICT co-ordinator will also, of course, use the internet for communication with colleagues in other schools, for researching ideas about new developments in technology and in

teaching about-with-through ICT, and for personal staff development needs.

#### 6.6 Developing ICT-capable management

As mentioned earlier, the role of senior management team is crucial. ICT co-ordinators may be left isolated and impotent if they do not have the leadership, support and encouragement of the principal and other senior managers. Principals can support ICT co-ordinators directly in terms of (i) Vision and drive; (ii) Policy review and promulgation; (iii) Resource planning and funding allocation; (iv) Staff development planning; (v) Monitoring and evaluation; and (vi) Setting an example in ICT capability.

The school's vision and drive should be focused on teaching and learning, not merely the acquisition of more resources. The ICT-capable school will have systems in place, accepted and adopted by all staff, to ensure that the process of development is continuous. The ICT-capable principal should also support the development of teaching and learning by effective use of management information systems to inform curriculum planning, staff development and appraisal, and pupil support (Mohammed Sani Ibrahim. 1992) [13].

#### 6.7 External support and services

The ICT-capable school will make use of a range of external services – commercial, academic and governmental. The District Education Department staffs are seen as a valuable filter for general findings on good practice. Schools' inspections are a powerful force in stimulating change. The most successful schools should respond positively to any weaknesses in ICT teaching identified by the inspection reports.

### 7. Principals and ICT

Currently, there is no research on the aspects of how school principals in Malaysia acquire the necessary knowledge and skills in handling ICT software and hardware. But in Australia, Gurr (2000) had conducted a study based upon interviews in 1999 with 21 Victorian government school principals concerning the impact of ICT on their work. In the interview, principals were asked to describe the impact that information communication technology had on their work as principals. The interview was unstructured with principals free to explore the areas

that they felt most relevant. The responses to this question were thematically analysed. The themes that arose were as follows:

**(a) Use of technology: Software**

Principals used a variety of software and related administrative packages provided by the Department of Education (DOE). Principal must be expert in Multimedia software for the example Flash Player software. The Flash Player is a simple and useful player for viewing flash on your computer freely without any cost. It can play any .swf file in any platform, navigator and devices (mobile devices included).[16]

**(b) Use of technology: Hardware**

The most significant hardware mentioned was the use of DOE supplied laptops. All principals had a desktop or laptop computer at work and many had their own desktop computer at home. For some, having their own work place computer has been a dramatic change.

**(c) Use of technology: Networks**

Many principals mentioned how their schools were developing networks or responding to government initiatives in this area and how these were impacting on the teaching and learning processes.

**(d) Teaching and Learning**

Most principals seemed to be energised by the possibilities of IT to change teaching and learning. Principals believed that they had an important role in this process of change.

**(e) Working with Staff**

Principals relied on staff to assist with technology. This may have meant working with a dedicated IT person or with teaching staff with particular expertise. Principals sometimes had to support IT staff to make sure that the technology was being used efficiently, or simply to encourage the work of the support staff.

**(f) Administration**

Technology is changing the way school administration operates. The management information systems constructed by the Department of Education allow schools to collect, store and manipulate most of the data related to the running of a school. Principals described how these systems gave them ready access to critical information. To access this quickly and to manipulate the information, principals needed to be competent users of technology.

**(g) Department of Education: Help and Hindrance**

The use of technology by the Department of Education was cited as both helping and hindering the work of principals.

**(h) Principal Professional Development in Technology**

Principals acknowledged the need for professional development. Some principals mentioned that whilst they had a need for professional development, they found it difficult to find the time. A lot of development in skills appears to occur on-the-job simply through the use of technology. One of the principals had a parent who was providing weekly training sessions for the principal. Principals also rely on staff expertise to help them learn new software or to solve technical problems.

**(i) Personal Qualities**

There appeared to be two broad categories of principals. Those who were confident in their technology skills and those who were insecure about using technology.

## 8. Conclusion

This section had explained why it is important for principals of Smart Schools to acquire the knowledge and skills which will enable them to transform their schools as smart schools. Based on the findings of many researches in Malaysia, it was obvious that most principals are not prepared to do

this. This paper had discussed the 'hows' and the 'whats' aspects in integrating technology in the teaching and learning processes as well as in the administration of the schools. All principals must transform the schools into smart schools by the year 2010. Principals now have to be sophisticated users of management information systems. They are also must become proficient users of a variety of software including word processing, spreadsheets, databases and email. They have not had to be network experts, but they have had to ensure that their school is developing appropriate networks. The nature of work in both teaching and learning and administration has changed, and whilst old practices can be done more efficiently, the technologies have allowed new practices to develop.

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