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## SMART PRINCIPALS AND SMART SCHOOLS

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### Abstract

*Contemporary researches on the impact of globalization and the development of Information, Communication and Technology (ICT) towards the roles of principal had shown that school principals are experiencing dramatic changes in their work. The Malaysian Ministry of Education is planning to transform all schools into smart schools. Principals simply cannot avoid this. They have to be sophisticated users of management information system. They have to become proficient users of a variety of software, hardware, both Intra and Inter Networks, integrating technology into teaching and learning processes, attending professional development programs for enhancing their level of competencies in handling ICT equipment, and experiencing the impact of ICT on their work. Specifically, this paper will focus on the roles of principals in transforming their respective schools into smart schools.*

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## 1. INTRODUCTION

The information age poses a whole new set of challenges and questions to Malaysian schools. The quality of our nation's political, social and economic future will depend on the ability of our young generation to become functioning members of society who can 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 a 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 that 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.

The mission 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 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. Malaysia needs to make the critical transition from an industrialised economy to being a leader in the Information Age. In order to make this vision a reality, Malaysians 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. 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. NEW PARADIGM IN INFORMATION TECHNOLOGY ENVIRONMENT

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. The paradigm shift in learning inevitably requires corresponding paradigm shift in teaching and teachers' role. Teaching is considered 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.

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; Ryan, Scott, Freeman, & Patel, 2000). 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.

## 3. ICT AS A TOOL AND AN ENABLER IN EDUCATION

According to 2013, Ministry of Education's websites, Malaysia has 7,745 primary schools and 2,340 secondary schools. Infrastructure development for schools includes the installation of ICT facilities to all schools in Malaysia. Planning for the 10,085 schools is carried out in phases as follows:

2001	2,400 schools
2002	2,000 schools
2003 onwards	the rest of the schools: 10,085 schools

It is against this background that Smart Schools have been made one of the flagship applications in the Multimedia Super Corridor (M.S.C.). The concept of Smart Schools is no longer a fashionable luxury but the only way forward. In 1999, there were 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). Smart Schools are equipped with computers and appropriate software that 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. 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.

How successful is the Smart Schools Programme? During the 2010/2011 academic year, we 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%** received the necessary support from their respective principals (Mohammed Sani Ibrahim, 2010).

Consistent finding was obtained from another study conducted earlier 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 randomly selected teachers in the State of Johor, Malaysia who had involved in the Computers-in-Education and 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 obtained from their school heads.

These two research projects had proved that Malaysian school principals 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 2020. Appropriate steps should be taken immediately to overcome this situation by infusing technological culture among school principals first before trying to convert all schools to become Smart Schools.

#### **4. MALAYSIA EDUCATION DEVELOPMENT BLUEPRINT 2013-2025**

The Prime Minister of Malaysia had recently launched the Malaysia Education Blueprint 2013-2025. There are eleven shifts that had been suggested in order to achieve the national vision. Shift Number 7 is to leverage ICT to scale up quality learning across Malaysia. Why such shift is important? : The Ministry has spent more

than RM6 billion on Information and Communication Technology (ICT) over the past decade in education initiatives such as Smart Schools—one of the most capital-intensive investments the system has undertaken. However, ICT usage in schools continues to lag expectations—both in terms of quantity and quality. For example, a 2010 Ministry study found that approximately 80% of teachers spend less than one hour a week using ICT, and only a third of students perceive their teachers to be using ICT regularly. Critically, the 2012 UNESCO review found that ICT usage has not gone much further than the use of word-processing applications as an instructional tool. ICT has tremendous potential to accelerate the learning of a wide range of knowledge and thinking skills. However, this potential has not yet been achieved. What success will look like: Across all 10,000 schools in Malaysia, ICT will enhance how teaching and learning happens. Students will be able to access a wider range of content that is more engaging and interactive. They will be able to learn some lessons at their own pace, and will have fewer limitations in what they choose to study through distance-learning programmes. Teachers and principals will have access to both national and international learning resources and communities to help them improve their practice. ICT will be a ubiquitous part of schooling life, with no urban-rural divide, and with all teachers and students equipped with the skills necessary to use this technology meaningfully.

### **5. THE ROLE OF PRINCIPALS IN DEVELOPING SMART SCHOOLS**

What makes an administrator ready for the digital age? What kinds of leadership skills are necessary for both in-service and pre-service administrators to lead in today's ever-changing field of technology? In order to lead and collaborate affectively with other educators and policy-makers in the digital age, educational administrators need to take advantage of the wireless revolution and its impact upon the infrastructure of school districts. School leaders must recognize and use the "power of technology" to improve student productivity, while making "more efficient use of time, money, and staff (O'Neil and Perez, 2002; Schrum and Levin, 2009). Many studies have demonstrated that computers are still found in computer labs, with limited access for integrated instructional uses, and students use technology far more outside of school than within the school environment, where it is often still seen as an "addition" rather than a part of the curriculum" (Schrum and Levin, 2009, pp. 65-66). Educational administrators should inspire and lead development and implementation of shared vision for comprehensive integration of technology to promote excellence and support transformation throughout the organization, engage in an on-going process to develop, implement, and communicate technology-infused strategic plans aligned with a shared vision and advocate on local, state and national levels for policies, programs, and funding to support implementation of a technology-infused vision and strategic plan. The principal, technology coordinator, and superintendent are urged to collaborate with key stakeholders, such as teachers, students, program and curriculum directors, parents. Community members and governmental officials should be involved in strategic planning initiatives that enhance the most effective technology use in education.

Below are some ways that school principals can adopt in order to transform their schools to become smart schools:

#### **Develop an ICT Culture**

The principals and the senior management play important roles in building a professional culture of teaching which is responsive to changes (Hargreaves and Dawe, 1990). ICT is becoming an important facet of school culture. If a school is to move forward with its usage of ICT, such a subculture must be embedded in the structure of the school. 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.

#### **Leadership**

Even the most inspiring ICT co-ordinator is going to make little impact on a school without the support of the principal. Principals continue to be the powerful definers of the culture, ethos and organisation of their schools, and it through working with individuals, within the school system that they are able to build the momentum and involve others in the process of change. While there are different viewpoints on educational leadership, most

schools have adopted an approach that involves some type of collaborative management. In this way, schools are able to maximise the skills, commitment and energy of their staff to create a 'potent and catalytic mix for successful change and development'. It is important to have deadlines and clear targets, as well as the support required to achieve them (Fullan, 1992). Principals wishing to embed a positive ICT culture in the school must make their intentions clear to all through the processes that take place on a daily basis

Principal as an administrator, one should ask:

- Does the principal give attention to the ICT usage in subject areas on a daily basis?
- What are the available financial resources for ICT and to what extent does the principal involved in seeking additional funding for this purpose?
- Does the principal serve as a role model in the usage of ICT?
- How does the principal support staff development in ICT?
- What are the principal's immediate needs in developing a partnership?
- What kinds of professional development can he provide for his staff?
- What are the legal, social, and ethical issues that he must be concerned with?
- Does the principal take into account a person's ICT capability when selecting and promoting staff?
- What kind of technology plan can he implement?

As a teacher, one can ask these similar, but more learner-centered, questions:

- How can I partner with others to help my students?
- What support can I have with using new technologies?
- How can I use technology to enhance my instructional strategies in class?
- What could I do to impede or improve the progress of my students' learning?
- What are the legal, social, and ethical issues that I must be concerned with?

### **Generating and Maintaining an ICT Policy**

As ICT is something that every teacher will use, it is important to have a policy to hold together the ways in which ICT is involved in lessons throughout the school. It is vital that all teachers share the values envisaged within it and that they understand its implications. It follows that every teacher should have some involvement in the production and upkeep of the policy.

Here are some suggestions for designing an acceptable use of policy in your school:

- Keep it simple, one page if possible.
- Use student-friendly language, but be very clear about the policies.
- Provide reasons for having the Acceptable Use Policy (AUP).
- Install penalties for misuse.
- Have a place for all stakeholders to sign an agreement with the AUP requirements.

Compliance training conducted yearly for all staff members could minimize any possible negative impact upon the way in which the acceptable use policy is carried out in the school. Technology changes constantly on a yearly basis. It makes sense, therefore, to institute a training program that is updated frequently.

### **6. TARGET SETTING**

Target setting is a key activity for improving schools and it involves school community. Target setting provides a focus from planning changes and for monitoring progress towards personal or institutional goals. Targets should fulfil five characteristics summarised by the SMART acronym: Specific, Measurable, Achievable, Realistic and Time-related. Everyone can participate in the formulation of targets as well as sharing the responsibility for carrying them out.

#### ***The School Development Plan***

The development plan represents specific activities which school intends to carry out in order to implement its policy and achieve its targets. ICT will undoubtedly form a part of each school's development plan and will

probably continue to do so as the technology improves and our knowledge of pupils' learning with computers grow. The purpose of the plan is to help school to improve its use of ICT through reflection on existing practice and the development of new ideas. Schools need to undergo the process of finding out *where they are now* and identifying *where they wish to be* after a set time interval.

### **7. ACHIEVING AND SUSTAINING ICT CAPABILITY**

A policy with respect to ICT and the inclusion of ICT in the school development plan alone will not result in the desired change in teachers' perspective. Teachers' thinking is now challenged. A key element in successfully achieving and maintaining an ICT culture is the establishment of development cycle where policy and whole-school planning are put into practice through integrated schemes of work. Here teachers recognise the importance of undergoing certain types of training, depending on their needs, and understand the importance of reflecting on the effectiveness of their ICT usage in lessons. The challenge for managers is to create conditions which will help individuals and teams to achieve their goals and the overall goals of the school.

The ICT co-ordinator plays a significant part in ensuring that the development process is maintained. Policies and schemes of work of every school should be reviewed annually and developed in response to new technologies, educational initiatives, inspection findings and internal evaluation. It was recognised that not only could policy changes lead to improvements in practice, but that often policy needed to be developed to reflect and disseminate successful practice that had been implemented and evaluated informally.

### **8. MONITORING PROGRESS**

For any change programme, monitoring and evaluation are the most important elements. Improving both quantity and quality is a daunting task and needs to be thought of in terms of both short- and long-term goals. For schools embarking on a review of their policy, the normal starting-point is the auditing of current teaching and learning activities involving ICT. It is important to identify a baseline for development through an audit process for ICT and to monitor progress towards the goals or targets set.

### **9. 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.

#### ***Developing ICT-capable pupils***

We have to develop pupils to become ICT-capable pupils. 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.

#### ***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 that 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. Technology cannot survive in schools without full integration in professional practice by all educators, and that must both include and be led by educational administrators (Garland, 2010). School principals, in particular, need to understand and facilitate collaborative models of professional development. The delivery of in-service programs for teachers should be interactive and on-going. The content should address the 21<sup>st</sup>-century educational mandates for competency-based instruction and connected learning (Garland, 2008). Administrators and teachers alike need to engage in career-long learning networks. Empowering teachers to make changes in their instructional practices is a powerful means to help them meet their students' needs. The results of a study by Bogler (2005) showed that teachers who perceived that they could make positive changes in their instructional methods were most likely to also improve their commitment to professional development. Continuous in-service training, possible only with the proper allocation of time and resources, is an important element in integrating technology at any school site. Many educators can also benefit

from a networked learning community that links other professionals regionally and globally to the education platform.

#### ***Developing ICT-capable classrooms***

The ICT-capable classroom is a combination of

- *Teachers* who are prepared to use technology as a model for pupils.
- *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;
- *Resources* which are easily available – either in the classroom or in a nearby resource area.

Teachers need 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 (Pachler & Williams, 1999). 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*.

In particular, principals and technology coordinators must support classroom assistance and professional development for teachers in implementing new technology resources for the targeted learning needs of all students. Special needs students are not always well served by the technology available in most schools because most software programs and Internet search sites are only in English and learning disabled students are also found to be academically excluded from information communication (McKenzie, 2007). In addition to these socio-economic, language, and special needs issues in the digital divide are factors of race and gender. Social issues in technology use by students and educators involve not only safety and privacy but also ethical and communication practices.

#### ***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.

#### ***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.

#### ***Developing ICT-capable management***

As mentioned earlier, the role of senior management team is crucial. 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.

#### ***External support and services***

The ICT-capable school will make use of a range of external services – commercial, academic and governmental. The personnel in District Education Department 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 inspection reports.

#### ***Staff development programmes for ICT capability***

Staff development must also be based on teaching and learning needs. In-service training programmes are needed to ensure that staff have the requisite skills to make personal use of ICT equipment and that they

understand how it can be used to help pupils to learn. The programme must also match the ICT policy and be in line with the school development plan. After attending INSET programmes, new techniques must be adopted to implement the changes in teaching processes required to take advantage of ICT.

## 10. 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 these questions 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).

**(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.

In their own professional development efforts, administrators themselves must learn the technology that best applies to the profession. In order to ensure effective practices in the infusion of technology across the disciplines, professional development opportunities do not have to occur within the boundaries of a particular school or district. There are numerous conferences, both online and on-ground, that provide training for administrators and teachers in emerging technologies. Principals, program coordinators, and technology coordinators can stay connected by participating in annual conventions and conferences in which digital age collaborations are celebrated. The educational leaders are thus urged to attend an online or local technology conference in order to better stimulate innovation at the school level.

## 11. CONCLUSION

This paper had explained why it is important for principals to acquire the knowledge and skills which will enable them to transform their schools into 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 'how' and the 'what' 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 2020. Principals now have to be sophisticated users of management information systems. They also must become proficient users of a variety of software including word processing, spread sheets, databases and email. They don't have 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.

## References

- Albrow, M. (1990). Introduction, In M.Albrow & E. King(eds.), *Globalization, knowledge and society*. London: sage.
- Armstrong, S., Thompson, G., & Brown, S.(Eds.). (1997). Facing up to Radical Changes in Universities and Colleges, *Staff and Educational Development Series*. London: Kogan Page.
- Baharom Bin Mohamad. (2002). Teachers' perception towards instructional leadership in computer technology in schools. Ph.D. Thesis. Faculty of Education, Natiuonal University of Malaysia.
- Bogler, R. (2005). The power of empowerment: Mediating the relationship between teachers' participation in decision-making and their professional commitment. *Journal of School Leadership*, 15, pp. 76-98.
- Cheng, Y.C. & Townsend, T. (2000). Educational Change and Development in the Asia-Pacific Region: Trends and Issues, In Townsend, T & Cheng, Y.C. (eds.). *Educational change and development in the Asia-Pacific Region: Challenges for the future*. )pp. 317-344) The Netherlands: Swets and Zeitlinger Publisher.
- Cheng, Y.C. (2005). *New Paradigm for Re-engineering Education*. Netherlands: Springer
- Davis, B. & Ellison, L. (1999). *Strategic direction and development of the school*. London: Routledge.
- Dimmock, C. (2000). *Designing the learning-centred school: A cross-cultural perspective*. London: Falmer Press.
- Drucker, P.F. (1993). *Post-capitalist society*. New York: Harper Business.
- Drucker, P.F. (1995). *Managing in a time of great change*. Oxford: Butterworth Heinemann.
- Embertson, S.E., & Hershberger, S.L. (1999). *The new rules of measurement: What every psychologist and educator should know*. Mahwah, New Jersey: Lawrence Erlbaum Associates, Publishers.
- Fullan, M. & Hargreaves, A. (1992). *Teacher development and educational change*. London: Falmer Press.
- Garland, V.E. (2008). Transforming instruction: The roles of the principal as technology leader. *Scholar and Educator*, XXIX, (1-2), pp35-45.

- Garland, V.E. (2010). Emerging technology trends and ethical practices for the school principal. *Journal of Educational Technology Systems*, 38(1), pp39-50.
- Goldstein, G. (1997). *Information technology in English schools –A commentary on inspection findings 1995-6*. London: Office for Standards in Education.
- Gurr, B. (2000). “Principals and ICT” Paper presented at the International Conference on Learning, at RMIT, Melbourne, Australia.
- Heinrich, P. (1995). The school development plan for IT. In B. Tagg (ed.), *Developing a whole-school It policy*. London: Pitman, m.s. 51-71.
- Hirsh, W.Z., & Weber, L.E. (1999). Challenges Facing Higher Education at the Millennium. *American council on education/Oryx Press Series on Higher Education*. Arizona: the Oryx Press.
- Hokanson, B., Miller, C., and Hooper, S.R. (2008). Role-based design: A contemporary perspective for innovation in instructional design. *TechTrends: Linking Research and Pracxtice to Improve Learning*, 52(6), pp-36-43.
- Holmes, W. (1999). The Transforming Power of Information Technology. *Community College Journal*, 70(2), m.s. 10-15.
- ISTE (International Society for Technology in Education). (2009). *National Educational Technology Standards for Administrators (NETS.A)*, Eugene, OR:ISTE.
- Joyce, B., Calhoun, E. & Hopkins, D. (1999). *The new structure of school improvement: Inquiring schools and achieving students*. Buckingham: Open University Press.
- Lawley, P. (1999). *Target setting and bench marking*. Dunstable: Folens.
- McKenzie, K. (2007). Digital divides: The implications for social inclusion. *Learning Disability Schools*, New Yorkj, NY: McKinsey and Company, Social Sector Office.
- Ministry of Education, Malaysia. (2013). *Malaysia Education Development Plan 2013-2025*.
- Mohammed Sani Ibrahim, Jamalul Lail Abdul Wahab, Mohd Izham Mohd Hamzah & Warnoh Katiman. (2002). *The Effectiveness of the Smart Teacher Training Programs*. Faculty of Education, National University of Malaysia.
- Mohammed Sani Ibrahim. (1992). An evaluation of the INSET programs for teachers in Malaysia. Faculty of Education, National University of Malaysia.
- Naisbitt, J., & Aberdence, P. (1991). *Megatrends 2000*. New York: Avon.
- NCET-NAACE. (1999). *The annual report of Her Majesty’s chief inspector of schools 1997-98*. London: Stationary Office.
- O’Neil, H. and Perez, R. (2002). *Technology Applications in Education: A Learning View*, Mahwah, NJ: L. Erlbaum Publishers.
- Pachler, N. & Williams, L. (1999). Using the internet as a teaching and learning tool. In M. Leask & N. Pachler (eds.). *Learning to teach using ICT in the secondary school*. London: Routledge. M.s. 51-70.
- Roberson, S. and Roberson, R. (2009). The role and practice of the principal in developing novice first-year teachers. *Clearnbing House*, 82(3), pp113-118.
- Rohani Abdul Hamid. (2002). *Education reform to meet the challenges of a k-economy: The Malaysian perspective*. Paper presented at the International Conference On The Challenge of Learning & Teaching In A Brave New World: Issues & Opportunities in Borderless Education di The JB Hotel, Hatyai, Thailand pada 14-16 Oktober 2002.
- Ryan, S., Scott, B., freeman, H., & Patel, D. (2000). *The virtual university: The internet and resource-based learning*. London: Kogan Page.
- Schein, E.H. (1997). *Organisational culture and leadership*. 2<sup>nd</sup> edn. San Francisco, CA: Jossey-Bass.
- Schrum, L. and Levin, B. (2009). *Leading 21<sup>st</sup>-Century Schools*, Thousand Oaks, CA: Corwin Press.

Stoll, L. & Fink, D. (1996). *Change our schools*. Buckingham: Open University Press.

Townsend, T. (1999). *The third millennium school: Towards a quality education for all students*. IARTV Seminar Series, No. 81, Victoria, Australia: Incorporated Association of Registered Teachers of Victoria.

Ward, C. (1999). Using and developing information and communications technologies in a secondary school. *Computer Education*. 93: 9-17.