

Wong Ai Yieng, Khadijah Daud (2017). Headmaster Technology Leadership in Malaysia Elementary Schools. *Journal of Education and Learning*. Vol. 11 (2) pp. 154-164. DOI: 10.11591/edulearn.v11i2.5573

Headmaster Technology Leadership in Malaysia Elementary Schools

Wong Ai Yieng*
Faculty of Education, Universiti Teknologi Malaysia

Khadijah Daud**
Senior Lecturer, Faculty of Education, Universiti Teknologi Malaysia

Abstract

Headmaster technology leadership increasingly important in education today. This leadership, providing various positive effects to the headmaster, teachers, students and schools. Therefore, headmaster need to master this leadership to take up the leadership role of technology in schools. Based on the Headmaster Technology Leadership Model by Chang (2003), a study based on interviews conducted on 6 headmasters serving in Johor, Malaysia. This study aims to review i) the role of the headmaster in Johor as a technology leader in school ii) the challenges faced by headmaster to serve as a technology leader. Analysis of the findings from interviews found the headmaster in Johor play a role as a technology leader in the school. However, the findings have found the effort in ICT development by the headmaster in schools is different based on the needs of the school. Therefore, there is no single fixed pattern headmaster role as a technology leader. In addition, the role of the headmaster as a technology leader is not comprehensive of the five dimensions as suggested by Chang (2003). Headmaster of Johor advised to make improvements to the school led to the transformation of technology-based education.

Keywords: *Headmaster, technology leadership, technology leader*

Abstrak

Kepimpinan teknologi guru besar semakin penting dalam pendidikan masa kini. Kepimpinan ini mendapat persetujuan umum berkeupayaan memberi pelbagai kesan positif kepada guru besar, guru, pelajar dan sekolah. Justeru itu, guru besar perlu menguasai kepimpinan ini untuk berperanan sebagai pemimpin teknologi berkesan di sekolah. Berdasarkan model kepimpinan teknologi guru besar daripada Chang (2003), satu kajian berasaskan temu bual dijalankan ke atas 6 orang guru besar yang berkhidmat di Johor, Malaysia. Kajian ini bertujuan untuk meninjau i) peranan guru besar Johor sebagai pemimpin teknologi di sekolah ii) cabaran yang dihadapi oleh guru besar untuk berperanan sebagai pemimpin teknologi. Analisis dapatan temu bual mendapati guru besar Johor memainkan peranan sebagai pemimpin teknologi di sekolah. Namun demikian, hasil dapatan mendapati usaha perkembangan ICT guru besar di sekolah adalah berbeza berdasarkan keperluan sekolah. Oleh itu, tidak ada satu pola tetap peranan guru besar sebagai pemimpin teknologi. Selain itu, peranan guru besar sebagai pemimpin teknologi tidak menyeluruh bagi kelima-lima dimensi seperti yang dicadangkan oleh Chang (2003). Guru besar Johor disarankan melakukan penambahbaikan untuk memimpin sekolah menuju transformasi pendidikan yang berasaskan teknologi.

Kata kunci: *Guru besar, kepimpinan teknologi, pemimpin teknologi*

*Wong Ai Yieng, Faculty of Education, Universiti Teknologi Malaysia.
E-mail: aiyieng@yahoo.com

**Khadijah Daud, Senior Lecturer, Faculty of Education, Universiti Teknologi Malaysia.
E-mail: p-khadijah@utm.my

Introduction

Technology leadership is the leadership that has received increasing attention in the world of education. This leadership is a combination of strategies, techniques and tactics of leadership in general, but a particular focus on technology with an emphasis on access equipment and the latest technology (Grey Bowen, 2010; Mohd Jamil, 2011; Anderson and Dexter, 2005; Dexter, 2011; Fletcher, 2009). The leadership agreed upon by researchers such as Anderson and Dexter (2005), Dawson and Rakes (2003), Flanagan and Jacobsen (2003), Woelfel *et al.* (2004), Geer (2002), Hughes and Zachariah (2001) as an important component of effective education administration.

Past research has also shown technological leadership skills influence positively the leadership of the headmaster (McLeod and Richardson, 2011; Richardson and McLeod, 2011; Rutkowski *et al.*, 2011). Besides that, Leithwood and Riehl (2003), Printy (2010), Sebastian and Allensworth (2012) unanimously agreed the headmaster technology leadership affects instructional practices of teachers positively. In addition, the revised draft of the new education reform in many countries demonstrates technological leadership has become one of the important strategies for improving academic quality and student achievement (Greaves *et al.*, 2012; Chang, 2012; Ghamrawi, 2010). Given the effectiveness of technology leadership to the headmasters, teachers, students and schools, this leadership need to be implemented in schools. Headmaster as school head must bear the primary responsibility for initiating and implementing change in schools through the use of ICT (Schiller, 2003).

However, the issue of technological leadership weakness is no stranger in our society. Researchers such as Richardson and McLeod (2011), Brockmeier *et al.* (2005), Flanagan and Jacobsen (2003), McGarr and Kearney (2009) states that many headmasters are still not ready with their new role as a technology leader. These leaders do not understand learning digital, lack the knowledge to make decisions on technical issues, lack of training with computers and technology, rarely uses the technology for their personal use, failing to focus on the integration of technology in the classroom and are not actively using technology to improve teaching and learning (Richardson and McLeod, 2011; Flanagan and Jacobsen, 2003).

Therefore, this study explores technological leadership among headmasters in the state of Johor with the Headmaster Technology Leadership Model pioneered by Chang (2003). Two research questions are i) How do headmasters play a role as a technology leader in the school? ii) What are the challenges faced by headmasters for school technology leadership role?

Theoretical Framework

To help headmasters act as school technology leaders, this study uses the Headmaster Technology Leadership Model by Chang (2003). He has been exploring the headmaster technological leadership dimension through his doctoral dissertation in the United States since 2002. He was subsequently run other empirical studies and identified five dimensions required for effectiveness as a technology leader in the school. Five of these dimensions are vision, planning and management; staff development and training; technology and infrastructure support; evaluation and research; interpersonal and communication skills. All five of these dimensions are critical. There is a core task of the headmaster in the operating handle teaching, learning and administration involving technology in their schools.

The first dimension of headmaster technology leadership is vision, planning and management. As the head of school, headmasters need to have a clear and shared vision of technology along with the school community and stakeholders (Richardson and McLeod, 2011; Chang, 2012; Grey Bowen, 2010; Mohd Jamil, 2011; Moktar, 2011; Nazri, 2011; Leong, 2010; Kamala, 2008). This partnership is important because the higher commitment and consensus given by the school community, the more likely it is that vision of technology and headmaster planning will become a reality (Chang, 2003; Chang, Chin and Hsu, 2008; Kim and Marshall, 2009).

Staff development and training is the second dimension. As a technology leader, headmasters should identify resources, plan and adjust the program based on the needs of individual professional development and school (Chang, 2003; Chang, Chin and Hsu, 2008; Kim and Marshall, 2009). In addition, headmasters also need to provide the latest models, materials and technology support at every stage of the implementation of technology plans to achieve an optimum development plan for staff.

For the third dimension, namely technology and infrastructure support, headmasters should provide technology equipment and technical support to their schools (Fisher and Waller, 2013; Chang, 2012; Moktar, 2011; Redish and Chan, 2007; Mohd Jamil, 2011). In addition, headmasters also need to provide equal opportunities for teachers to get technological resources and ensure appropriate facilities to support technology (Creighton, 2003; Leong, 2010).

The fourth dimension of headmaster technology leadership is evaluation and research. This dimension requires major efforts of the headmasters to administer the procedure for measuring the growth of every individual teacher (ISTE, 2001). Headmasters also need to set targets and implement the technology professional development plan. At the same time, headmasters also need to assess a student's grade and encourage teachers to integrate technology to improve academic performance (Leong, 2010; Duncan, 2011; Nazri, 2011).

The fifth and the last dimension is interpersonal and communication skills. To effectively serve as a technology leader, a headmaster must master the skills necessary to get along with the teachers, especially when they begin to integrate technology into teaching and learning. Technology leadership requires interpersonal communication abilities and mastery of technology. This is commensurate with researchers warning like Chang (2003); Chin and Chang (2006); Chang et al. (2008); Kim and Marshall (2009). They unanimously expressed headmaster can be an effective leader without technological expertise. However, headmasters cannot be effective without the technology leader interpersonal and communication skills.

Methodology

This research uses the interview technique to obtain detailed information and in-depth about the role played by the headmaster as a technology leader in the school. The sample size for the interview is relatively small, about 6 headmasters who serve in primary school in Johor state. This amount meets the required number of qualitative research subjects recommended by Guest et al. (2006) of 6 to 12 subjects. Thus, a total of 3 male headmasters and 3 female headmasters that served between 1 to 4 years in current school as headmaster are selected as subjects.

An open-ended structured technique used during the interview. Open-ended structured technique interviews helped shape the study subjects to give an answer, and not divert it from the original goal of the study and will facilitate data analysis. Audio recorder used to record each interview conducted. Next, researcher's transcript each of the 6 interviews to track and review a common theme on the views, opinions and feedback of the headmaster of what the headmaster's role as a technology leader in the school. The generated text of interview transcripts provides input to the process of analysis to understand the data and reconstruct the perspective of the group studied.

In order to maintain the validity of this study, the researchers used the member checks. Each study subject was given an opportunity to revise the data provided and confirm it. For the purpose of ensuring the reliability and validity of the study, revision of codes and themes are made through the constant comparative method so that data is saturation.

Results and Discussion

The role of the headmaster as a technology leader

Overall, the six headmasters who serve in Johor play a role as a technology leader in the school. However, the role of the headmaster as a technology leader is not comprehensive of the five dimensions of technological leadership proposed by Chang (2003). The analysis results verbatim interviews for each dimension of technological leadership is described in detail below:

First Dimension: Vision, Planning and management

Analysis of the findings from interviews found all the headmasters in the study had a clear vision with the use of technology in schools. For example, headmaster C, D and F focus on vision-specific technology development for teachers and their students.

"First and foremost, my first goal is to improve the skills of students in the use of technology as young as seven years old. I want them to become proficient, at least be able to use these technologies in teaching and learning. The second one for teachers. I will ensure that all teachers this school proficient in the use of technology as we know the current technological developments are becoming increasingly rapid and the importance of technology in education is a matter of concern." (Headmaster C)

"For me, I really hope that all of my teachers at this school are ICT literate and friendly with all the latest technological developments. Students were also exposed to the use Frog VLE." (Headmaster D)

"My vision is the teachers here can apply the technology, according to the latest trend. Students here also become a quality students." (Headmaster F)

Based on the technology vision to be achieved, headmaster plans the allocation of resources for the advancement of technology in various different centres. Headmaster C shared his school technology plan as follows:

"This school was originally the access centre where we have a computer lab, an access centre... We are creating a cyber cafe." (Headmaster C)

In addition, all headmasters in this study also manage the technology effectively. Examples, headmasters D and F describe school facility management technology clearly.

"If you want to use more ICT, all can use the computer lab. If the computer labs all used up, you can use the audio visual rooms or SAC room. Sometimes there's needs to the science lab and resource centre, you can use these special rooms. There are LCD with laptops in these rooms. " (Headmaster D)

"We get netbooks and chromebook. That this can help in terms of teaching the pupils. Sufficient for several classes taught in the computer lab. But we have certain places that we can use to carry out teaching using netbooks or chromebook. For example, we can use computers in the science lab. This is a "wise science" school. So, we have a provision to upgrade the science room and provides a total of 10 computers and is ready with the internet. Besides, we can use RBT room and make it a place for teaching. In addition, we have provisions for mobile laptop and LCD that we can use in the classroom everywhere. It's centrally based, so if we want to use it, we can request it from ICT teacher to bring to class. " (Headmaster F)

The result of the interview clearly shows all the headmasters in the study had a clear vision of technology. By setting the technology vision to be achieved, the headmaster share that vision with the school community. In addition, the headmaster also acts proactively in school technology planning. They manage the school technology facilities so that teachers and students have equal access to use the technology.

Second Dimension: Staff Development and Training

For the dimensions of staff development and training, all of the headmasters in this study concerned with the professional development of teachers. They held a variety of staff development services such as training, workshops and courses related to technology for teachers and staff. Headmaster F shares his views as follows:

"Indeed, school do many workshops. So far we have done five. It's related to ICT pedagogical workshops and also involved with teaching. We have five formal workshops. We have more that are non-formal." (Headmaster F)

The headmaster also gives time off to teacher to attend training related to technology. The majority of schools invited experts from outside to expose the Frog VLE and the latest technology available in cyberspace. It aims to help teachers apply these skills in the classroom while teaching and learning. In addition, an ICT teacher in school also organizes internal technology courses for other school teachers. This can enhance the understanding of teachers about various techniques of integration of technology in teaching and learning. Headmaster C share plans as follows:

"LDP, if you calculate according to the amount of training, it is adequate 7 days a year, but since we always update with the latest technology. Also, with human resources expertise of the technician, he will give us new information that is required for the teaching and learning. I planned after UPSR, we will provide training to the teachers for their use of the updated application. Teachers are provided with the "movie maker" application so they can produce a teaching slides and not only using "power point" which is normally used. Yes, it is more interactive, meaning it can attract students. We can combine it with the video, a picture, a song and at the same time we can see a live show. " (Headmaster C)

Headmaster in this study also direct the school teachers to hold discussions in the committee. It is important for school teachers to share teaching techniques with a focus on different subjects. Headmasters D and F said the school staff development efforts as follows:

"Currently, in 2016 we've focused on LDP courses for Frog VLE. We invite a teacher, expert from Permas Jaya 3 primary school to provide training for all teachers. The LDP was conducted on Saturday. After the LDP training, teachers are encouraged to use the Frog VLE in general and also discussion in the group in the committee. So each committee will run the LDP by subject based with their existing basic skills. Teachers can use the skill and the syllabus according to the expertise available. " (GB4)

"We have PLC group. We will call through committees. Committees will get an ICT teacher to explain the technique, method and the steps required to create an atmosphere of teaching using ICT. " (Headmaster F)

These findings clearly show that all the headmasters in this study, prioritize in staff development and training. Therefore, the headmaster gave the time off to the teachers to join in-house training and external courses related to technology. In addition, some headmasters uses additional alternatives such as discussions in the teacher's committee and professional learning communities (PLC) to encourage teachers to share effective techniques for teaching certain topics in the classroom. All of this is necessary for teachers to help each other and complement each other so that effective teaching and learning can be carried out in class.

Third Dimension: Technology and Infrastructure Support

Based on the findings of the interviews, all the headmasters in this study support the use of technology. He makes sure the school has technology related facilities for the students and teachers use. Equipments such as computers, netbooks, chromebook, LCD projectors and printers are placed in a special room for the use during teaching and learning. Among them, headmaster C informed about technology facilities in his school.

"In the computer lab provided by government, there are 20 computers for students and one computer for the teacher. We have 10 computers in the access centre and another 20 netbook provided by the government in the cyber cafe." (Headmaster C)

In terms of the recovery and maintenance of technology related equipment, headmaster C, E and F have the advantage of getting technical support of from technicians supplied by the Ministry of Education. Headmasters C share technology equipment maintenance situation in his school.

"For maintenance, we do have a computer technician. So if there are small repair that do not require high cost, we will leave it to the computer technician to do the maintenance. He will constantly update the computer with the latest version, and also the most importantly is the antivirus, it will always be updated. " (Headmaster C)

Headmaster D mentioned that for schools that do not have a computer technician to do maintenance such as in her school, she will obtain maintenance services from various sources such as from the school ICT team, the teacher activity centre (PKG) and the help of ICT officer of PPD. In her view, the headmaster must act actively to inform the relevant parties about the school problems. This is because no one will know if the school keep the problem to themselves.

In terms of financial resources for the technological needs of schools, headmasters use a variety of ways such as applying for contributions from parents and get contributions from the Parent Teacher Association (PTA). Headmasters F shares his experience as follows:

"I run a network with companies and external agencies, through the PTA itself. That is, a member of the PTA will introduce me to the company outside and I ask for help if I need anything for school. It can be but the total quantity will not be much. " (Headmaster F)

All the headmasters in this study take responsibility to make sure the school has the appropriate technology. Next, he distributed the source to the right place with appropriate quantity. It aims to provide maximum benefits to the student's learning. In addition, headmasters in this study played an important role in the repair and maintenance of technological equipment according to the requirements. Similarly, in getting financial resources for technology. Headmasters use a variety of ways to obtain financial resources for technology. All these efforts are important for effective implementation of technology in schools.

Fourth Dimension: Evaluation and Research

Qualitative data analysis found that headmasters in this study using a variety of ways to evaluate the use of technology among teachers. Headmasters C, D, E and F using the monitoring of teaching and learning to evaluate the performance of teachers teaching technology. In addition, the headmasters also gave a mandate to the assistant principals and senior teachers to monitor teaching and learning and report to him about the frequency of use of technology in teaching and learning. Headmaster E gives his views as follows:

"The monitoring that often we do among administrators and we also use time tables for pupils in the computer lab. ICT teacher also ensures that the program we have planned for the program to run smooth. And I often meet with ICT teacher and also assistant principals. So far, the results of our monitoring, we found that all is well. " (Headmaster E)

For headmasters A, C and E, they use the data to evaluate the use of instructional technology among teachers and students. Sharing of headmaster A, C, and E are as follows:

"The use of technology data among teachers and pupils are very good based on the use Frog VLE which my school exceeded PPD KPI percentage of 15% " (Headmaster A)

"The percentage of use Frog VLE in this school was ranked third when released in a statement by the PPD. Indeed the percentage of our consumption is very high. So it shows that the use of this technology is maximized. "(Headmaster C)

"We reached the first ranking in the use of frog in this school last week. And for several weeks, we got the first ranking. It is actually a remarkable achievement in this area. (Headmaster E)

The findings of this dimension showed headmaster using a variety of different methods to evaluate the use of technology among teachers. The majority of headmasters uses the monitoring of teaching and learning to evaluate whether teachers are using technology during teaching and learning. Some of the headmasters in this study also uses data, such as the percentage of use in Frog VLE to identify the frequency of use of instructional technology among teachers and students. This method shows the diversity of the headmasters' efforts to increase the percentage of technology integration

Wong Ai Yieng, Khadijah Daud (2017). Journal of Education and Learning.

Vol. 11 (2) pp. 154-164

among teachers. Technology integration efforts among headmasters in Johor must be followed up with monitoring of teaching and learning from time to time. Monitoring and evaluation of teaching and learning have various advantages such as allowing teachers keep up with the use of ICT in schools, improve teaching and learning and to establish a more positive attitude. Therefore, this effort must continue.

Fifth Dimension: Interpersonal And Communication Skills

For the dimensions of interpersonal and communication skills, all the headmasters in this study frequently use the technology such as email, WhatsApp, Facebook and telegram to create positive relationships with teachers.

"We use WhatsApp, telegram and email to communicate." (Headmaster B)

Through the application of technology, all the headmasters in the study, communicate effectively with teachers. Technology applications serve as a platform for headmasters to discuss and review the activities and programs held at the school. In addition, the headmaster also using technology to share materials such as proposal, minutes of meetings and examination reports. Headmaster E shares his experience as follows:

"Very helpful, we can use email, WhatsApp, phone, Facebook that we use frequently. When I wanted to say something, technology has really helped. For example, I received information from the PPD on what actions need to be made by teachers. So I just need to send it to the teacher. Teachers will be able to know and be able to act quickly. " (Headmaster E)

Similarly, the relationship between headmasters and external parties such as parents. Technology applications such as System Sms Sync, WhatsApp and telegrams used as a platform for presenting school information, notifications school program, discussion of issues or problems of students to the parents. Parents benefited from the advantages of using this technology. They can find out the activities held during the day at school.

"We use the system sms sync. We send information via sync. We asked parents to download the application in their handphones. So, the school GPK hem will inform holidays Thaipusam, Deepavali holidays thru the system. Parents cannot comment on it, but we have WhatsApp PTA group. PTA connected through it. If they wants to discuss anything, i'll let them discuss thru the Whatsapp. " (Headmaster D)

"We have WhatsApp and school Facebook page where we often keep in touch with parents. PTA and headmasters often communicate with parents regarding the problems of children and so on and any development activities in our schools will upload it in WhatsApp. The response was overwhelming. Parents are satisfied. With the technology available today, they may know of what their children do. They are at home, but parents can see the activity their children do. Fun, so the response is encouraging. It's good, so, it is one of which we are using. " (Headmaster E)

"Parents have group PTA and they can make a complaint to me or give an opinion or if they wanted to propose something to me thru the group. So, I have no problem. Parents always give cooperation. Very good. I have a very good PTA and parents here are very fine. If they want any report, or something that I wanted to inform, I just put it in the PTA or school website and they will read and they will comment. We have website admin and they will reply the comment. " (Headmaster F)

Obviously, all the headmasters in this study have good interpersonal and communication skills. They use technology applications such as email, WhatsApp, telegram and Facebook as a platform to establish a positive relationship with all teachers. Thus, the headmaster and the teachers always connected without the constraints of time and place. Besides that, the headmasters in this study also established effective communication with teachers via email facilities, WhatsApp, telegram and Facebook. They deliver the latest information directly to the school community and get follow-up feedback from teachers. They also share materials and monitor the activities held at the school. This clearly shows the Johor headmasters are wise and they understand the importance and benefits of maintaining good relations with teachers. Therefore, they take advantage of technology to interact and communicate well. Through effective communication, headmaster of Johor managed to obtain the cooperation of teachers for various school affairs.

Similarly, the relationship between headmaster Johor with external parties such as parents. Through the use of technology, headmaster maintaining good and positive relations with outsiders. This can be evaluated through the use of applications such as system sms sync, WhatsApp, telegram as a platform for presenting school information, notifications school program, discussion of issues or problem students. Parents benefited from the advantages of using this technology. They can find out the activities held during the day at school. This confirms the headmasters in Johor have interpersonal and communication skills that are positive and good. They took advantage of interpersonal and communication skills to maintain a positive relationship with the school community and outsiders. This positive relationship is important for the establishment of cooperation between teachers with all parties for the implementation of all programs for the benefit of students and schools. These efforts must be continued and sustained.

Challenges as a technology leader

Headmasters serving in Johor face a number of challenges in dimensions 3: technology and infrastructure support and dimensions 4: evaluation and research. For dimension 3, the majority of the headmasters (4 out of 6 headmasters) voiced their restraint. The number of computer and LCD projector that is not enough in school. Headmaster C, D and F express their feelings.

"To me, the software is still not enough, not sufficient in terms of our lack of LCD and also computers which have been damaged and cannot be replaced with a new one. As disclosed earlier, in the computer lab we have 20 computers and one for teachers and in the access centre we have 10, it still lack, because when teachers take students into the access centre, they had to share it. " (Headmaster C)

"For me, so far it does not. Just 60% of it. Because computer lab have 20 PC and notebook. It is just enough for one class. But we have 76 students in primary 6. We cannot put all of them in 1 session. So, the students still need to share. " (Headmaster D)

"Actually, it's not yet sufficient because in the classes we still have old ICT equipments. Various screens are old, then, we have limited laptop. So, our teachers need to borrow. First come, first served. So, we are still adding features in the class so the teacher does not need to move much because it's time consuming. " (Headmaster F)

Besides that, the majority of the headmasters (headmaster A, B, D and F) were also disappointed with a poor internet access in schools. Headmaster A said the staff carrying out administrative work have difficulties arising from the uncertain internet access. Headmaster B and F also recounted his experience as follows:

"The problem is Internet access. Wired internet is quite slow here. So, the teachers feel so lazy to use. Not lazy, but she tries to browse, but at the end ...hope you understand." (Headmaster B)

"We do have an internet connection, as I said earlier, it's contributed by the state, but its online connection is very weak. Sometimes cannot connect at all." (GB6)

For dimension 4, headmasters use a variety of methods such as monitoring of teaching and learning, use of data to evaluate the use of technology in teaching. However, something that is disappointing is there is no headmaster in this study who were willing to talk about the use of technology research results to guide the application of technology in schools. This clearly shows the headmasters in Johor still less applied the use of technology research results in schools. This field should be given attention by the headmaster in Johor. They must move to gather technology-based monitoring teaching and learning or findings in teachers' use of ICT as data for improving the effective use of technology. Similarly, the results of scientific research scholars are a joint educational proven through research. Therefore, headmasters should explore the knowledge of this field and use the findings as a resource to help improve existing practices. All these efforts can help headmasters in Johor to serve as a technology leader with more effectively.

CONCLUSIONS

In conclusion, the findings have found all the headmasters who served in the state of Johor play a role as a technology leader in their school. They define and share the vision of school technology with school staff so that they move in tandem with the vision established technology. Johor headmaster also supports and encourages the development of ICT professional among educators. Through interpersonal and communication skills, headmasters establish good relations with teachers and this increased cooperation between headmasters and teachers in using technology. They also use a variety of methods such as the use of technology monitoring to evaluate teachers. It is important to ensure that the use of technology in schools continue to meet the educational needs of the present. However, the findings have found the reform and development of the Johor ICT in school is different based on the needs of the school. Therefore, there doesn't exist a fixed pattern of the headmaster's role as a technology leader. In addition, the findings also revealed the role of the headmaster Johor as a technology leader is not comprehensive of the five dimensions of technological leadership as suggested by Chang (2003). There is still room for improvements that need to be addressed by the headmaster in Johor. It is important that headmasters should play a role as a technology leader that includes a variety of different dimensions. Technology leaders who master all dimensions of technological leadership skills suggested by Chang (2003) is a technology leader that is required by the state. Technology leadership is needed by headmasters for the transformation of technology-based education.

Acknowledgement

This article is part of a study of my PHD thesis entitled Headmaster Technology Leadership and Teacher Integration Technology that carried out in Johor, Malaysia.

References

- Anderson, R. E. & Dexter, S. L. (2005). School technology leadership: An empirical investigation of prevalence and effect. *Educational Administration Quarterly*, 41(1): 49-82.
- Brockmeier, L. L., Sermon, J. M., & Hope, W. C. (2005). Principals' relationship with computer technology. *National Association of Secondary School Principals Bulletin*, 89(643): 45-63. doi:10.1177/019263650508964305
- Chang, I. (2003). Assessing the dimensions of principals' effective technology leadership: An application of structural equation modeling. *Educational Policy Forum*, 6(1): 111-141.
- Chang, I.-H. (2012). The Effect of Principals' Technological Leadership on Teachers' Technological Literacy and Teaching Effectiveness in Taiwanese Elementary Schools. *Educational Technology & Society*, 15 (2): 328-340.

- Chang, I.-H., Chin, J. M., & Hsu, C.-M. (2008). Teachers' Perceptions of the Dimensions and Implementation of Technology Leadership of Principals in Taiwanese Elementary Schools. *Educational Technology & Society*, 11 (4): 229–245.
- Chin, J. M., & Chang, I. (2006). The study of the dimensions and implementation of the elementary school principals' technology leadership. *Journal of Education and Psychology*, 29(1): 1–27.
- Creighton, T. (2003). *The Principal as Technology Leader*. Thousand Oaks, CA: Sage Publications.
- Dawson, C., & Rakes, G. C. (2003). The influence of principals' technology training on the integration of technology in schools. *Journal of Research on Technology in Education*, 36(1): 29-49.
- Duncan, J. A. (2011). *An Assessment of Principals Technology Leadership: A Statewide Survey*. Thesis PHD: Virginia Commonwealth University.
- Dexter, S. (2011). School technology leadership: artifacts in systems of practice. *Journal of School Leadership*, 21 (2): 166-189.
- Fisher, D. M. & Waller, L. R. (2013). The 21st Century Principal: A Study of Technology Leadership and Technology Integration in Texas K-12 Schools. *The Global ELearning Journal*, Volume 2, Number 4, 2013.
- Flanagan, L. & Jacobsen, M. (2003). Technology leadership for the twenty-first century principal. *Journal of Educational Administration*, 41(2): 124-142.
- Fletcher, G. H. (2009). A matter of principals. *Transforming Education through Technology*, 36 (5): 22-28.
- Geer, C. (2002). Technology training for school administrators: A real world approach. *TechTrends*, 46 (6): 56-59.
- Ghamrawi, N. (2010). Teaching-learning-technology (TLT): A new formula for school enhancement. *International Journal of Excellence in Education*, 3. <http://journals.hbmeu.ae/>
- Greaves, T. W., Hayes, J., Wilson, L., Gielniak, M., & Peterson, E. L. (2012). *Revolutionizing education through technology: The project RED roadmap for transformation* [e-Book]. Eugene, OR: International Society for Technology in Education.
- Grey Bowen, J. E. (2010). *A study of technology Leadership among elementary public school principals in Miami Dade County*. Thesis PhD: St. Thomas University.
- Guest, G., Bunce, A., & Johnson, L. (2006). How Many Interviews Are Enough? : An Experiment with Data Saturation and Variability. *Field Methods*, 18(1): 59- 82.
- Hughes, M., & Zachariah, S. (2001). An investigation into the relationship between effective administrative leadership styles and the use of technology. *International Electronic Journal for Leadership in Learning*. Retrieved 10 June, 2015, from <http://iejll.synergiesprairies.ca/iejll/index.php/iejll/article/view/498/160>.
- ISTE (2001). *Role-specific technology leadership tasks: Principal DRAFT v4.0*, retrieved Jun 14, 2012 from <http://cnets.iste.org/tssa/printtaskprofile.html>.
- Kamala, S. (2008). *Principal as Technology leaders of a secondary school in the District of Labu Negeri Sembilan*. Unpublished Master Project Paper. Kuala Lumpur: Universiti Malaya.
- Kim, H.Y. & Marshall, W. (2009). The Effect of a Technology Leadership Workshop on Principals' Five Dimensions of Technology Leadership. In G. Siemens & C. Fulford (Eds.), *Proceedings of EdMedia: World Conference on Educational Media and Technology 2009* (pp. 2415-2420).

- Association for the Advancement of Computing in Education (AACE). Retrieved May 31, 2016 from <https://www.learntechlib.org/p/31817>.
- Leithwood, K. A., & Riehl, C. (2003). *What we know about successful school leadership*. Philadelphia, PA: Laboratory for Student Success.
- Leong, M.W. (2010). *Principal's Technology Leadership and Teacher's Information and Communication Technology (ICT) application phase in schools at Seremban*. Unpublished Master Project Paper. Kuala Lumpur: Universiti Malaya.
- McGarr O. & Kearney, G. (2009). The role of the teaching principal in promoting ICT use in small primary schools in Ireland. *Technology, Pedagogy and Education*, 18 (1): 87–102.
- McLeod, S., & Richardson, J. W. (2011). The dearth of technology coverage. *Journal of School Leadership*, 21(2): 216-240.
- Mohd Jamil Saleh (2011). *Principal's Technology Leadership at a Smart School in Kota Tinggi, Johor*. Unpublished Master Project Paper. Kuala Lumpur: Universiti Malaya.
- Moktar Johar. (2011). *Technology leadership and Teacher Competency in ICT at Islamic schools in the District of Kuching, Sarawak*. Unpublished Master Project Paper. Kuala Lumpur: Universiti Malaya.
- Nazri Bakar (2011). *Principal Technology Leadership for Implementation of Information and Communication Technology (ICT) in school*. Unpublished Master Project Paper. Kuala Lumpur: Universiti Malaya.
- Printy, S. (2010). Principals' influence on instructional quality: Insights from US schools. *School Leadership & Management*, 30(2). doi:10.1080/13632431003688005
- Redish, T., & Chan, T. C. (2007). Technology leadership: Aspiring administrators' perceptions of their leadership preparation program. *Electronic Journal for the Integration of Technology in Education*, 6: 123-139.
- Richardson, J.W. & McLeod, S. (2011). Technology Leadership in Native American Schools. *Journal of Research in Rural Education*, 26(7), 1-14. Retrieved from <http://jrre.psu.edu/articles/26-7.pdf>.
- Rutkowski, D., Rutkowski, L., & Sparks, J. (2011). Information and communications technologies support for 21st century teaching: an international analysis. *Journal of School Leadership*, 21 (2): 190-215.
- Schiller, J. (2003). *The elementary school principal as a change facilitator in ICT integration*. http://technologysource.org/article/elementary_school_principal_as_a_change_facilitator_in_ict_integration.pdf
- Sebastian, J., & Allensworth, E. (2012, October). The influence of principal leadership on classroom instruction and student learning: A study of mediated pathways to learning. *Educational Administration Quarterly*, 48(4):626-663. doi:10.1177/0013161X11436273
- Woelfel, K. D., Murray, K., & Hambright, A. (2004). Making sense of technology in educational leadership programs. *TechTrends*, 48 (5): 29-33.