A Quantitative Analysis of Malaysian Secondary School Technology Leadership

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Abstract: Effective school administrators are keys to large-scale, sustainable education reform. Rapid changes in technology have led to new possible ways for managing and leading schools. Leadership within the context of these changes becomes a crucial agenda among school leaders all over the world. Technology Leadership is seen as the relationship between leadership and technology, whereupon the administrators must play a more proactive role in implementing technology, and more specifically strive to interface the human and information technology components. Many point to the problem of overemphasis on the technological aspect at the exclusion of the human resources function. The use of a Model of Technology Leadership, which is based on the standard set by National Educational Technology Standard for Administrators (NETS-A, 2002), is proposed. NETS-A, 2002, was initiated by International Society for Technology in Education. This paper discusses both the model and standards mentioned. It also explores the concept of Technology Leadership against the backdrop of current structure and processes in the education institution. It also reports on the findings of a survey on Administrators as Technology Leaders among 63 administrators of Secondary Schools in Negeri Sembilan. The findings explored show the existence of Technology Leadership elements in school; but school administrators scored average on the Leadership and Vision and Teachingand Learning variables and below average on the Productivity and

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Professional Practice variable. The t-test scores revealed that neither school location nor administrators' gender significantly influence the level of technology leadership.
Keywords: Technology Leadership; Model of Technology Leadership; Administrators as Technology Leaders

1. INTRODUCTION

Current reforms in education have placed significant emphasis on the integration of Information and Communication Technology (ICT), in the curriculum and the use of it to improve not only teaching and learning, but administration of schools. The growth in the use of ICT has brought about pervasive impacts on all staff throughout schools and district offices teaching or non-teaching alike; resulting on the need of leadership among administrators. It was long argued by Kearsley and Lynch (1994) that educational leadership is different from leadership in general. The right skills demonstrated by leaders ascertain the success programs of technological transformation in educational institutions.

Fullan (2002), states that "Effective school leaders are key to large scale sustainable education reforms". There is no reason to doubt that this is true pertaining to the integration of ICT, where school environments are currently seen experiencing changes at a speed never witnessed before, and technology is at the very centre of these changes. Administrators, as school leaders need to make dramatic adjustments regarding effective leadership, as suggested by Kotter (2001), "Leadership is about coping with change". The apparent consensus in the change literature, that leadership is important extends into the literature about technology leadership in education.

Avolio (2000), discusses the relationship between leadership and technology and suggests that leaders must play a more proactive role in implementing technology, and more specifically, strive to interface the human and information technology components. Picciano (2002) emphasised on the importance of leaders planning for the implementation of technology at their institutions. Many point to the problem of overemphasis on the technological aspect at the exclusion of the human resource function. Flanagan and Jacobsen (2003) proclaim that the role of technology in schools is receiving a great deal of attention because of the gap between expectation and preparation. Principals and teachers face the huge tasks of reinventing schools and classrooms in a society that has been transformed by digital technologies, and many feel overwhelmed by the mandate to integrate computer technology into every subject and grade. Increasingly, school administrators are required to assume leadership responsibilities in areas with which they are unfamiliar, and which they have received little training. Both the researchers argue that Technology Leadership is much more than resource acquisition and management. Instead, Technology Leadership has multiple dimensions given the complexity of schools as learning organization. Flanagan and Jacobsen (2003), further argues that computers and networks in schools is insufficient for educational reforms. Administrators as school leader should learn from research on obstacles that limit ICT integration and how can they translate this knowledge into effective approaches for leadership.

Technology Leadership is a school characteristic consistent with the emerging consensus concerning distributed leadership. Anderson and Dexter (2003), in an empirical investigation of prevalence and effect of school Technology Leadership, conclude that although technology infrastructure is important for educational technology to become an integral part of a school, technology leadership is even more necessary. Based on the analysis of data from the 1998 Teaching, Learning and Computing survey of schools in the USA, they proposed a Model of Technology Leadership. The model depicts the relationship between Technology Leadership and three indicators of technology outcomes. Technology Leadership is measured by the sum of eight dichotomous variables: presence of a technology committee; principal spending five or more days per year on technology planning; principal making regular use of email for communication; presence of a staff development policy in relation to technology; budget

provision for technology; district support; special grants for technology; and, an intellectual property policy. Whereas technology outcomes were *net use,* representing teacher and student use of e-mail and the Web; *technology integration,* representing the numbers of teachers integrating technology into various teaching activities; and *student tool use,* representing the extent to which students used computers for academic work. Findings showed that Technology Leadership had a significant positive correlation with each of the three outcome variables; and was the strongest predicator for all three outcomes.

The Model of Technology Leadership proposed by Anderson and Dexter (2003), has integrated and operationalized technology leadership in terms of National Educational Technology Standard for Administrators (NETS-A,2002). NETS-A (2002) was initiated by International Society for Technology In Education, (ISTE, 2000) and is the most recent set of suggestions in the literature about what school leaders, especially administrators should know and be able to do in initiating, promoting and supporting the effective integration of technology into the educational environment.

The standards are:

i. Leadership and vision: *Educational leaders inspire a shared vision for comprehensive integration of technology and foster an environment and culture conducive to the realization of that vision.*
ii. Learning and Teaching: *Educational leaders ensure that curricular design, instructional strategies, and learning environments integrate appropriate technologies to maximize learning and teaching.*
iii. Productivity and Professional Practice*: Educational leaders apply technology to enhance their professional practice and to increase their own productivity and that of others.*
iv. Support, Management and Operations*: Educational leaders ensure the integration of technology to support productive systems for learning and administration.*
v. Assessment and Evaluation: *Educational leaders use technology to plan and implement comprehensive systems of effective assessment and evaluation.*
vi. Social, Legal and Ethical Issues: *Educational leaders understand the social, legal, and ethical issues related to technology and model responsible decision-making related to these issues.*

Other recent studies confirm that effective leadership is critical to providing a successful and sustainable technology-enriched learning environment. Yu and Durrington (2006) investigated practicing and aspiring school administrators' perceived level of proficiency related to the Technology Standard for School Administrators adopted by ISTE (2000) among 57 aspiring administrators and 16 practicing administrators in the state of Mississippi. Their analysis showed that there were significant differences between practicing and aspiring school administrators for the criteria in the *Leadership and Vision, Productivity and Professional Practice and Social, Legal and Ethical Issues* standards. The study also shows that there was not a significant difference between practicing administrators' and aspiring school administrators' perceived ability to meet the standards.

Another research is a case study conducted by Staples *et al.* (2005), in three urban elementary schools. The study looked into technology leadership, in the form of support from the principal for equipment and staff. The analysis showed that three scaffolds, each associated with leadership, support technology integration. These were *alignment* of technology use with the curriculum and mission of the school, the presence of *teacher leadership* allowing teachers agency to influence technology development throughout the school, and *public/private roles* for technology that recognize and empower teachers and students working with technology. These cases illustrate the variety of elements that make up successful technology leadership and the advantages of a distributed model of leadership.

Mac Neil and Delafield (1998) in a research that examined technology implementation in the classroom and the principals' perception of what the inhibitors are to technology integration. Results indicated that principals viewed technology as very important in their schools and that it is significantly important for teachers to learn technology as a curriculum tool. The study also shows that the main inhibitors to implementing technology in the classroom is the lack of time for professional development and planning

Researches have shown that many school leaders have not been prepared for their new role as technology leaders and have therefore struggled to develop both the human and technical resources necessary to achieve technology outcomes in their schools, thus this section reports on the findings of a survey, to explore the role of administrators as Technology Leader.

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2. METHODOLOGY

Quantitative method was used to measure the level of Technology Leadership among secondary school's administrators. Data was collected through a survey, on a total of 63 administrators (30 of urban school and 33 of rural schools). The sample was 52.4 % female administrators and   47.6 % male. The study took place in secondary schools in Negeri Sembilan. Level of Technology Leadership was measured by the modified Principal's Technology Standard Assessment (PTSA), by ISTE (2000). The instrument contains 94 statements that are categorized into three dimensions of Technology Leadership towards integration of technology for educational purposes: *Leadership and Vision, Teaching and Learning and Productivity and Professional Practice*. All participants were asked to rate the extent to which they participated or supported the integration of technology on their organization, using a 5-point Likert scale.

The analysis of the survey questionnaire was descriptive and inferential in nature and was used to assess administrators' level of leadership concerning technology integration. Percentages, means and standard deviations were used to analyse the data. A t-test was carried out to explore whether there was any significant differences on the level of Technology Leadership according to gender of administrators and location of schools.

3. RESULTS AND DISCUSSION

The first analysis addresses the level of Technology Leadership among administrators on the variables *Leadership and Vision, Teaching and Learning and Productivity and Professional Practice*. The level is categorized as High (3.67-5.00), Average (2.34-3.66) and Low (1.00-2.33).

Table 1: Means, Standard Deviations and Level of Technology Leadership

Technology Leadership	Mean	Standard Deviation	Level of Technology Leadership
Leadership and Vision	3.25	.787	Average
Teaching and Learning	3.35	.784	Average
Productivity & Professional Practice	2.88	.857	Below Average

On the variables Leadership and Vision, Teaching and Learning, and Productivity and Professional Practice, sample administrators scored average on all counts. The sample administrators scored (Mean=

3.25, SD= .787) on the variable Leadership and Vision, (Mean= 3.35, SD= .784, on the variable Teaching and Learning and (Mean= 2.88, SD= .857) on the variable Productivity and Professional Practice. Even though, sample administrators scored average on all the variables, but administrators' Productivity and Professional Practice seemed to be below average. This would indicate that there is still room for improvement for administrators on the Productivity and Professional Practice.

This finding is in tandem with the finding of Merkley, Bosik and Oakland (1997) where leadership that promotes change is the missing factor when it comes to merging technology and instruction. It is also argued that the lack of attention to the needs of teachers concerning technology is the lack of participation in staff development by school administrators. It is difficult to support an innovation about which one is novice. Where as, Holland and Moore-Steward (2000), concludes that it is difficult to support an innovation about which one has little knowledge. The administrator is looked upon as the key facilitator in the effort to infuse technology in school; therefore technology training for administrators should be a priority. The finding also coincides with the finding of Sabariah and Rohani (2006). Their research showed that principals scored average on the practices as leaders concerning the innovation of technology in teaching and learning in school.

Inferential statistics was also used to explore the leadership of administrators concerning integration of ICT. An independent- samples t-test was conducted to compare the Technology Leadership scores for urban and rural schools and; males and females.

Table 2: T-test between urban and rural schools

Group	N	DF	t	Level of Sig.
Leadership and Vision	63	61	.400	.690
Teaching and Learning	63	61	-.748	.457
Productivity & Professional Practice	63	61	-.248	.805

The mean difference is significant at the .05 level

The result is shown in Table 2:

Leadership and Vision: with response to the item Educational leaders inspire a shared vision for comprehensive integration of technology and foster an environment and culture conducive to the realization of that vision, the t-test scores revealed that there is no significant differences (t = .400, p = .690) between urban and rural school administrators.

Learning and Teaching: with response to the item Educational leaders ensure that curricular design, instructional strategies, and learning environments integrate appropriate technologies to maximize learning and teaching, the t-test scores revealed that there is no significant differences (t = .248, p = .805   ) between urban and rural school administrators.

Productivity and Professional Practice: with response to the item Educational leaders apply technology to enhance their professional practice and to increase their own productivity and that of others., the t-test scores revealed that there is no significant differences (t = .748,   p =.457) between urban and rural school administrators.

Table 3: T-test between male and female

Group	N	DF	t	Level of Sig.
Leadership and Vision	63	61	.803	.425
Teaching and Learning	63	61	.439	.155
Productivity & Professional Practice	63	61	.854	.396

The mean difference is significant at the .05 level

The result in Table 3 shows:

Leadership and Vision: with response to the item Educational leaders inspire a shared vision for comprehensive integration of technology and foster an environment and culture conducive to the realization of that vision, the t-test scores revealed that there is no significant differences (t = .803 , p = .425) between male and female school administrators.

Learning and Teaching: with response to the item Educational leaders ensure that curricular design, instructional strategies, and learning environments integrate appropriate technologies to maximize learning and teaching, the t-test scores revealed that there is no significant differences (t = .439, p = .155) between male and female school administrators.

Productivity and Professional Practice: with response to the item Educational leaders apply technology to enhance their professional practice and to increase their own productivity and that of others., the t-test scores revealed that there is no significant differences (t =.854,   p = .396) between male and female school administrators.

The research examined whether the demographic variables, school location, and administrators' gender significantly influence the leadership of administrators in the integration of technology. Results indicated that neither school location nor administrators' gender significantly influence the level of technology leadership. These findings coincide with the findings of Dawson and Rakes (2003) and Anderson and Dexter (2005), where that administrator's gender does not influence the integration of technology, nor does the school level and size.

4. CONCLUSION

Technology has become a necessary part of our society. Almost every business, company and organization depends on technology to help them function efficiently. Early exposure to technology is important for students, where it can help them gain literacy that will be critical for future success in the workplace. Thus, the traditional roles and responsibilities of school administrators as educational administrators changed. Educational administrators are seen as the keys to successful and sustainable technology planning and integration, thus they need to alter existing leadership practices and they must also be open to the probability of participating in a transformation of traditional leadership skills and knowledge. However the dilemma is that administrators often lack the necessary technology skills and knowledge to achieve their schools' technology oriented goals.

The findings in this research showed the existence of Technology Leadership elements in school; but it is at the average level on the vision and leadership; and teaching and learning in the integration of technology. The research also showed that the level of productivity and professional practices among administrators are at the below average level. Based on these findings, it is pertinent for school administrators to acquire a thorough and comprehensive education on the necessary technology skills and knowledge.

It is without doubt that administrators as school leaders needs to take advantage of the rapid changes in technology and turn it into an opportunity for his organization, but from the literature reviewed the writer realised there seem to be a relative paucity of research in the field of Technology Leadership that will benefit school leaders. The writer is also of the opinion that it is no longer possible for school administrator to be novice about technology and at the same time be a good school leader.

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