LEVERAGING ICT FOR LEARNING AMONG NEWLY APPOINTED SCHOOL LEADERS AND TECHNOLOGY LEADERSHIP PRACTICES

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Abstract

Leadership is an important component in guiding the teacher-learning process. The newly appointed school leaders have a major responsibility for initiating and implementing school change through the use of technology. Nevertheless, they need to facilitate a complex decision on integrating it into leveraging ICT for learning. However, there is less information about the current status of technology use by Malaysian newly appointed school leaders. This study aims at examining the relationship between newly appointed school leader technology leadership practices and leveraging ICT for learning in Malaysian national schools. This is a non-experimental quantitative research using survey technique through the administration of a set of questionnaires on newly appointed school leaders' technology leadership practices and leveraging ICT for learning. The findings indicate that newly appointed school leaders have a high level of technology leadership and they also rated themselves having a high level of leveraging ICT in learning. Furthermore, data indicated statistically significant positive and moderately strong correlation between technology leadership practices and leveraging ICT for learning. Thus a proposed conceptual model was established in this study for future work.

Keywords: Technology Leadership; Leveraging ICT for Learning; Newly Appointed School Leaders

I. INTRODUCTION

School administrators should play a key role in promoting technology in schools. In other words, it shows the new way of technology leadership and offers new capabilities that lead to significant changes in the organization (Haughey, 2006; Mojgan, 2008; Mohd Izham Mohd Hamzah, 2014; Arokiasamy, 2014). Hence, technology literate school leaders are vital to remaining competitive (Ministry of Education Malaysia, 2013). School leaders have more challenging responsibility to equip themselves with ICT knowledge and skills as well as to transform themselves and their organization for 21st century learning (Malaysia Education Blueprint 2013-2025 (MOE, 2013; Pasukan Pemikir, 2017). The study shows that the level of technology leadership among school leaders in Malaysia was at a high level and there was a significant relationship within Principal Technology Leadership (Raamani, 2018). Furthermore this was supported by the recent scenario during the COVID-19 period, school principals want to ensure curriculum continuity, ensure students' commitment to school, and assist teachers' professional development in technology while managing distance education using educational technologies (Thuran 2020).

Therefore, Mohd Izham Mohd Hamzah (2014), suggested school leaders should play key roles in promoting technology in schools. Moreover, the technology leadership seeks school leaders to change the existing practice, (Jones, 2015; Harris, 2015; Perera, 2016) and to be more open towards the new concept of ICT in Education includes a roadmap of leveraging ICT for learning (Sathiamoorthy, 2016; Malaysia Education Blueprint 2013-2025 (MOE, 2013).

II. LITERATURE REVIEW

Lately, the Ministry of Education received criticism from stakeholders and the public concerning the challenges of 21st century learning preparation (Sathiamoorthy, 2016). Even though, Malaysian government has invested huge amount of establishing technology in education, expected improvement in school and student outcome is still being debated (Leong, 2010; Lu, 2013; Wahdain, 2014). Such inattention to the principals' cultural

perceptions may generate unforeseen repercussions for ICT diffusion in Malaysian schools. As stated by (Raman & Thannimalai (2019), in their studies proven that professional development has been shown to be crucial and has a high performance index value when it comes to technological leadership, school leaders should be provided with more effective continuous professional development, particularly in the areas of ICT and leadership. According to Alkrdem (2014), for past few years, literature studies on Technology Leadership focus and refers to National Education Technology Standards-Administrator (NETS-A) standards as entire study to investigates technology adoption (Sheila,2016) into education. Even though there are various studies associated with NETS-A(2009) and other factors such as teachers ICT competency and ICT integration in Malaysian National Schools (Chang, 2012;Leong,2016; Sathiamoorthy, 2016; Raamani, 2018), a few studies in Malaysia has investigated the relationship between five variables of principal technology leadership practices among newly appointed school leaders with Malaysia National Education Blueprint 2013-2025 (Leveraging ICT in Learning) (MOE, 2013). Despite that some school administrators want to assess present technology initiatives in order to design policies that promote effective teaching methods. This concept is consistent with the visionary leadership educational framework in technology (Torrato,J et.al, 2021)

In addition studies pertaining to principals' leadership were found more focused on technology leadership at High-Performance Schools (Hamzah, 2014). Nevertheless, Wang (2010); Richardson and McLeod (2011); Fisher and Waller (2013); Dunham (2012); Sincr (2013) and suggested that professional technology leadership development components, Sheila (2014) should be investigated as research variables. Hence, studies on principal technology leadership and their professional development needs have not been extensively researched in western countries (Grey-Bowen, 2010) and not many studies have been done on these two variables, more so in the Malaysian context.

School leaders at present have roles that are more demanding towards 21st century learning and industry technology revolution 4.0 in coming years. The challenge to overcome issues in this era seeks progressive change from the aspect of conventional education leadership to education technology leadership of high performing school leaders. Therefore, this research studies prevailing gap between newly appointed school leaders with principal technology leadership practices towards leveraging ICT for learning.

III. RESEARCH METHODOLOGY

In this study, a quantitative method was employed to collect data from the population of newly appointed primary school leaders in Malaysia. Using a survey instrument, quantitative data were collected from a random sample of 120 newly appointed primary school leaders. This is a non-experimental quantitative research using survey technique through the administration of a set of questionnaires on newly appointed school leaders' demographic variables, principal technology practices and for learning. The aim of the study was at examining the relationship between newly appointed school leader technology leadership practices and leveraging ICT for learning in Malaysia National Schools. The target population in this study was newly appointed school leaders in Malaysia during the 2017-2018 school years. The list of newly appointed school leaders was based on the school principal's directory by Ministry of Education. The questionnaires are divided into two parts. Part A measures the perceived level of leveraging ICT for learning by newly appointed school leaders .Part A comprises of 12 questions adapted from (Garland, 2013) and modified according to Malaysian National Education Blue Print 2013-2025 chapter six; ICT in education (MOE, 2013).Part B measures principal technology leadership practices by newly appointed school leaders which is adopted from (Leong, 2016) based on by the International Society for Technology in Education (ISTE, 2009). Part B consists of 25 questions with a five-point Likert Scale measure from low to high. Face and content validity of the instruments were established by the panel of experts. Moreover, Cronbach's alpha was used to measure internal consistency and calculated via the SPSS 19.0 statistical package. Both descriptive and inferential statistics methods were used to analyze the data to answer the proposed research questions. First two research questions were analyzed using descriptive statistics in terms of mean and standard deviation. Third research questions were conducted using inferential statistics; Pearson product-moment correlation test was performed to examine the relationship between principal technology leadership practices and leveraging ICT for learning. Inferential statistic in terms of multiple regression analysis was carried out to identify which of the principal technology leadership practices dimensions contribute to changes in leveraging ICT for learning.

IV. CONCEPTUAL FRAMEWORK

This study investigates leveraging ICT for learning the dependent variable in relation to newly

appointed school leader's technology leadership practices as the independent variable. The independent variable, newly appointed school leaders technology leadership practices comprised five aspect according to the ISTE Standards•A (2009).

1) Visionary leadership which is defined as whether newly appointed school leaders is able to encourage continuous quality development of a shared vision for holistic integration of information technology to encourage enhancement and support transformation throughout the school..

2) Digital age learning culture is defined as whether newly appointed school leaders is able to generate, encourage, and sustain a constant change, digital-age learning culture that contribute a rigorous, applicable, and interesting education for all students.

3) Excellence in professional practice is defined as whether newly appointed school leaders is able to encourage an environment of professional learning and innovation that permit educators to improve student learning through creativity in recent technologies and digital resources.

4) Systemic improvement is defined as whether newly appointed school leaders is able to contribute digital age leadership and management to continuously upgrade the school through the valuable use of information technology resources.

5) Digital citizenship is defined as whether newly appointed school leaders is able to model and facilitate knowledge of social, ethical and legal issues and authority related to an evolving digital culture among community members.

The dependent variable, leveraging ICT for learning were based on Malaysian National Education Blue Print (MOE, 2013). Drawing on the current research on the impact and potential of ICT in education, the Ministry adopts the development of its ICT strategy using the four principles:-

1) Ensuring the fundamentals are place defined as successful rolling out a strong ICT programme in education such as devices, network and application, ICT proficiency in teachers, and curriculum and assessment must be in place prior to shifting to more intense, innovative usage of ICT

2) Building on established foundations defined as to ensure that all future ICT initiatives enhance and strengthen the effectiveness for ICT innovation maximize the return on investment

3) Investing in ICT solutions for group with specific needs defined as current ICT solutions can still be utilised to enable cost-efficient access to high-quality teaching and learning resources to groups with specific needs such as rural schools and gifted students

4) Relying on outcome-based assessments defined as evidence-based assessment should form the basis for evaluating significant potential investments in ICT

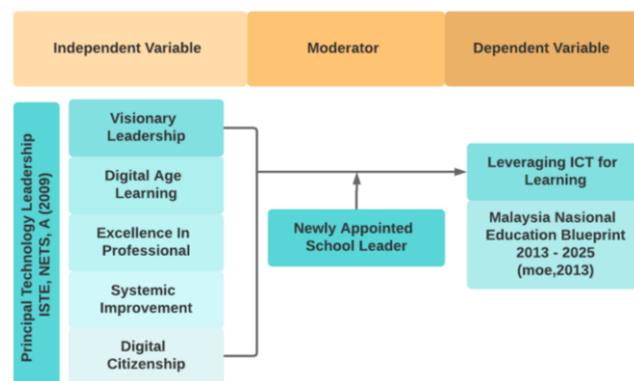The conceptual framework of the study as shown in **Figure 1**

Figure 1: Proposed Model

V. FINDINGS

This section presents the results of the study according to each research question. According to Moidunny (2009) the mean score interpretation had shown in Table 1.

Table 1: Mean Score Interpretation

Mean Score	Interpretation
1.00-1.80	Very Low
1.81-2.60	Low
2.61-3.20	Medium
3.21-4.20	High
4.21-5.00	Very High

Source: Moidunny (2009)

Research Question 1: What are the levels of leveraging ICT for learning in Malaysian National School?

Descriptive statistic was used to analyze the data collected from 120 newly appointed school leaders in Malaysia. The analysis yield results as shown in **Table 2**.

Table 2: Mean, Standard Deviation and the Level of leveraging ICT for learning (N=120)

Mean, Standard Deviation and the Level of Leveraging ICT for Learning (N=120)	Mean	SD	Level
Overall	**4.058**	**0.652**	**High**

Based on Table 2, the overall mean for leveraging ICT for learning is 4.058. This could be interpreted as high level of leveraging ICT for learning among newly appointed school leaders in Malaysian National School. The standard deviation of less than 1, means that the variations in respondent's opinions were small. Leveraging ICT for learning on the whole has a mean of 4.058 (SD=.652).

A. *Research Question 2: What are the levels of principal technology leadership practice among newly appointed school leaders in Malaysian National School?*

The descriptive analysis yield results as shown in **Table 3**. From **Table 3**, the overall mean of principal technology leadership practices is 3.910. This could be interpreted that majority of the respondents perceived that newly appointed school leaders demonstrated high level of technology leadership practices in Malaysian National schools. Three out of the five principal technology leadership practices dimensions have higher mean than the overall mean. These dimensions are Visionary Leadership, Digital Age in Culture and Excellence in Professional Practice.

The other two principal technology leadership dimensions have lower mean than the overall mean: Digital Citizenship and Systemic Improvement. However, all the five principal technology leadership practices dimensions have means interpreted as high level.

Table 3: Mean, Standard Deviation and the Level of Principal Technology Leadership Practices (N=120)

Mean, Standard Deviation and the Level of Principal Technology Leadership Practices (N=120) **Dimension**	Mean	SD	Level
1) Visionary Leadership	4.267	0.530	High
2) Digital Age Learning Culture	4.000	0.648	High
3) Excellence in Professional Practice	3.958	0.627	High
4) Systemic Improvement	3.600	0.814	High
5) Digital Citizenship	3.750	0.736	High
Overall	**3.910**	**0.670**	**High**

In conclusion, school leaders in Malaysia National Schools perceived that newly appointed school leaders practice high level of technology leadership. Furthermore, the data showed that all the five dimensions of newly appointed school

leaders' technology leadership practices are at the high levels. These newly appointed school leaders demonstrated highest practices in visionary leadership followed by digital age learning culture, excellence in professional practice, digital citizenship, and the lowest mean was for the systemic improvement dimension.

Research Question 3: Is there a significant relationship between principal technology practices and leveraging ICT for learning among newly appointed school leaders in Malaysia National School?

The Pearson product-moment correlation test was performed to analyze the relationship between principal technology leadership practices and leveraging ICT for learning. Prior to the analysis, researchers need to compute the mean for principal technology leadership practices and the mean for leveraging ICT for learning using SPSS. Then, the correlation analysis was performed by comparing the means of these two variables. The result of the analysis is presented in **Table 4**

Table 4: Pearson Product-Moment Correlation Analysis between Principal Technology Leadership Practices and Leveraging ICT for Learning

Variable	Leveraging ICT for Learning	
Principal Technology Leadership Practices	Pearson Correlation	.564**
	Sig. (2-tailed)	.000
	N	120

**. Correlation is significant at the .01 level (2-tailed)

Table 4 shows that for the sample of this study (n=120), there is a statistically significant positive correlation which is moderately strong (r = .564, p < .01) between newly appointed school leaders technology leadership practices and leveraging ICT for learning among newly appointed school leaders in Malaysian National schools. This positive correlation revealed that if the newly appointed school leaders' practices higher level of technology leadership, the level of leveraging ICT for learning will be increased as well.

The multiple regression analysis yields outputs as shown in **Table 5**

Table 5: Multiple Regression (Stepwise) on Principal technology Leadership Practice to Leveraging ICT for Learning

Variable	(Unstad.) B	(Stand.) β	t	Sig	R^2	Contribution (%)
Digital Age Learning Culture	0.760	0.810	5.129	.000	0.656	65.6%
Constant	1.052		15.017	.000		

The result of multiple regression analysis shown in **Table 5** indicates that the prediction model contained one out of the five predictors. These predictors are digital Age Learning Culture (β = .810, p =.000 < .05) .The digital Age Learning Culture dimension was found to contribute 65.6% of the variance on leveraging ICT for learning These model demonstrated large effect size on leveraging ICT for learning.

The dominant predictor for leveraging ICT for learning is digital age learning culture dimension (β=.810, t = 5.129 and p =.000). The t-test result was significant at the significance level of p<.05 with the R^2=.656, indicating that the digital age

learning culture dimension contributes 65.6% of variance on leveraging ICT for learning. Based on the standardized beta value, when the digital age learning culture dimension increases by one unit of standard deviation, leveraging ICT for learning increases by .810 unit of standardized coefficients.

Table 6: Multiple regression (Stepwise): ANOVA

Model	Sum of Squares	df	Mean Square	Sig
1	Regression	28.880	1	
	Residual	15.112	118	.000*
	Total	43.992	119	
a.	Predictors : (Constant), Digital Age Learning Culture			
b.	Dependent Variable : Leveraging ICT for Learning			

Based on **Table 6**, the F-test result indicated a statistically significant relationship between the predictor variable with Leveraging ICT for Learning [F (1,118) =225.511, p=.000] at the significance level of p <.05. The multiple regression analysis results also show that the combination of the digital age learning culture dimensions of principal technology leadership practices accounted for 65.6% of the variance in leveraging ICT for learning. This means that as much as 34.4% of the variance on leveraging ICT for learning is unable to be predicted by principal technology leadership practices as it may be caused by other variables (other factors) not examined in this study.

VI. DISCUSSIONS

The major responsibility for principals who act as a school leaders is to initiate and implement school change through ICT usage and facilitate complex decisions to integrate IT into the instructional process and school administration (Afshari, Kamariah, Wong, Bahaman, & Foo, 2008).According Arokiasamy (2014), In the era of information technology , school leaders must be able to consolidate ICT into their daily practice and to provide compatible and positive leadership for technology use in the teaching-learning process. In reality, they must be technology leaders. The results of this study indicated that the level of principal technology leadership among newly appointed school leaders at Malaysia National School demonstrated at a high level. This finding aligned with (Leong, 2016; Alkrdem, 2014; Thannimalai, 2018 ;) who also found that school leaders or administrators have positive attitude towards ICT. Specifically, the school leaders in this

study practiced Visionary Leadership which has the highest mean of 4.267 compared to the other four constructs of NETS-A (2009). The result of this study indicated that school leaders have high level practice on technology leadership and has positive relationship towards leveraging ICT for learning. Therefore, as suggested by Torrato,J,et.al (2021),instead of one-off preparatory programmes, the Ministry of Education, in partnership with institutions that provide training for school leaders, should create sustainable program-wide educational technology courses. Technology should be used to reinvent learning and teaching experiences in classrooms through these trainings, with teachers acting as mediators. Similar findings were also reported by (Arokiasamy, 2014; Alkrdem, 2014; Moktar, 2011).This finding reflected that newly appointed school leaders in Malaysia National schools have realized their role as technology leaders and they are capable of playing a technology leadership role in their daily practices .In this way, the applicability of the technology leadership practice to leveraging ICT for learning was well supported by the results of this study. The Pearson product-moment correlation test showed that there is a statistically significant and moderately strong positive correlation between principal technology leadership practices and leveraging ICT for learning. This positive correlation revealed that if the principal practices higher level of technology leadership, the level of leveraging ICT for learning will be increased as well. This finding confirmed that principal technology leadership practice is one of the factors influencing leveraging ICT for learning. Furthermore, based on the multiple regression analysis, digital age learning culture is principal technology leadership practices dimensions that are statistically significant predictors of leveraging ICT for learning in Malaysian national schools. This finding implies that the level of leveraging ICT for learning will be increased when newly appointed school leaders perceived their leadership concerns about create, promote, sustain a dynamic learner centered environments equipped with technology and learning resources among their school community are addressed and believed that provides a rigorous , relevant and engaging education for all students.

VII. CONCLUSION

This paper analyzed the impact of ICT in Education (Leveraging ICT for Learning) as stated in the Malaysian National Education Blue Print (MOE, 2013) and the role of newly appointed school leaders in technology integration. Hence, determines the extent to which Malaysian school

leaders use ICT in their schools and identifies their perceived ICT usage in learning and their leadership style. Even Though earlier findings by (Arokiasamy, 2014; Mohd Izham, 2014) indicate that technology leadership practice were at moderate level. However, after the launch of Malaysia National Education Blueprint 2013-2025 in 2013 supported the findings in this study. The result emphasized positive improvement among newly appointed school leaders towards technology leadership practices and presented a high level indicator in leveraging ICT for learning. In fact, if Malaysian school leaders want to be more successful for their new role as technology leaders, they must perform the role of ICT in their school management and acquire appropriate ICT skills to use this knowledge. In other words, they must be proficient in leveraging ICT tools to assist in administrative and instructional functions. In the age of revolution of industry 4.0, Malaysian school leaders should become competent in leveraging ICT for learning.

Although we have found several encouraging results, it is important to recognize that the current findings also have limitations and future works. First, the sample size should be increased because using data from a larger number of respondents will permit more powerful findings. Second, Structural Equation Modelling should be carried out to evaluate whether the data collected fit with the proposed model for goodness-of-fit that will be useful to establish re-specified model for policy makers, providers of professional development programs and for system level decision makers to support mechanism and strategies to assist school leaders to develop their knowledge, skills and their leadership style.

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