Profiling E-Leadership Practices using Mobile Technology among School Leaders in Malaysia

Mohd Yusri Ibrahim, Zurita Othman

Abstract*: *In line with the 4th Industrial Revolution, organizational leaders were suggested to practice e-leadership using mobile technology. This digital-based leadership enables organizational leaders to conduct a dynamic leadership functions at various places and times, despite being away from their employees. Despite being equipped with a variety of ICT facilities including mobile gadgets, there are still organization leaders who not interested in practicing of e-leadership, rather than adopting a conventional leadership style that is face-to-face with employees. This study was conducted to develop a profile of e-leadership practices among school leaders in Malaysia. Four main constructs of e-leadership ie online interaction, file sharing, online meeting and planner sharing are reviewed by demographic factors such as school area, school level, gender, position, academic qualification, working experience and teaching area. A total of 1033 school leaders at various levels in Malaysia were studied through questionnaires, while the data were analyzed statistically. Findings shows that e-leadership practices among school leaders differ according to their demographic factors such as school area, school level, gender, position, academic qualification and working experience. It is recommended to the responsible parties to use the findings of this study to encourage the use of mobile technology among school leaders, in order to carry out their leadership functions. The findings of this study also can be used to improve training, encouragement, campaigning, appreciation and recognition of school leaders.

Index Terms*: *e-leadership, digital leadership, educational leadership, mobile technology

I. INTRODUCTION

Leadership is an important topic in organizational research throughout the years, including educational organization (Hallinger, 2011). Several studies by researcher had found that leadership styles affected organization from different perspective such as employee's attitudes and behaviors, which might also affect the feelings and thoughts of the employees. Those studies also indicated effective organization usually lead by an effective leader (Horng & Loeb, 2010). Traditional or conventional leadership was defined as using interpersonal influence and face to face communication in real situations to attain specialized goals (Tannenbaum et al., 1959). However, latest world experienced a very rapid development in the field of communication and information technology (Hambley et al. in Kock, 2009; Cascio & Shurygailo, 2003), where is enables to work at any place and any time (Huang et. Al, 2010). These trends gave new dimension in leadership and organizational management (Purvanova & Bono, 2009; Avolio & Kahai, 2002;2003, Avolio et al., 2001; DeSanctis & Poole, 1994). Leadership task is no longer limited to a direct relationship between the leaders and employee of the organization. Now, leaders can exercise their leadership in virtual function (Purvanova & Bono, 2009) using mobile technology gadgets. As rapidly developmental in information and communication technology, leadership functions also grew by modernity and it always important part for organization (Schultz, 2010). Technology had changed the traditional approach of leadership to virtual concept. Virtual leadership or e-leadership is a concept that integrated mobile technology in leadership style, and it was different from traditional or conventional styles (Lee, 2010). E-leadership was define as a leader using computer mediating for task-oriented, decision-making and problem solving group (Hinds & Kiesler, 2002). As the development of mobile technology rises, most of leader prefer in using mobile technology devices to coordinate their members in an organization. This may increase productivity by reducing operational cost (Huang et. al, 2010;Townsend et al, 2001). Although some research on virtual team leadership styles exists, relatively little research on how leadership affects virtual team interaction and performance (Hambley et al. in Kock, 2009). Leader of modern organization faces more frequently due to the dynamics of the workplace and situation. The new challenges are workers are physically dispersed away from the leader and fellow (Schultz, 2010). In the Malaysian context, school leaders are very busy commonly. They rarely able to attend school session for a variety of meetings and another commitments outside school (Ibrahim, 2012; Bity Salwana et. al, 2008; Maimunah, 2005). As a result, they are not be able to pay attention to school organization, especially in part of curriculum and instruction (Mohd Suhaimi & Zaidatol Akmaliah, 2007; Azlin, 2006). To overcome this problem, the scholars had proposed the using of mobile technology in leadership practices. In this situation, leaders need to change their role toward e-leaders in organization.

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The concept of e-leadership was suggested to elaborate how communication technologies can interact with group leaders and members in order to develop new team structures and cultures (Purvanova & Bono, 2009; Avolio & Kahai, 2002;2003, Avolio et al., 2001; DeSanctis & Poole, 1994). The purpose of the study was to develop a profile of e-leadership practices among school leaders in Malaysia, who use mobile gadgets to deliver their leadership functions

II. BACKGROUND

Practices of digital leadership or also known as e-leadership was moving along with the fast development of information technology and communications (ICT) and mobile technology such as smartphone, tablets and any gadgets that easy to carry (Avolio et al., 2001). The impact of the 21st Century and 4th Industrial Revolution has been causing a shift in research of organizational leadership, including educational and school organization. Digital leadership or e-leadership is a new paradigm that provides opportunities for communication ability, enhancing organizational performance by creating multi-functional group teams, enhancing customer satisfaction, reducing costs, and also providing situation for improvement of management knowledge (DasGupta, 2011).

Digital leadership or also known as virtual leadership should be practicing among leaders, including school leadership. Nearly a decade ago, researchers had suggested for school leaders to integrate mobile technology in their instructional leadership practices. Ibrahim et al (2019), for example suggested a model how to use mobile technology gadgets to practice their virtual instructional leadership as shown in Figure 1 bellow.

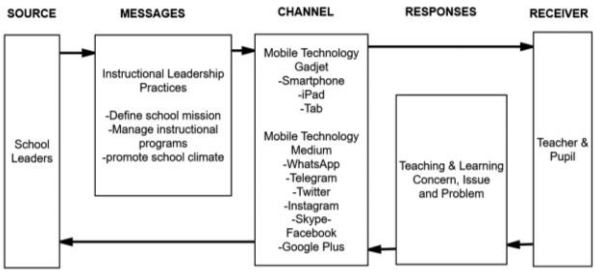

Figure 1. Model of virtual instructional leadership by Ibrahim et al (2019).

The model of virtual leadership was developed from the classic communication model known as SMCR Berlo, which developed by Berlo (1960). The model suggests that essential elements of communication are source, message, channel and receiver. In the context of leadership, organizational leaders are the sources that will convey instructions, notifications, monitoring and so on, while workers are the receivers who receive the information from leaders. In the context of effective communication, the receiver can and should provide responses to the source. For virtual leadership, both leaders and followers use mobile technology as a channel for sending messages and giving responses. For more clear, this virtual leadership is a concept that school leaders are practicing their dimensions of leadership by manipulating mobile technology hardware and software as communication channel. The mobile technology gadget can be using such as smartphone, iPad or any type of tab, while communication apps such as WhatsApp, Telegram, and Twitter, and web apps such Facebook and any type of web 2.0.

Meanwhile, Ibrahim (2014) suggested e-leadership as a concept that integrated mobile technology in leadership style, whereas a leader use computer mediating for task-oriented, decision-making and problem solving group (Hinds & Kiesler, 2002). From that research, he suggested four elements for measurement model of e-leadership such as online interaction, electronic file sharing, online meeting and electronic planner sharing as shown in Figure 2 below.

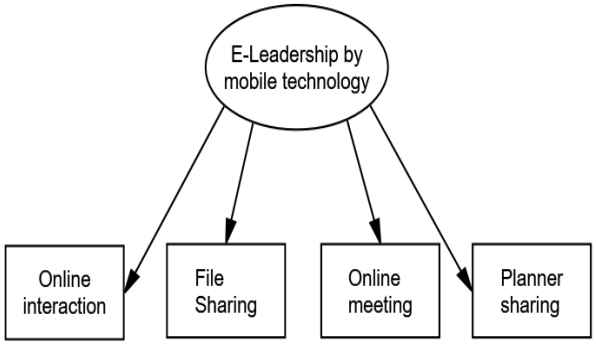

Figure 2. E-Leadership model (Ibrahim, 2014)

This model had suggested items such SMS/MMS, SMS/MMS group, Facebook, Facebook messenger, Facebook group, Twitter, WhatsApp, WhatsApp group, email, email group, Yahoo messenger, Google talk, Google messenger and Skype as channel for online interaction between leaders and their followers. While for construct of electronic file sharing, that model suggesting Email, Dropbox, Google Drive, Sky Drive, iCloud and Facebook as sharing platform inside organization, especially between leaders and employees. For online meeting, this model had suggested Skype and Google Hangout as channels, while Google Calendar and Yahoo Calendar as platform for planner sharing, especially school program and so on. This study using that model to profile e-leadership practices among school leaders in Malaysia, but this study differ compare to previous in area to use only mobile technology such smartphone, tabs and any gadgets that easy to carry or putting in pockets.

As conclusion, the concept of e-leadership is about applying mobile-mediating in leadership practices as suggested by Ibrahim et al (2018). In their research, they were proved that mobile technology application was fit as moderator between leadership practices and effect to followers, as shown in Figure 3.

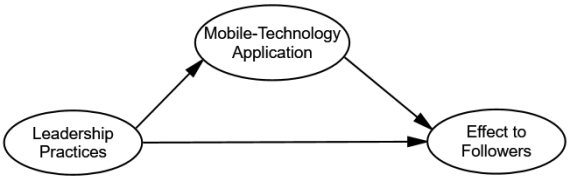

Figure 3: Mobile-technology application as moderator in e-leadership practices (Ibrahim et al, 2018)

III. MEASURES

The study was applied a cross sectional survey design using quantitative methods. The participants are school leaders in Malaysian that consists of principals, headmasters, senior assistant, head of the departments and head of unit. Total of 1033 school leaders were involved in the study which 361 was male and the rest are female.For school area, 39.8 percent or 411 participants were from urban area, while the balance from schools at rural area. 579 participants are leaders at primary school, while the rest of 454 were working at secondary school. For position at school, 67 are principals at secondary school, 129 are headmasters/misters at primary school, 298 senior assistant, 122 as head of departments, and 417 as head of unit. The participants also came from various criteria of ages, working experiences, teaching area, academic qualification and school type. Data were collected by questionnaire that was developed by the researcher. The instrument consists of three main parts of e-leadership variable such as online interaction, file sharing, online meeting and planner sharing. The questionnaire applied four number of agreement scale ie never, rarely, frequently and very frequently. The participants were asked to response how frequently they using certain hardware and software of mobile technology to deliver their leadership functions. Reliability coefficient of the instrument was 0.931, while achieved all validity testing like convergent validity and discriminant validity. Data were analyzed using SPSS, analyzing were more concerned on independent sample t-test and anova test to profile the e-leadership practices among participants.

IV. RESULT

Within maximum score of four, average score for e-leadership practices among school leaders only 1.482, which mean below half of whole score point. It was indicated that e-leadership performance among participants still at moderate level. All preliminary result for all four research variables was shown in Table 1 below.

Table 1. Preliminary result

Variables	Mn	Sd	Skw	Krt	Alp	1	2	3	4
Online Interaction	1.84	.509	.818	.262	0.92	1	.746	.359	.476
File Sharing	1.67	.450	.154	.583	0.91	.746	1	.447	.476
Online Meeting	1.08	.255	.162	.078	0.93	.359	.441	1	.417
Planner Sharing	1.33	.552	.536	.427	0.95	.430	.476	.417	1

Comparing between school location, study found leaders at urban school more active in using of mobile technology for online interaction with their subordinate, while no significant difference in function of file sharing, online meeting and planner sharing as shown in Table 2.

Table 2. E-Leadership practices on urban and rural area

Variables	Location	N	Mean	Sd	t	df	Sig.
Online Interaction	Urban	411	1.902	.533	2.945	1031	.003
	Rural	622	1.807	.489	2.893	824.069	.004
File Sharing	Urban	411	1.692	.468	1.221	1031	.222
	Rural	622	1.657	.437	1.204	835.851	.229
Online Meeting	Urban	411	1.086	.257	.468	1031	.640
	Rural	622	1.078	.254	.466	870.009	.641
Planner Sharing	Urban	411	1.329	.549	-.226	1031	.821
	Rural	622	1.337	.555	-.226	884.921	.821

The study also found leaders at secondary school more practices e-leadership in element of online interaction compare to leaders at primary school as shown in Table 3. Meanwhile, there is no significant difference on construct of file sharing, online meeting and planner sharing.

Table 3: E-Leadership practices across school level

Variables	School Level	N	Mean	Sd	t	df	Sig
Online Interaction	Primary School	579	1.8055	.49733	-2.859	1031	.004
	Secondary School	454	1.8965	.52087	-2.843	951.186	.005
File Sharing	Primary School	579	1.6836	.46520	1.005	1031	.315
	Secondary School	454	1.6553	.43025	1.015	1003.366	.311
Online Meeting	Primary School	579	1.0915	.27164	1.384	1031	.167
	Secondary School	454	1.0694	.23287	1.410	1022.805	.159
Planner Sharing	Primary School	579	1.3446	.55884	.663	1031	.508
	Secondary School	454	1.3216	.54499	.663	1031	.508

Went through gender factor, surprisingly the result found female leaders more active on using of mobile technology to communicate with their employee. This finding is contrary to the general belief that men are more obsessive using electronic gadgets than women. The result of e-leadership behaviors across gender factor was shown in Table 4 below.

Table 4: E-Leadership practices between male and female leaders

Variables	Sex	N	Mean	Sd	t	df	Sig
Online Interaction	Male	361	1.7873	.49455	-2.697	1031	.007
	Female	672	1.8767	.51511	-2.730	762.861	.006
File Sharing	Male	361	1.6570	.47057	-.744	1031	.457
	Female	672	1.6788	.43900	-.728	693.946	.467
Online Meeting	Male	361	1.0956	.27865	1.270	1031	.204
	Female	672	1.0744	.24195	1.217	653.172	.224
Planner Sharing	Male	361	1.3435	.55254	.385	1031	.701
	Female	672	1.3296	.55306	.385	737.222	.701

Referring to leader's position at school, the result indicated that there is significant difference on e-leadership practices across the position factor for all construct of e-leadership as shown in anova testing in Table 5.

Table 5. E-Leadership practices across leader position at school organization

Variables		Sum of Squares	df	Mean Square	F	Sig.
Online Interaction	Between Groups	6.553	4	1.638	6.443	.000
	Within Groups	261.413	1028	.254		
	Total	267.966	1032			
File Sharing	Between Groups	2.199	4	.550	2.731	.028
	Within Groups	206.946	1028	.201		
	Total	209.146	1032			
Online Meeting	Between Groups	.794	4	.198	3.065	.016
	Within Groups	66.544	1028	.065		
	Total	67.338	1032			
Planner Sharing	Between Groups	8.274	4	2.068	6.928	.000
	Within Groups	306.919	1028	.299		
	Total	315.193	1032			

Continue with post-hoc testing, the result found that leader in higher hierarchy in school organization behave more active on using of mobile technology to deliver their leadership needs, result was shown in Table 6.

Table 6. Comparison of e-leadership practices across leader's position

Dependent Variable	(I) Position	(J) Position	Mean Difference (I-J)	Std. Error	Sig.
Online Interaction	Principal	Headmaster/mister	.32130*	.07594	.000
		Senior Assistant	.31265*	.06818	.000
		Head Department	.21665*	.07668	.039
		Head Unit	.30562*	.06637	.000
File Sharing	Principal	Headmaster/mister	.17016	.06757	.087
		Senior Assistant	.18780*	.06066	.017
		Head Department	.20257*	.06823	.025
		Head Unit	.18021*	.05905	.020
Online Meeting	Principal	Headmaster/mister	.10934*	.03831	.036
		Senior Assistant	.11870*	.03440	.005
		Head Department	.09304	.03869	.115
		Head Unit	.09517*	.03349	.037
Planner Sharing	Principal	Headmaster/mister	.20942	.08228	.082
		Senior Assistant	.22789*	.07388	.018
		Head Department	.26095*	.08309	.015
		Head Unit	.34642*	.07192	.000
	Senior Assistant	Principal	-.22789*	.07388	.018
		Headmaster/mister	-.01847	.05759	.998
		Head Department	.03306	.05873	.980
		Head Unit	.11853*	.04145	.035

Checking on academic qualification factor, the study indicated differences in e-leadership practices across academic qualification of school leaders. However, the differences just appear on function of online interaction and no differ in others construct, as shown on Table 7.

Table 7. E-Leadership practices across academic qualification of school leaders

Variables		Sum of Squares	df	Mean Square	F	Sig.
Online Interaction	Between Groups	5.818	3	1.939	7.612	.000
	Within Groups	262.148	1029	.255		
	Total	267.966	1032			
File Sharing	Between Groups	1.436	3	.479	2.371	.069
	Within Groups	207.710	1029	.202		
	Total	209.146	1032			
Online Meeting	Between Groups	.112	3	.037	.571	.634
	Within Groups	67.226	1029	.065		
	Total	67.338	1032			
Planner Sharing	Between Groups	1.463	3	.488	1.599	.188
	Within Groups	313.731	1029	.305		
	Total	315.193	1032			

Once go through on post-hoc testing, the result found as generally the higher academic qualification the higher practicing e-leadership among school leaders, as shown in Table 8.

Table 8. E-leadership practices across academic qualification

Dependent Variable	(I) Academic Qualification	(J) Academic Qualification	Mean Difference (I-J)	Std. Error	Sig.
Online Interaction	Diploma	Bachelor	-.11747*	.03404	.003
		Master	-.23942*	.05883	.000
		Doctor of Philosophy	-.42260	.25379	.343
	Bachelor	Diploma	.11747*	.03404	.003
		Master	-.12195	.05636	.134
		Doctor of Philosophy	-.30513	.25323	.624
	Master	Diploma	.23942*	.05883	.000
		Bachelor	.12195	.05636	.134
		Doctor of Philosophy	-.18318	.25774	.893
	Doctor of Philosophy	Diploma	.42260	.25379	.343
		Bachelor	.30513	.25323	.624
		Master	.18318	.25774	.893

Referring to working experience factor, the result found a significant difference on e-leadership practices across period of services among school leaders, as proven in Table 9.

Table 9: E-Leadership practices by working experience

Variables		Sum of Squares	df	Mean Square	F	Sig.
Online Interaction	Between Groups	2.499	2	1.250	4.849	.008
	Within Groups	265.467	1030	.258		
	Total	267.966	1032			
File Sharing	Between Groups	3.987	2	1.993	10.008	.000
	Within Groups	205.159	1030	.199		
	Total	209.146	1032			
Online Meeting	Between Groups	.323	2	.162	2.484	.084
	Within Groups	67.015	1030	.065		
	Total	67.338	1032			
Planner Sharing	Between Groups	2.110	2	1.055	3.470	.031
	Within Groups	313.084	1030	.304		
	Total	315.193	1032			

While post-hoc testing got the younger the leader, more active in e-leadership practices especially in online interaction and file sharing. However, result found contradict pattern in construct of planner sharing, where senior leaders more active compare to juniors. The result was shown in Table 10.

Table 10. E-Leadership practices across working experience

Dependent Variable	(I) Working Experience	(J) Working Experience	Mean Difference (I-J)	Std. Error	Sig.
Online Interaction	10 years and below	11-20 years	.11160	.0479	.052
		21 years and above	.13364*	.0431	.006
	11-20 years	10 years and below	-.11160	.0479	.052

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		21 years and above	.02204	.0368	.821
	21 years and above	10 years and below	-.13364*	.0431	.006
		11-20 years	-.02204	.0368	.821
File Sharing	10 years and below	11-20 years	.13464*	.0421	.004
		21 years and above	.16941*	.0379	.000
	11-20 years	10 years and below	-.13464*	.0421	.004
		21 years and above	.03477	.0323	.530
	21 years and above	10 years and below	-.16941*	.0379	.000
		11-20 years	-.03477	.0323	.530
Planner Sharing	10 years and below	11-20 years	-.10288	.0520	.118
		21 years and above	-.12272*	.0468	.024
	11-20 years	10 years and below	.10288	.0520	.118
		21 years and above	-.01984	.0399	.873
	21 years and above	10 years and below	.12272*	.0468	.024
		11-20 years	.01984	.0399	.873

Relating to teaching area, result found there is no significant different on e-leadership practices across area of linguistic, humanistic, sciences and mathematics, and vocational and technology among school leaders, as shown in Table 11.

Table 11. E-Leadership practices across teaching area

Variables		Sum of Squares	df	Mean Square	F	Sig.
Online Interaction	Between Groups	1.100	3	.367	1.413	.238
	Within Groups	265.463	1023	.259		
	Total	266.563	1026			
File Sharing	Between Groups	.399	3	.133	.655	.580
	Within Groups	207.976	1023	.203		
	Total	208.376	1026			
Online Meeting	Between Groups	.184	3	.061	.934	.424
	Within Groups	67.114	1023	.066		
	Total	67.297	1026			
Planner Sharing	Between Groups	.216	3	.072	.234	.873
	Within Groups	314.059	1023	.307		
	Total	314.275	1026			

V. CONCLUSION & RECOMMENDATION

The main purpose of this study is to profile e-leadership practices using mobile technology among school leaders in Malaysia. The result was successful elaborates how school leaders in Malaysia practicing their leadership functions using smartphones, tablets and any mobile gadgets. Mostly of school leaders were applied mobile technology for online interaction, file sharing, online meeting and planner sharing with their subordinates, but still in moderate level. There still needs a lot of initiatives by several responsible parties to encourage school leaders to apply e-leadership on their organizations. The results also concludes that school leaders in urban area more practicing online interaction with their subordinates compare to school leaders in rural area. This results maybe effects by problem of internet coverage at rural, the issues that never solve till now. Therefore, government should concern more serious for the matter. In order to decrease education gap between urban and rural area, coverage problem of internet must be settle soon, especially to increase education access for pupils in rural.

The study also found educational leaders at secondary school more practicing e-leadership compare to leaders at primary school. This finding maybe related to academic qualification factor, which generally leaders at secondary school hold higher education level compare to primary school. To break the gap, the superior parties could deliver effective training to leaders at primary school, especially in part of using ICT hardware and software that suitable to apply in leadership practices. Somewhat surprising, female leaders more active in online interaction with their employee compare to male leaders, while the marketing data shown no significant different in owning ICT gadgets across the gender. This issue is need more study to explore significant reasons why male leaders were less apply mobile technology to interact with their subordinates, especially to deliver their leadership functions.

The study also found that principals practiced e-leadership at higher level compared to headmasters/misters, senior assistants, head departments and head units. This result results were related to training program that gains by principals compare to others. Therefore, school principals are urging to run in-house training especially to their intermediate leaders at school to practice leadership base on using of mobile gadgets.

Another surprising result, this study found a less experience leaders more practices e-leadership especially in online interaction compare to leaders who longer service as school leaders. It is about the younger generation were expose more to ICT technology compare to elders, that why they are more comfort in using technology in daily works. Hence, school leader needs to take benefit from the youngers to deliver in-house training in school in order to increase ICT knowledge especially among the senior stuff.

Generally, this study found it was possible for school leaders to practice e-leadership by mobile technology. Organizational leaders still can fullfil their role as leaders despite at dynamic places and times from their subordinates. The result was similar to the previous scholars (Purvanova & Bono, 2009; Avolio & Kahai, 2002;2003, Avolio et al., 2001; DeSanctis & Poole, 1994) who suggested virtual leadership can be practiced by leaders with communication technology applied, especially mobile technology. Even in virtual mode, the leadership behavior is still contributing to the effectiveness of communication within the organization and their job performance.

In conclusion, the school leaders proposed to fully utilize mobile technology to practice their leadership functions. By those technology, a leader can be work at any places and any times. They can give the order, information and sharing with the members within organization.

It also can increase the effectiveness of intra-team communication and contribute to the organizational performance.

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