
INVESTIGATION ON THE EFFECTS OF ICT-BASED TRAINING ON MALAYSIAN PRIMARY SCHOOL DEPUTIES

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ABSTRACT

With the implementation of the national Information, Technology and Communication (ICT) policy in schools, the role of school leaders is considered as significant through their effective role as technological leaders. As catalyst for ICT implementations, school leaders should acquire additional ICT skills and also understand their role in the implementation of ICT policy within the school leadership context. Thus, this study was conducted to investigate the ICT-based training received by public primary school deputies. Respondents consist of 159 deputies from 72 primary schools to provide their feedbacks related to their ICT-based training received. Findings revealed that primary school deputies had received an adequate ICT-based training in improving their role as ICT catalyst and as a technological leader. Inferentially, there are significance differences in terms of primary school deputies' gender as far as the element of ICT usage and internal training on ICT are concerned. As for years of experience among primary deputies, there are significance differences in terms of five clusters of years of experience among primary school deputies.

Key Words: ICT training-received, primary schools, deputy principals

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1. INTRODUCTION

ICT has various purposes in determining the school's development and improvement processes which include the support of teaching and learning, and for the school management and administration purpose for example system connectivity and data storage. [1]. Since 2013, the Malaysian Ministry of Education (MOE) has articulated and implemented several pertinent functions of ICT in the school context such as; (a) internet accessibility for students' usage within the technological borderless community, (b) classroom's teaching and learning as an independent subject or adoption within other subjects; (c) enhancing the efficiency and effectiveness of school's management and administration [2, 3]. Through this empowered approach, teachers and school administrators have much widespread access to the process of

learning with the assistance of ICT and also enhancing their practices. In the same year, the Educational Technology Division, Ministry of Education launched the School Management System (SMS) [16, 17] to create a centralized management system that accomplished various management tasks. The resourceful and integrated system of SMS was introduced to store all students and teachers' personnel data [13] for better usage of school's resources and reducing teachers' workloads [14].

As emphasized by previous researchers on ICT and school leadership, the role of school leaders in ensuring the successful implementation of ICT in school is considered as vital through their role in technological leadership [4, 5, 6]. Through their roles in technological leadership, school leaders i.e. school principal and their middle layer leaders (the school's deputy head and the head of the subject) should have at least understand the role of ICT in school leadership context as catalyst for the school ICT implementation [7]. At the same time, school leaders should have acquired some knowledge related to ICT which significantly essential to support the employment of ICT in schools [23, 24]. Therefore, school leaders played their significant roles as technological leaders based on two roles; (a) structural – ICT is employed as a storing or distributing system or database as within the school's management routines. (b) Instructional – ICT is employed to support students' learning and teaching such as through multimedia, videos, animations and other related teaching and learning [3].

1.1. Research Aims

School deputies are indeed holding the second leadership posts within the school's hierarchy and played an important role in the school's daily operation. These deputies' role to execute strategies and programs in promoting the schools' visions and objectives are apparently important. [10, 11] while reducing the administrative workload of the school principals [12]. Hence, the level of ICT belief, knowledge and their training received among school deputies are considered as dearth since most of studies that examined the school leaders' level of ICT competence and lack of studies that measured on the ICT-based training received by the school deputies. Based on the statement of problem, this study was designed to address and answer the relevant research questions below:

- Do primary deputies receive an adequate training related to ICT?
- Is there any significance difference among primary school deputies in terms of their demographics (gender and years of experience)?

2. LITERATURE REVIEW

Apparently there is still lack of studies related to school deputies' level of ICT and their knowledge competencies related to ICT even though most studies highlighted on the essential role of school leaders in supporting and providing ICT at schools. In this sense, school leaders are individuals that determine the successful or failure of ICT implementation at school [6, 22, 23]. Therefore, in discussing on the linkage between ICT and school's deputies, previous studies on ICT and school leadership or school administrators are being discussed in this section.

Empirically, in Taiwanese schools, Weng and Tang (2014) [5] conducted a study on the school leaders' technological leadership practice, their awareness and the implementation of technological leadership within the context of school administration. A total of 323 school leaders from 82 Taiwanese primary schools were selected to provide their feedbacks. Findings revealed that the school leaders in Taiwanese schools were practicing their technological leadership strategies and applied their effective practice within their school administration routines. In Oman, Al-Harhi (2016) [4] investigated the technological self-efficacy of 67 school leaders who currently at their leadership positions while attending a leadership

preparation program at Sultan Qaboos University in Oman. The findings revealed that most school leaders that attended the leadership preparation program had a high level of technological self-efficacy which also significantly related with their demographic variables. In Norwegian schools, Ottestad (2013) [21] concludes that it was the school's culture which was created by the school leaders that enhance the ICT implementation such as developing and disseminating knowledge on teachers' instructional practice through ICT devices which later nurture teachers' competencies on ICT. The study was based on perceptions of 247 school leaders and 386 teachers from Norwegian primary and secondary schools. In Italy, Polizzi (2011) [22] investigates on the role of school leaders in ICT's integration at schools based on their attributes and roles as supporter and facilitator for ICT integration. Data was collected at 116 public schools in Palermo, Italy with perceptions of 95 principals. Results indicated that two major variables and levels effect the examining principals' supporting efforts for ICT integration; the contextual and individual. In the contextual level, teachers were supported with required ICT facilities to enhance their competencies and positive attitudes. In the individual context, principals reveal on their exposure into ICT-training which later influenced their ICT beliefs and competencies.

Earlier, Brockmeier et al (2005) [19] conducted a study that explored school leaders' ICT competencies and their usage of ICT, their professional development and whether they are prepared to integrate ICT within school's instructional and management tasks. Based on the findings, school leaders admitted that they need more professional development or training related to ICT due to factor such as unwillingness to make any decision related to ICT. In Turkish schools, Banoglu (2011) [20] investigated primary and secondary school leaders' ICT competence and their role as technological leadership. Based on the results, school leaders were perceived adequate for technological leadership at school while the leadership and vision has the lowest mean score value. Additionally, female school leaders perceived themselves with higher mean scores compared to their male school leaders in terms of their role as technological leaders. In Malaysian schools, Leong, Chua, Kannan and Maulod (2016) [16] investigated the school leaders' technology leadership practices and its relationship with teacher acceptance in secondary schools through teachers' feedbacks. Based on the responses of 417 teachers, majority of secondary teachers perceived highly on their school leaders' technological leadership practice and have a strong influenced on teachers' acceptance and the use of School Management System at their school's context. In supporting on the above finding, in 2015, Arokiasamy, Abdullah, and Ismail [17]'s study indicated that secondary school leaders have a moderate level of competency in computer applications based on the feedbacks of 520 secondary school leaders and they admitted that they spent a few times in a week working with their ICT devices for their instructional, information searching and administrative reasons. From Bruneian schools, Seyal [23] reveals that school leaders in Brunei responded that they required sound professional development on ICT which benefited their roles based on their multi-purpose routines such as for data analyses and for their administrative work purpose. The suggestion forwarded since 37 per cent of school leaders in Brunei admitted that they are not receiving professional development or training for ICT integration across curriculum into their teaching subjects.

3. METHODOLOGY

Instrumentation: In measuring the ICT-based training received by the primary deputies, eight items of open ended questions were used in this study. All items in this study are in Malay language since most of the primary deputies have a strong command and underwent their educational qualifications using the Malay language. Item were adopted from various studies that examined ICT-based training received among other professions such as a study by Abuhmaid (2011) [18]. Before items being administered, a few experts in ICT made their

validations towards the items and a few items were discarded from the questionnaire. Therefore, the latest version of the questionnaire was consisted into two major parts: (a) the background and demographics of the primary school deputies are listed in Section A consists of three (3) items on their gender, years of teaching experience and their age; (b) in section B, 7 items were developed to measure the ICT-based received training among primary deputies. All items are based on a five-point Likert scale: 1- represents Strongly Disagree, 2 - represents neither Disagree, 3-represents neither Agree nor Disagree, 4- represents Agree, and 5- represents Strongly Agree. All items underwent some major adjustments in ensuring the accuracy towards the objectives of the study. As for the pilot study purpose, 10 primary school deputies from districts were asked to provide their feedbacks on the relevancy of the items and measuring item's reliability and consistency. Through the responses from 10 primary deputies who were excluded in this study, the reliability value was tested and indicated at 0.919 values which was considered as accepted value and items were have a strong consistency.

Data collection and analysis: In the data collection phase, all primary school deputies were asked to provide their responses to all items in the questionnaire through the online survey mode. All surveys were e-mailed to all participated primary deputies and followed with a reminder to answer the online survey. All collected data were analysed and presented using descriptive statistics such as mean scores and standard deviations. Furthermore, in answering research question 3, inferential bivariate statistics were also employed such as the *t*-test and the Analysis of Variance (ANOVA) in determining the significance differences based on primary deputies' gender and their age towards their ICT-based training-received.

4. FINDINGS

4.1. Primary Deputies' Demographics

A total of 159 primary deputies from 72 primary schools were randomly selected in examining their ICT-based training received to enhance primary deputies' competencies in ICT. From a total of 159 deputies, 86 (54.1 %) were male primary deputies and another 73 (45.9%) were female primary deputies based on their gender category. In terms of their age, 9 (5.7 %) primary deputies were between 31 to 35 years followed 21 (13.2 %) primary deputies which aged between 36 to 40 years old. In addition, 33 (20.8 %) primary deputies were ranged between 41 to 45 and 96 (60.4%) primary deputies were more than 46 years old and represented the highest percentage of primary deputies that participated in this study. In terms of their teaching experiences, 3 deputies (1.9 %) were between 6 to 10 years of experience followed by 63 deputies (39.6 %) who have 11 to 15 years of experience. A total of 79 deputies (49.7 %) have teaching experiences between 16 to 20 years followed by 10 deputies (6.3%) have 21 to 35 years of experience and lastly only 4 deputies (2.5 %) have experiences more than 35 years in the teaching profession.

4.2. Descriptive Statistics

In this study, primary deputies' ICT-based training received was the element that being examined. Table 1 below illustrates feedbacks provided by the primary deputies related to their ICT-based training based on the 7 items studied. Based on primary deputies' feedbacks through the high mean score ($M = 4.31$; $SD = 0.60$), it is assumed that primary deputies had obtained an adequate training on ICT-based that assisted them as a school administrator. Through the mean scores of all seven items, primary deputies believed that the external ICT-based training that they received are much related to their school management task ($M = 4.41$; $SD = 0.49$) and improve their knowledge on ICT ($M = 4.41$; $SD = 0.49$). Through the ICT-based training that primary deputies received regarding on how to use ICT and its applications, primary deputies responded that they had satisfactory training on how to use ICT at school ($M = 4.30$; $SD = 0.66$)

and received suitable training on ICT application ($M = 4.28$; $SD = 0.68$). Lastly, primary deputies also responded that they received 'in-house' training which much related to the school management tasks ($M = 4.26$; $SD = 0.70$). Even though primary deputies had a positive remark on the ICT-based training that they received, surprisingly, primary deputies indicated that the ICT-based training that they received failed to provide deputies with new knowledge and skills related to ICT ($M = 4.19$; $SD = 0.76$). Therefore, they requested on new and current knowledge on ICT.

Table 2 ICT-based Training Received

	Items	SD %	D %	NS %	A %	SA %	Mean Score	SD
1	Training on how to use ICT devices.	-	-	11.3	47.8	40.8	4.30	0.66
2	Training on ICT application	-	-	13.2	45.9	40.9	4.28	0.68
3	'in-house' ICT training related to school management tasks	-	-	15.1	44.0	40.9	4.26	0.70
4	External ICT training related to school management task	-	-	-	59.1	40.9	4.41	0.49
5	Internal training improve my ICT knowledge	-	-	-	59.1	40.9	4.41	0.49
6	External training improve my ICT knowledge	-	-	-	62.9	37.1	4.37	0.48
7	Enhance my new ICT knowledge and skills.	-	-	20.8	39.6	39.6	4.19	0.76
	*N= 159 * SD = Standard deviation			Overall Mean Scores			4.31	0.60

* SD = strongly disagree, D= Disagree, NS = Not sure, A = Agree, SA = strongly agree.

Based on primary deputies' feedbacks through the overall mean score which indicated on high mean score ($M = 4.31$; $SD = 0.60$), it is concluded that primary deputies believed that they had received an adequate and relevant training which to them are meaningful and beneficial towards their roles as technological leader who supposed to support ICT implementation and usage at their school context.

4.3. Inferential Statistics

In measuring primary deputies' differences based on their demographics, two differentiation tests were employed to ensure whether there are any significance differences based on primary deputies' gender, age and their years of experiences in teaching profession. In measuring primary deputies' differentiation based on their gender, an independent *t*-test was conducted to diagnose the differentiation values in terms of ICT-based training received. Table 3 below illustrates on the results of an independent *t*-test based on primary deputies' gender.

Table 3 ICT-based Training Received Based on Deputies' Gender

	Items	Male (n= 86)	Female (n = 73)	<i>t</i>	<i>p</i>
1	Training on how to use ICT devices.	4.18	4.42	2.298	0.023*
2	Training on ICT application	4.10	4.47	3.653	0.000*
3	'in-house' ICT training related to school management tasks	4.13	4.39	2.331	0.021*
4	External ICT training related to school management task	4.37	4.45	1.019	0.310
5	Internal training improve my ICT knowledge	4.32	4.50	2.342	0.020*
6	External training improve my ICT knowledge	4.32	4.42	1.287	0.200
7	Enhance my new ICT knowledge and skills.	4.02	4.38	3.073	0.002*

$p < 0.05$; $N = 159$.

Based on primary deputies' feedbacks, female primary deputies had positive perceptions on the ICT-based training that they received compared to their male primary deputies with much higher values on mean scores in all seven items measured. Based on the *t*- values, five items indicated significant difference values that showed differences in terms of perceptions between male primary deputies with female primary deputies (Use ICT devices: $t = 2.298$, $p = 0.023$; ICT application: $t = 3.653$, $p = 0.00$; in-house' ICT training to school management: $t = 2.331$, $p = 0.021$; Internal training improve knowledge: $t = 2.342$, $p = 0.020$; Enhance my new ICT knowledge: $t = 3.073$, $p = 0.002$). However, two items revealed the non-significant difference based on primary deputies' gender (External ICT training to school management: $t = 1.019$, $p = 0.310$; external improve my ICT knowledge: $t = 1.287$, $p = 0.200$). Based on level of mean scores, male primary deputies believed that training on ICT application ($M = 4.10$, $F = 4.47$) and ICT-based training received enhance their new knowledge and skills ($M = 4.02$; $F = 4.38$) had least implication on deputies' knowledge on ICT- based training received compared to female primary deputies.

In examining primary deputies' years of experience in teaching profession, the Analysis of Variance (ANOVA) test was conducted in determine which cluster from various types of teaching experiences have significant difference based on the seven items studied.

Table 4 ICT-based Training Received Based on Deputies' Years of Experience

Items		6-10 (n= 3)	11-15 (n = 63)	16-20 (n-79)	21-35 (n=10)	>35 (n=4)	<i>F</i>	<i>p</i>
1	Training on how to use ICT devices.	3.00	3.80	4.68	4.60	4.50	34.99	0.000*
2	Training on ICT application	4.00	3.71	4.68	4.60	4.50	5.683	0.018*
3	'in-house' ICT training related to school management tasks	3.00	3.70	4.68	4.60	4.50	24.12	0.000*
4	External ICT training related to school management task	4.00	4.14	4.68	4.00	4.50	18.837	0.000*
5	Internal training improve my ICT knowledge	4.00	4.04	4.68	4.60	4.50	24.87	0.000*
6	External training improve my ICT knowledge	4.00	4.04	4.68	4.00	4.50	29.70	0.000*
7	Enhance my new ICT knowledge and skills.	3.00	3.80	4.39	5.00	5.00	15.38	0.000*

$p < 0.05$; $N = 159$.

Further, primary deputies' years of experience were inferentially inspected using the ANOVA tests. The findings from Table 4 show results indicate that primary deputies' years of experiences have significant differences based on their ICT-based training received in all seven items studied. Based on the *F*-values, all seven items indicated significant difference values that showed differences in their teaching profession (1. Use ICT devices: ($F(df = 4) = 34.99$, $p = 0.000$); 2. ICT application: ($F(df = 4) = 5.683$, $p = 0.018$); 3. in-house' ICT training to school management: ($F(df = 3) = 24.12$, $p = 0.000$); 5. Internal training improves knowledge: ($F(df = 4) = 18.83$, $p = 0.000$); 7. Enhance my new ICT knowledge: ($F(df = 4) = 24.87$, $p = 0.000$); 4. External ICT training to school management: ($F(df = 4) = 34.99$, $p = 0.000$); 6. External improve my ICT knowledge: ($F(df = 4) = 29.70$, $p = 0.000$). Therefore, it is hypothetically believed that there are significance differences based on primary deputies' ICT-based training received. Based on results on Table 4, primary deputies who have years of experience in teaching profession between 16 to 20 years have higher and positive perceptions on the six items studied except for item 7 followed by primary deputies who have years of experience between 21 to 35 years. On the contrary, primary deputies who had years of experience between 6 to 10 years had least mean scores in all seven items compared to other four clusters on primary deputies. The least perceptions based on mean scores provided by primary deputies

between 6 to 10 years because most of them are young deputies and were exposed to the ICT software and applications compared to more senior primary deputies within other four clusters.

As an extension in measuring primary deputies' ICT-based training received, we extended our analyses using the Scheffe's *Post Hoc* tests to identify and compare groups which had significance differences.

Table 5 The Scheffe's Post Hoc based on primary deputies' years of experience

Variables	Primary deputies' years of experience		Mean Difference	Sig
1. Use ICT devices.	6 to 10 years	11 to 15 years	0.809	0.09
		16 to 20 years	1.683	0.00*
		21 to 35 years	1.600	0.00*
		35 years and above	1.500	0.00*
3.in-house' ICT training to school management tasks	6 to 10 years	11 to 15 years	0.714	0.22
		16 to 20 years	1.683	0.00*
		21 to 35 years	1.600	0.00*
		35 years and above	1.500	0.00*
6.External training improve my ICT knowledge	6 to 10 years	11 to 15 years	0.047	1.00
		16 to 20 years	0.683	0.04*
		21 to 35 years	0.000	1.00
		35 years and above	0.500	0.53
7. Enhance my new ICT knowledge and skills.	6 to 10 years	11 to 15 years	0.809	0.35
		16 to 20 years	1.392	0.01*
		21 to 35 years	2.000	0.00*
		35 years and above	2.000	0.00*

$p < 0.05$; N = 159.

Based on Table 5, significant differences were indicated in a few items that measured on the ICT-based training received which were item 1, item 3, item 6 and item 7. Another three items which were item 2, item 4, and item 5, there are no-significance difference measured in all three items studied. In item 1 which measure on the 'usage of ICT devices' based on primary deputies' years of experience between primary deputies who had 6 to years of experience with the 16 to 20 (MD = 1.683; Sig = 0.00), 21 to 35 (MD = 1.600; Sig = 0.00) and those more than 35 years (MD = 1.500; Sig = 0.00). As for the second item which measured primary deputies' ICT application, there is no-significant difference in all five clusters. In measuring item 3 which related to statement on 'in-house' ICT training to school management tasks', there are significance difference between primary deputies who had 6 to years of experience with the 16 to 20 (MD = 1.683; Sig = 0.00), 21 to 35 (MD = 1.600; Sig = 0.00) and those more than 35 years (MD = 1.500; Sig = 0.00). As for item 6 which measured on 'external training improves my ICT knowledge', significance difference was indicated between primary deputies who had 6 to years of experience with the 16 to 20 (MD = 0.683; Sig = 0.04). Lastly, for item 7 'enhance my new ICT knowledge and skills', significance differences were indicated between primary deputies who had 6 to years of experience with the 16 to 20 (MD = 1.392; Sig = 0.01), 21 to 35 years (MD = 2.00; Sig = 0.00) and 35 years and above (MD = 2.00; Sig = 0.00).

5. DISCUSSION

This study provides new in-sights related to primary deputies' ICT-based training received while performing their role as ICT supporter within the technological leadership framework. In general, based on the findings, we assumed that primary deputies had received a satisfactory training in ICT which later enhance their school's management and leadership tasks and routines. Thus, through the study, primary deputies indicated that they had received ICT-based training through the internal and external courses on ICT organised to enhance primary deputies' level of knowledge and skills in ICT. In fact, through the courses, primary deputies

highlighted that they were taught by various ICT experts on how to use the ICT devices and to employ their application. Based on the findings, primary deputies positively admitted that most of the ICT courses that received by primary deputies are relevance and beneficial within primary deputies' duties to enhance their school's management and leadership tasks. In addition, primary deputies also mentioned that through the ICT-based training, their knowledge related to ICT is highly improved through internal and external courses on ICT. Nevertheless, primary deputies also mentioned some of the ICT courses didn't provide them with new knowledge and skills on ICT.

Statistically, results from the descriptive findings indicate that female primary deputies have higher level of perception on the ICT-based training that they received compared to their male colleagues. Female primary deputies scored higher in all seven items that studied compared to the male primary senior assistants which indicated slightly lower mean scores in all seven item on ICT-based training that primary deputies received. In measuring their significant differences, five items on the ICT-based training received had significance differences based on primary deputies' gender except for two items which relates to external training on ICT knowledge which indicates no significance difference in terms of ICT-based training received based on primary deputies' gender. In terms of significance differences based on primary deputies' years of experience, all seven items indicated significance differences which shown some significance differences based on five clusters on primary deputies' years of experience. In addition, the Scheffe's *Post Hoc* analyses revealed that there are significance differences in terms of primary deputies use of ICT devices, in-house' ICT training related to school management tasks and whether ICT enhance my new ICT knowledge and skills. Based on the *Post Hoc* analyses, it is indicated that the wide differences are between primary deputies that ranging at the 16 to 25 years of experience with four senior groups of primary deputies.

6. CONCLUSIONS

To conclude, this study provides much better implications towards the initiative of enhancing training and professional development among primary deputies related to their level of knowledge and training received on ICT. In order to provide much roles to school leader as technological leaders, their training and professional development should be enhanced to prepare them to be an ICT savvy leader who are highly responsible to implement the effective use of ICT at school. Admittedly, this study has several limitations need to be acknowledged. First, findings of this study were based on the perceptions, comments and reflections of 159 participating primary deputies. Therefore, generalisation to all primary deputies in Malaysia is not possible. Second, this study was conducted based on items from a survey that all primary school leaders were required to make in response to the questions posed. Lack of face-to-face interaction has resulted in some participating primary deputies to not respond, leaving the questions unanswered. For future study, research should employ qualitative interviews in order to obtain a more in-depth perception of primary deputies on the sufficiency of ICT skills, beliefs and knowledge. Qualitative interviews could in fact generate clearer perceptions, standpoints and also evoke emotional feelings, thereby generating a richer set of data.

REFERENCES

- [1] Ghavifekr, S., Afshari, M., Siraj, S., and Seger, K. ICT Application for Administration and Management: A Conceptual Review. *Procedia – Social and Behavioral Sciences*, 103, 2013, pp. 1344 – 1351.
- [2] Zakaria, A. Quality Education: Recent Issues and Challenges. Paper presented at Seminar on Quality Education, 29 – 30 November 2004, Institute Aminuddin Baki, Genting Highlands.

- [3] Ku Ahmad, R. K. Managing the Use of ICT at Schools: Strategies for School Leaders. *Educational Administration and Management Journal*, 2012, pp 1 – 9.
- [4] Al-Harathi, A.S.A (2017). Technological Self-Efficacy among School Leaders in Oman: A Preliminary Study, *Journal of Further and Higher Education*, 41 (6), 2017, pp. 760 – 772.
- [5] Weng, C.H., & Tang, Y. The Relationship between Technology Leadership Strategies and Effectiveness of School Administration: An Empirical Study. *Computers & Education*, 76, 2014, pp. 91 – 107.
- [6] Stuart, L.H., Mills, M.A., and Remus, U. School Leaders, ICT Competence and Championing Innovations. *Computers & Education*, 53, 2009, pp. 733 – 741.
- [7] Slowinski, J. Becoming a Technologically Savvy Administrator. *Teacher Librarian*, 30(5), 2003, pp. 25–29.
- [8] Cheng, K.L. Occupational Stress as Perceived by Assistant Principals in Hong Kong Aided Secondary Schools. Dissertation of Master Degree of Education, the University of Hong Kong. 1993.
- [9] Brotschul, B.B. A Qualitative Examination of Factors Influencing Assistant Principal Motivation to Pursue Principalship in An Era of Eccountability. Unpublished EdD Dissertation, College of Education and Human Sciences, Seton Hall University. 2013.
- [10] Harvey, M. Empowering the Primary School Deputy Principal. *Education Management and Administration*, 22(1), 1994, pp. 26–38.
- [11] Haslina, H., Bahbib, R., and Norhisham, M. N. Towards School Management System (SMS) Success in Teacher's Perception. *Malaysian Online Journal of Educational Technology*, 2(4), 2014, pp. 50-60.
- [12] Madiha Shah. Impact of Management Information Systems (MIS) on School Administration: What the Literature Says. *Procedia - Social and Behavioral Sciences*, 116, 2014, pp. 2799-2804.
- [13] Rossafri, M., and Balakrishnan, M. Translating Technology Leadership to Create Excellent Instructional Leadership. *Educational Leadership and Management Journal*, 17(2), 2007, pp. 91-103.
- [14] Leong, M.W., Chua, Y.P., Kannan, S., and Maulod, S. Principal Technology Leadership Practices and Teacher Acceptance of School Management System (SMS). *The Educational Leader*, 4, 2016, pp. 89 – 103.
- [15] Arokiasamy, A.A.A., Abdullah, A.G.K., and Ismail, A. Correlation between Cultural Perceptions, Leadership Style and ICT Usage by School Principals in Malaysia. *Procedia - Social and Behavioral Sciences*, 176, 2015, pp. 319 – 332.
- [16] Abumaid, A. ICT Training Courses for Teachers' Professional Development in Jordan. *The Turkish Online Journal of Educational Technology*, 10(4), 2011, pp. 195 – 210.
- [17] Brockmeier, L. L., Sermon, J. M., and Hope, W. C. Principal's Relationship with Computer Technology. *National Association of Secondary School Principals Bulletin*, 89, 2005, pp. 45–63.
- [18] Banoglu, K. School Principals' Technology Leadership Competency and Technology Coordinatorship. *Educational Science: Theory and Practice*, 11(1), 2011, pp. 208 – 213.
- [19] Ottestad, G. School Leadership for ICT and Teachers' Use of Digital. *Nordic Journal of Digital Literacy*, 8, 2013, pp. 107 – 125.
- [20] Polizzi, G. Measuring School Principals' Support for ICT Integration in Palermo, Italy. *Journal of Media Literacy Education* 3:2, 2011, pp. 113 – 122.
- [21] Seyal, A.H. Preliminary Study of School Administrators' Use of Information and Communication Technologies: Bruneian Perspective. *International Journal of Education and Development using Information and Communication Technology*, 8(1), 2012, pp. 29-45.