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Headmaster Technology Leadership and Its Relationship to Teachers' Competence in Information and Communication Technology

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Abstract

Headmaster technology leadership is important in information and communication technology management as it encourages teachers to integrate technology into teaching and learning. Headmaster who can influence teachers of using technology are able to improve the efficiency of teachers in utilizing technology in teaching and learning. However, there is a constraint to integrating information and communication technology, which is the aspect of teacher competence in using technology. The role played by the headmaster in encouraging the use of technology among teachers can realize the government's desire towards digital education. This study shows the importance of technology-minded headmaster in producing teachers who are competent in the use of technology. Therefore, this study aims to examine the level of technology leadership of the headmaster and its relationship with teacher competence in information and communication technology. Quantitative research is used in this study. Survey data was collected from 272 teachers through a simple random sampling method in one state of West Malaysia using Google Forms. Data were analyzed using SPSS version 26. The results showed a high level of technology leadership practice (mean = 4.18, s.p. = 0.527). Similarly, the findings for the level of teacher competence in information and communication technology (mean = 4.26, s.p. = 0.456). Inferential analysis through the Pearson correlation test showed a significant positive relationship between the technology leadership of headmasters with the level of teacher competence in technology ($r = 0.415$, $p < 0.01$). It could be suggested that the higher the technology leadership practiced by the headmaster, the higher the level of teacher competence in using technology and vice versa. This study can provide valuable information for policymakers to strengthen leadership training for school leaders and promote effective educational technology integration programs for teachers. In addition, qualitative research approach can be suggested for further study to get more in-depth perspective on the issues.

Keywords: Education, Headmaster, Technology Leadership, Teacher, Competence.

Introduction

To ensure the quality of national education, the Ministry of Education Malaysia (MOE) has planned the Malaysian Education Development Plan (MEDP) initiative for 2013-2025. In

realizing this aspiration, the fifth shift contained in the MEDP is implemented to ensure that all schools in Malaysia have headmasters who have high performance and can improve school progress (Ministry of Education Malaysia, 2013). The rapid educational transformation demands many reforms and leadership competencies of the headmaster to enhance the professionalism and management of technology-driven schools. The headmaster technology leadership must be integrated with the competence of teachers in sustaining the use and culture of ICT. Thus, the role of the headmaster as a technology leader is enormous in mastering current technological developments not only for personal use but also as key drivers in the technology ecosystem that promotes conducive ICT culture (Apsorn et al., 2019). Technology-minded headmaster systematically owns a strong influence on the quality of ICT culture. The Educational Resources and Technology Division (BSTP) in MOE introduced Smart School Qualification Standards (SSQS) in 2007 to rate school performance by measuring the status of schools in terms of culture and integration of ICT in education (Bahagian Teknologi Pendidikan, 2016). The filling of the SSQS instrument, which is implemented once a year, involves the principal and headmaster, library teacher, ICT coordinator, and several teachers and pupils related to the use and cultivation of ICT. To support the school improvement initiatives implemented by the MOE, the headmaster plays an essential role in ensuring the effective cultivation and use of ICT in developing an educational organization. In addition, the competence of teachers in ICT is crucial in enabling the use of ICT in education to improve the quality of the teaching and learning process in line with the development of the digital era in recent times. ICT can improve the quality of organizations' systematic administrative and management systems (Unal and Karatas 2015; Arumugam and Shariff 2018).

However, teachers were found to lack the knowledge and skills of technology, hindering ICT's successful implementation. A handful of teachers refuse to accept change and state that ICT is very burdensome for them (Sanchez-Prieto et al., 2019). Studies indicate that headmaster technology leadership practices significantly impact teachers' ICT competencies. The headmaster who does not encourage and motivate teachers to use ICT lead to a low level of cultivation of the instructional culture of ICT. Headmasters who consistently practice technology leadership can set an example for teachers to participate in improving the culture of ICT in schools and the impact of practice together. The technology leadership of the headmaster and its relationship with teacher competence in ICT has been emphasized less in previous studies. Although some researchers have paid attention to technological leadership, it only focuses on the scope of principals at the secondary school level (Norhayati and Aida Hanim 2018; Arumugam and Shariff, 2018; Mohamad et al., 2019; Omar et al., 2019; Azam and Nor, 2021). In addition, previous studies also discuss the relationship of technology leadership with other aspects of variables (Juraime and Hamzah, 2017; Subramaniam and Hamzah, 2020; Tiop and Talip, 2020).

Therefore, this study aims to investigate the headmaster's technology leadership level using five dimensions of ISTE-Standards for Education Leaders (ISTE, 2018). The five dimensions consist of (1) Equity and citizenship advocate, (2) Visionary planner, (3) Empowering leader, (4) Systems designer, and (5) Connected learner. In addition, this study was also conducted to identify the level of teacher competence in the use of ICT. This study also examines the differences in the level of teacher competence in using ICT based on teaching experience and the relationship between technology leadership and the level of teacher ICT competence.

Problem Statement

The Ministry of Education Malaysia has spent more than RM6 billion on initiatives to develop ICT in education to strengthen school development (Ministry of Education Malaysia, 2013). The ministry also has provided interim Internet services in 10,203 schools according to the technology and suitability of Internet access infrastructure at the school's location (Ministry of Education Malaysia, 2020). In addition, the Digital Educational Learning Initiative Malaysia (DELIMa) learning platform was launched in June 2020 as a one-stop platform for all educational needs to cultivate the ICT environment in education. Therefore, the commitment of the headmaster as a technology leader who practices technology leadership style and teachers as competent technology implementer is essential. However, the cultivation and integration of ICT in educational institutions are at a low level (Azli et al., 2019). It is influenced by the pattern of leadership practiced, which indirectly impacts the competence of teachers in cultivating ICT. According to Esplin et al (2018), some headmasters are not yet ready to enhance ICT competencies in administering schools. The inability of headmasters to integrate ICT into school management symbolizes weak technological leadership practices. The report on school smartness rating by the ministry through SSQS found that 15 schools in Perak achieved two stars, not reaching the set level of smartness (Bahagian Sumber dan Teknologi Pendidikan, 2020). This situation reflects the low level of technological leadership and ICT culture in the school instructional climate. School smartness levels are measured based on key performance indicators through SSQS. The five main domains of SSQS are (i) human capital, namely the development of ICT competencies of administrators, teachers, and students, (ii) the use of ICT in management and teaching and learning, (iii) applications, namely systems used in schools, (iv) infrastructure, namely existing technology in schools and (v) management of educational resources through the school library. The use of ICT requires a high level of commitment, a positive attitude, technological skills, and knowledge.

Nevertheless, some teachers are reluctant toward ICT and refuse to make changes in implementing ICT (Sanchez-Prieto et al., 2019). Among the factors that motivate and influence teachers to use ICT is the technology leadership style practiced by the headmaster (Leong et al., 2016). Therefore, the headmaster's high technology leadership can improve teachers' ICT competencies. On the other hand, teachers' weak ICT competence indirectly reflects the headmaster's technology leadership level. Thus, a headmaster should cultivate the spirit of teachers in using ICT and facilitating digital education in schools. In addition, many domestic and foreign scholars stated that demographic factors such as gender, school location, and length of service also impact the improvement of teachers' competencies and experience (Raamani and Arumugam 2018a; Raamani and Arumugam, 2018b). At the same time, the influence of headmasters' technology leadership is inherent and complementary to teacher competence. The use of various advanced technological devices as teaching media in teachers' teaching and learning sessions is also influenced by aspects of school location (Latef et al., 2018). Nevertheless, detailed studies of background influences such as school location and teachers' teaching experience are still lacking in more depth. Therefore, there is a need to study these variables to determine the differences in ICT competence among teachers based on teaching experience.

Literature Review

Headmaster Technology Leadership

Technology leadership is defined as the leadership practice of the headmaster in technology-oriented activities in the school climate that include policy, technology implementation, and organizational decisions (Anderson and Dexter, 2005; Raamani and Arumugam, 2018a). Technology leadership refers to behaviours and skills needed by school leaders to create and maintain support for using and integrating technology in schools (Okeke and Dike, 2019). Technology integration in the teaching and learning process requires the headmaster to establish efficient and well-planned technology management. However, there are challenges in practicing technology leadership where there are constraints in terms of commitment, lack of teachers, and lack of infrastructure. Thus, the headmaster plays a crucial role in changing the school environment based on the needs and potential of technology-based learning by providing complete infrastructure facilities and adequate technology integration training for teachers (Ugur and Koc, 2019). There is a need to coordinate professional development programs through strategic planning plans to emphasize and empower teachers to integrate ICT (Raman et al., 2019). Adopting effective change leadership strategies to the current school culture is one of the biggest challenges for a leader. Therefore, when a leader can effectively lead the school's change process, school change can then be successful (Cheng et al., 2019).

Dimensions of Technology Leadership

Technology leadership standard is measured using five dimensions based on ISTE-Standards for Education Leaders, which replaces the National Educational Technology Standard-Administrators [Nets-A] (ISTE, 2018) to help headmaster understand their role as technology leaders in schools. Such roles include: *(i) Equity and citizenship advocate; (ii) Visionary planner; (iii) Empowering leader; (iv) Systems designer; (v) Connected learner; and (vi) Teacher ICT Competence. Equity and citizenship advocate* refers to the headmaster using technology to promote equity, inclusion, and digital citizenship practices at school. Meanwhile, *visionary planner* refers to the headmaster's role in engaging others to create a vision, strategic planning, and ongoing assessment to transform learning with the integration of technology. *Empowering leader* refers to the headmaster's role in empowering both teachers and learners to be innovative and enrich teaching and learning by using technology. Besides that, the headmaster also plays an important role as a *systems designer* in developing teams and systems to ensure the implementation, maintenance, and continuous improvement in the use of technology to support learning. Finally, *connected learner* refers to the headmaster's role to encourage the continuous professional development of teachers to improve their skills in using technology.

Competency Model

This study describes two of the three elements of the Iceberg Competency Model (1993) as dependent variables, namely skills and knowledge. This model was selected because this study involved two critical aspects of competence: skills and knowledge. Aspects of skill and knowledge are part of competency that can be seen and measured. In contrast, a person's internal aspects or attitudes are not a variable in this study because the attitude aspects of nature and motivation are the part that cannot be seen to measure one's ability and ability. The two elements of competence, namely skills and knowledge. *Skills* are defined as a teacher's competence, intelligence, and ability to reason, practice, and implement a lesson more effectively (Jalin, 2011). Among the initiatives implemented by the MOE is to provide

prospective teachers with the necessary knowledge and skills through teacher training (Mustapa and Miskon, 2013). Skills are essential for teachers to act and make the right decisions. In this study, the skills studied are the competence of teachers in using ICT in teaching and learning as well as the needs of other tasks that, in turn, become practical in a teacher.

Meanwhile, *Knowledge* is defined as anything known and about knowing. According to Bloom, knowledge is a person's ability to mention and redirect what is known (Steele, 2018). Knowledge is also defined as intellectual efficiency to recharge or identify the specific content contained in a subject (Madawan et al., 2017). Therefore, knowledge is the findings that a person gains through formal or informal education and experience. For example, when someone acquires specific knowledge, they can re-express, describe, define and frame what they want to explain after observing the senses. In this study, knowledge refers to the mastery of teachers' knowledge of theory and practical aspects of information and communication technology.

Methodology

The study design was a survey study that used a quantitative approach. This study was conducted in one state of West Malaysia, involving only 52 schools in the rural category. The study population consisted of 881 teachers, while the total sample was 272. A simple random sampling technique was used in this survey study. Rural schools were made the subject of the study because the SSQS report by the MOE in 2020 found that 15 schools in this state that did not reach the smart level were among rural schools. The achievement of the SSQS rating symbolises the low level of technological leadership and ICT culture in the instructional climate in rural schools.

The research questionnaire was developed based on ISTE-Standards for Education Leaders. A teacher who is also the head panel of the Malay Language Committee was involved as an examiner for the face validation process to check the use of language and sentence structure so that the questionnaire is suitable for research. The research instrument was then reviewed by two experts using the content validation form to determine the suitability of the constructs and question items that measure the variables as listed in the research objectives. The questionnaires were administered online using Google Forms. The questionnaire was divided into three sections containing 50 question items. Section A contains five items consisting of demographic aspects, and section B comprises 25 items that examine the headmaster's technology leadership level. Section C consists of 20 items that measure the level of teacher competence in using ICT, divided into two constructs, namely skills and knowledge. Data were analysed using Statistical Package for Social Sciences (SPSS) version 26.0. Descriptive analysis was used to determine the percentage, mean and standard deviation, while the two-way ANOVA test and Pearson correlation were used for inferential analysis.

Findings

Respondent Demographics

A total of 272 teachers were involved in the success of this study. The results showed that the highest number of respondents were women, 152 people (55.9%), compared to men, 120 people (44.1%). As for the age profile, it was found that 118 people (43.4%) were 41 - 50

years, while the respondents aged 21 - 30 years were 9 people (3.3%). The analysis of the highest academic qualifications showed that 205 people (75.4%) were holders of bachelor's degrees and 10 people (3.7%) had a teaching certificate. The teaching experience profile showed 93 people (34.2%) with 16 - 20 years of experience, while 52 people (19.1%) with 11 - 15 years. The profile of respondents by type of school shows that the highest number of respondents are from schools with few students, 202 people (74.3%), and the least respondents are from Grade A primary schools, 17 people (6.3%). Table 1 shows the demographic distribution of respondents:

Table 1
Demographic distribution of respondents

Demographics	Sub-profile	Quantity	Percentage
Gender	Male	120	44.1
	Female	152	55.9
Age	21 to 30 years	9	3.3
	31 to 40 years	97	35.7
	41 to 50 years	118	43.4
	51 to 60 years	48	17.6
Highest academic qualification	Teaching Certificate	10	3.7
	Diploma in Teaching	36	13.2
	Bachelor's degree	205	75.4
	Masters	21	7.7
Teaching experience	6 - 10 years	56	20.6
	11 - 15 years	52	19.1
	16 - 20 years	93	34.2
	More than 20 years	71	26.1
Type of school	Primary School Grade A	17	6.3
	Primary School Grade B	53	19.5
	Underserved Schools	202	74.3

Headmaster Technology Leadership Level

This section's findings answer the first research question: "What is the level of technology leadership of headmasters through the dimensions of equity and citizenship advocate, visionary planner, empowering leader, systems designer, and connected learner?" The descriptive analysis is shown in Table 2 below:

Table 2
Mean value and standard deviation of headmaster technology leadership level

Dimension	Mean	SD	Level
Equity and citizenship advocate	4.16	.536	High
Visionary planner	4.08	.591	High
Empowering leader	4.20	.623	High
Systems designer	4.21	.597	High
Connected learner	4.25	.551	High
Overall (Technology Leadership)	**4.18**	**.527**	**High**

(Level: Low = 1.00 – 2.33, Medium = 2.34 – 3.66, High = 3.67 – 5.00)

Level of Teacher Competence of ICT Usage

The findings in this section answer the second research question, "What is the level of competence of teachers in the use of ICT?" The descriptive analysis is shown in Table 3 below:

Table 3

Mean value and standard deviation of teacher competency level of ICT usage

Dimension	Mean	SD	Level
Skills	4.41	.453	High
Knowledge	4.12	.506	High
Overall (Level of Teacher Competence of ICT Usage)	**4.26**	**.456**	**High**

(Level: Low = 1.00 – 2.33, Medium = 2.34 – 3.66, High = 3.67 – 5.00)

Analysis of Differences in Teacher's Competency Levels in the Use of ICT Based on Teaching Experience

The findings in this section answer the third research question, "What are the differences in the level of teacher competence in the use of ICT based on teaching experience?"

The research hypothesis is as follows:

H_{o1} There is no significant difference in the level of teacher competence in the use of ICT based on teaching experience.

The results of the one-way analysis of variance in Table 4 show that there is a significant difference in the level of teacher competence in the use of ICT with a value of [F (3, 268) = 26.070, p = 0.00], p <0.01 based on the teaching experience of the respondents. Thus, H_{o1} is rejected.

Table 4

One-way ANOVA of differences in teacher's competency levels in the use of ICT based on teaching experience

		SoS	DF	MS	F	Sig. P
Level of Teacher Competence in the Use of ICT	Between groups	12.728	3	4.243	26.070	.000
	In Group	43.615	268	.163		
	Total	56.343	271			

Next, *Tukey* post-hoc test was implemented to measure the level of teacher competence in the use of ICT based on the teaching experiences of different respondents. The test results are shown in Table 5:

Table 5
Tukey Post-hoc test of teacher competency level in the use of ICT based on teaching experience

		N	Mean	SD	6 - 10 years	11 - 15 years	16 - 20 years	More than 20 years
Level of Teacher Competence in the Use of ICT	6 - 10 years	56	4.62	.252		.202*	.520*	.520*
	11 - 15 years	52	4.41	.248	-.202*		.318*	.318*
	16 - 20 years	93	4.10	.357	-.520*	-.318*		-.000
	More than 20 years	71	4.10	.601	-.520*	-.318*	.000	

*p < 0.05

The results of the Tukey post-hoc test in Table 5 identify the mean difference between different groups of respondents based on teaching experience. It showed that there is a significant mean difference p <0.05 in the level of teacher competence in the use of ICT between groups of respondents experienced between 6-10 years (mean = 4.62, SP = 0.252) with respondents with experience between 11 - 15 years (mean = 4.41, SP = 0.248) and respondents with experience between 16 - 20 years (mean = 4.10, SP = 0.357) and respondents with more than 20 years of experience (min = 4.10, SP = 0.601).

Similarly, there is a significant mean difference p <0.05 in the level of teacher competence in the use of ICT between the group of respondents experienced between 11 - 15 years (mean = 4.41, SP = 0.248) with respondents experienced between 16 - 20 years (mean = 4.10, SP = 0.357) and respondents with more than 20 years of experience (mean = 4.10, SP = 0.601).

The Relationship Between Headmaster Technology Leadership and Teacher Competency Level in the Use of ICT

The findings of this section answer the fourth research question: "Is there a significant relationship between the technology leadership of the headmaster with the level of teacher competence in the use of ICT?"

The research hypothesis is as follows

H_{o2} There is no significant relationship between the technology leadership of the headmaster with the level of teacher competence in the use of ICT.

The results of the study displayed in Table 6 show the dimensions of the level of technology leadership of headmaster from the aspect of empowering leader (r = 0.448, p <0.01); visionary planner (r = 0.367, p <0.01); connected learner (r = 0.246, p <0.01); systems designer (r = 0.408, p <0.01); and equity and citizenship advocate (r = 0.407, p <0.01) had a significant relationship with the level of teacher competence in the use of ICT. Overall, it showed that the technology leadership of the headmaster (r = 0.415, p <0.01) had a significant positive relationship with the level of teacher competence in the use of ICT. With that, Ho2 is rejected.

Table 6
The relationship between headmaster technology leadership and teacher competency level in the use of ICT

Dimension	**Level of Teacher Competence in the Use of ICT**	
	r	**Sig. P**
Equity and citizenship advocate	0.407**	.000
Visionary planner	0.367**	.000
Empowering leader	0.448**	.000
Systems designer	0.408**	.000
Connected learner	0.246**	.000
Overall (Headmaster Technology Leadership Level)	**0.415****	**.000**

**p < 0.01

Details of the correlation analysis findings are shown in Table 7 and Table 8 below:
Table 7
The relationship between the dimensions of headmaster technology leadership and the dimensions of teacher competency level in the use of ICT

Headmaster Technology Leadership	**Level of Teacher Competence in the Use of ICT**	
	Skills	Knowledge
Equity and citizenship advocate	0.439**	0.340**
Visionary planner	0.405**	0.299**
Empowering leader	0.541**	0.324**
Systems designer	0.460**	0.324**
Connected learner	0.331**	0.147*

** p < 0.01; * p < 0.05

The results of the study displayed in Table 7 show the dimensions of the level of technology leadership of headmaster from the aspect of equity and citizenship advocate (r = 0.439, p <0.01); visionary planner (r = 0.405, p <0.01); empowering leader (r = 0.541, p <0.01); systems designer (r = 0.460, p <0.01); and connected learner (r = 0.331, p <0.01) had a significant positive relationship with the level of teacher competence in the use of ICT in terms of skills. The results also showed the dimension of the level of technology leadership of headmaster from the aspect of equity and citizenship advocate (r = 0.340, p <0.01); visionary planner (r = 0.299, p <0.01); empowering leader (r = 0.324, p <0.01); systems designer (r = 0.324, p <0.01); and connected learner (r = 0.147, p <0.01) had a significant relationship with the level of teacher competence in the use of ICT in terms of knowledge.

Overall, as shown in Table 8, the technology leadership of the headmaster (r = 0.415, p <0.01) has a significant positive relationship with the level of teacher competence in the use of ICT. With that, Ho2 is rejected.

Table 8
The relationship between headmaster technology leadership and teacher competence level in the use of ICT

		Level of Teacher Competence in the Use of ICT	
		r	Sig. P
Headmaster Leadership Level	Technology	0.415**	.000

** p < 0.01

Discussion

This study shows that the headmaster practiced technology leadership at a high level. It could also be indicated that the headmaster in rural schools has realized their role as technology leaders. Nevertheless, the findings of this study show results that are not in line with the initial predictions of low technology leadership levels of the headmaster. There are other factors that may cause inaccurate findings as the initial predictions for the variables studied. Technology leadership practices are not a major factor influencing the achievement of SSQS ratings, i.e., whether it reaches a smart level or not. SSQS is not a comprehensive measurement mechanism to fully assess the level of leadership of a headmaster because it only measures certain aspects. In addition, the SSQS rating by self-assessment also allows the final data obtained to less than meet the main objective of rating the ICT culture level in schools. The SSQS rating instrument should be thoroughly reviewed for improvement.

The headmaster not only plays a role as a provider of support in finance and infrastructure but also should use ICT in administration and teaching. A headmaster who is competent in ICT can certainly encourage other teachers to try to improve their ICT competence. However, the results of this study do not coincide with the initial predictions, i.e., the low level of teacher competence in using ICT. One of the reasons may be the initiative of the teachers who use ICT in teaching and learning without being influenced by the technology leadership of the headmaster. In addition, the innovative characteristics of a teacher himself also lead to the use of ICT that can improve self-competence. Teachers who have a high internal motivation in self-initiative to integrate ICT in teaching and learning may improve in ICT competencies.

The results also found a significant difference in the level of teacher competence in using ICT based on teaching experience. The study of Kupusamy and Norman (2021) proved that teacher technological skills differences are based on teaching experience factors. Long-serving teachers have undergone much professional training related to ICT in line with the need to complete some training at least seven times a year. In addition, the current rapid development of technology has demanded teachers' commitment, whether serving in urban or rural areas, to apply ICT in daily work, especially integrating technology into teaching and learning. The headmaster has the capacity as a technology leader in the school to determine the culture, ethos, and management of a school that works with other school people and can involve them in the school transformation process.

Research Implication

The findings of this study have proven that the technology leadership style practiced by the headmaster has a direct relationship with the level of teacher competence in the use of ICT. Therefore, this study has implications for school policy, training, practice, and management.

First, in terms of impact on policy and training, the MOE needs to refine a comprehensive leadership training plan related to resource management and technology to empower competent school leaders. In addition, the Aminuddin Baki Institute (IAB), which trains headmasters in the National Professional Qualification for Educational Leaders (NPQEL) program, can also emphasize more aspects of technology leadership in training modules and programs.

In addition, the State Education Department and the District Education Office can formulate the form of support services needed by school administrators and teachers to enable the integration of ICT in schools. The authority officers can provide expert assistance regarding technical aspects and knowledge content related to ICT that can trigger the culture of ICT in schools. The high technology leadership of the headmaster, together with the readiness of competent teachers in ICT, can certainly guide school people to be more consistent and confident in making self-ratings on filling school improvement instruments using SSQS.

School administrators should be more creative and innovative in designing ICT culture programs, such as encouraging ICT applications in teaching and learning, boosting innovation programs, and strengthening ICT-related training series. In addition, school administrators can encourage the practice of cultivating ICT among teachers by using positive reinforcement elements such as offering incentives to school people either in the form of appreciation or recognition as a sign of support for the practice of ICT. This study shows that the headmaster, through technology leadership practices, needs to be more creative in influencing teachers to cultivate ICT in schools in a conducive and ethical environment. ICT in teaching and learning promotes an innovative and learner-centred educational environment (Makuru and Jita, 2022). The headmaster who successfully influences ICT competencies among teachers can undoubtedly encourage the improvement of the quality of technology-based teaching and learning.

Three things can be suggested to future researchers for further study. First, an in-depth study can be conducted using a different population and unit analysis. In addition, the study may also be extended to all types of schools in Malaysia, which is not limited to certain school levels only. Furthermore, a comparative study can also be conducted to compare the differences in technological leadership and ICT competencies among teachers in two states and two types of schools, namely primary and secondary schools. Finally, further research can be conducted using a qualitative research approach, such as interviews with school administrators, to get a different and more in-depth perspective on the issues and problems to be studied.

Conclusion

In conclusion, this study found that the practice of technology leadership among headmasters and teachers' competence in using ICT is at a high level. It also proved a strong and significant positive relationship between the two variables. The higher the technology leadership practiced by the headmaster, the higher the level of teacher competence in using ICT and vice versa. The results of this study can directly prove that the technological leadership style practiced by the headmaster can influence the teachers under his administration to have high ICT competencies. This study also provides implications on policy and training regarding technology leadership practices of headmasters in schools and teachers' ICT competencies.

In addition, this study has offered academic contributions in the form of empirical data related to the technology leadership of the headmaster and teachers' ICT competencies. It is hoped that policymakers can use the empirical data to improve the culture of ICT in schools and strengthen the ICT competence among school administrators and teachers.

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