



Journal of Advanced Research in Applied Sciences and Engineering Technology

Journal homepage:
https://semarakilmu.com.my/journals/index.php/applied_sciences_eng_tech/index
ISSN: 2462-1943



Toward Digital School: The Level of Usage, Competency and Awareness for Digital Storage Among School Administrators Pre to the Covid-19 Era

Ummu Aiman Akim¹, Mohd Shafie Rosli^{2,*}, Nor Shela Saleh³

¹ Ministry of Education, Malaysia

² School of Education, Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia, Malaysia

³ Department of Social Sciences, Centre of General Studies and Co-Curricular, Universiti Tun Hussein Onn, Malaysia

ARTICLE INFO

Article history:

Received 23 June 2023

Received in revised form 30 October 2023

Accepted 11 November 2023

Available online 28 November 2023

Keywords:

Digitalization; digital storage; technology acceptance

ABSTRACT

In today's rapidly changing and dynamic educational ecosystem, the Malaysian Ministry of Education emphasises digital education. Nationwide focus has been dedicated to the ICT proficiency of school administrators, as they play a pivotal role in technological leadership, in order to ensure the realisation of this objective. The sample consists of 266 school administrators who completed a questionnaire used as a research instrument. This study investigated the level of digital competence among school administrators in the southern peninsula of Malaysia. In addition, the researchers analysed the degree of cloud storage awareness and cloud storage usage across the samples. It was discovered that school administrators have a moderate degree of proficiency in cloud storage usage, use cloud storage infrequently, and have a high level of awareness regarding the significance of using cloud storage for school administration. It implies that school administrators require extensive training on the use and significance of cloud storage in school administration. However, these data were taken before the Covid-19 crisis. Covid-19 may have increased technological adoption in the global education system, necessitating more study on the status of these factors.

1. Introduction

Digital school has been a prominent initiative in the Malaysian educational system. The Ministry of Education of Malaysia is actively prioritizing the digitization of school administration, school-based evaluation, and the enhancement of learning process. This agenda requires multidimensional preparation and perspective. Students, teachers, parents, and school administrators must be prepared, knowledgeable, and competent in the related knowledge and technologies. In the context of school ecosystem, school administrators are influential in deciding the effectiveness of digitalization in schools. Schools in Malaysia are administered by at least three administrators, including the principal and two assistants. Each assistant assists the principal with academic and student-related matters. All the administrative tasks were digitalized in recent years to ensure the

* Corresponding author.

E-mail address: shafierosli@utm.my

<https://doi.org/10.37934/araset.34.1.249256>

security of data and ease of data storage. For that purpose, the Malaysian Ministry of Education provides cloud-based digitizing infrastructure for these two responsibilities. Part of this digitization includes cloud storage for document exchange, verification, and distribution of information.

As a means of streamlining school administration, cloud storage has been integrated into the educational system. To ensure the sustainability of education, it is essential that school administrators are well-versed in such technologies. The perceived degree of proficiency and awareness to accept or the understanding of the need for new technology integration into the education system are two important components for the effective deployment of technology by educators. Without these elements, the introduction of new technology runs the danger of encountering pushbacks, which might impede its integration.

1.1 Statement of Problem

Digitalization in learning is not confined to the product but is also impacted by the digitalized learning environment [1]. It demonstrates that the digital environment has a significant impact on the performance of digital schools. The deployment of digital school is consistent with efforts to include computational thinking into core curriculum. As noted by Yadav *et al.*, [2], computational thinking is relevant outside the context of computers and technology. However, it might be argued that computational thinking is closely tied to the use of digital technology. It is considered that the use of technology in education, such as cloud storage, might expedite the spread of computational thinking. Current education research, such as that conducted by Aidarbekova *et al.*, [3] focuses on the digitalization of education, particularly in terms of the utilization of digital resources. It is essential for school administrators to demonstrate technological leadership in order to provide teachers and students with access to a safe ecosystem [4].

In digital contexts, schools, teachers, and students require support from school administrators [5]. The proficiency of these administrators is crucial. Teachers' digital competency precedes their digital culture [6]. Yet, school administrators and teachers indicated a moderate level of digital proficiency [7]. Therefore, it is essential that we study the amount of digital proficiency among school administrators in order to comprehend technological leadership. According to reports, school administrators' technological leadership has a moderate impact on teachers' ICT self-efficacy [8]. It was discovered that school administrators frequently use the Internet at schools, and male administrators had a greater grasp of information security [9]. Unfortunately, little is known regarding school administrators' understanding of other forms of digital technology due to a paucity of study in this field.

1.2 Research Gaps

The literature has shown a number of study gaps. Currently, the literature has just a limited understanding of digital technology proficiency among school administrators. This resulted in a lack of knowledge on how technology may be integrated into the school milieu. The digitalization of schools in Malaysia is presently at giant scale, although the effects of such a move are still mostly unclear due to the lack of study in this field. If this issue is not addressed, the possibility of technological pushback may develop. In summation, the relationships between the factors that influence the integration of technology into schools are yet unclear, necessitating careful analysis to guarantee the integration of technology as a platform for school digitalization is effective. The following research objectives were formulated based on the above arguments and gaps:

- i. To study the level of digital competency among school administrators.
- ii. To study the level of cloud storage usage among school administrators.
- iii. To study the level of awareness about the importance of cloud storage among school administrators.
- iv. To study the relationships between the level of digital competency, the level of cloud storage usage, and the level of cloud storage importance awareness among school administrators.

The research questions were:

- i. What is the level of digital competency among school administrators?
- ii. What is the level of cloud storage among school administrators?
- iii. What is the importance of cloud storage among school administrators?
- iv. What are the relationships between the level of digital competency, the level of cloud storage usage, and the level of cloud storage awareness among school administrators?

2. Methodology

This research employed quantitative methodological approach in the analysis of survey data. Employing a quantitative methodological approach has several merits, such as the ability to integrate a high number of samples and accommodate a large sample size. It also enables a thorough knowledge of the interactions between variables and factors included in the study, as well as a comprehensive description of each factor's degree. Using quantitative data analysis also enables academics to provide a precise description of school administrators' present level of ability. The data in this study were examined descriptively and inferentially.

2.1 Population and Sample

This study's population consists of school administrators from a district on the southern peninsula of Malaysia. According to information obtained from the District Education Office, this district has 96 schools. Each school has three administrators, making the total number of administrators in this district 288. The size of the population dictated a minimum sample size of 165 [10]. For the current study, we surveyed 266 administrators. The administrators in this district were selected from daily schools.

2.2 Instrument

This study used a questionnaire. It was developed independently by the first author. The questionnaire consists of 35 questions divided into four sections. The first portion, labelled section A, has four elements regarding the demographic information of the samples. In the meanwhile, sections B, C, and D explore the concepts of digital competency, cloud storage utilization, and importance of cloud storage, respectively. Except for the awareness construct, which was tested with 11 items, all other constructs were measured with 10 items. The items use a four-point Likert scale.

The instrument's reliability was evaluated utilizing the approach of internal consistency. For the pilot study, ten school administrators from adjacent districts will serve as samples. The reliability is as shown in Table 1.

Table 1
 Reliability of the instrument

Construct	Cronbach's alpha, α	Number of items
Digital competency	.921	10
Cloud storage usage	.957	10
Awareness	.965	11

Cronbach's alpha was used to calculate reliability; however, Rosli *et al.*, [11] indicate that utilizing composite or construct reliability might yield a more accurate measurement. The instrument was evaluated by an educational technology instructor. In Malaysia, she has extensive experience as a lecturer and teacher. The instrument's face and content validity were confirmed.

3. Findings and Discussion

The demographic data of the 266 samples are as in Table 2.

Table 2
 Demographic data

Demographic		Frequency, f	Percent, %
Gender	Male	136	51.1
	Female	130	48.9
Age	25 – 35	31	11.7
	36 – 45	61	22.9
	45 and above	174	65.4

3.1 Digital Competency

The mean value for the digital competency construct is 2.567 and the standard deviation is 0.518. It indicates that samples moderately concur that they are digitally competent. Each item's outcome is shown in Table 3.

Table 3
 Mean and standard deviation for the items comprising digital competency

Item	Mean	Standard deviation
Digital Competency 1	2.992	.549
Digital Competency 2	3.120	.543
Digital Competency 3	3.150	.582
Digital Competency 4	2.485	.701
Digital Competency 5	2.421	.664
Digital Competency 6	2.383	.702
Digital Competency 7	2.248	.660
Digital Competency 8	2.263	.677
Digital Competency 9	2.327	.707
Digital Competency 10	2.278	.698

The least average item is Digital Competence 7. This item pertains to the perceived cloud storage proficiency of school administrators in offline mode. We assume this because the sample population is unfamiliar with the offline potential of some digital technologies due to their extensive use of online chores. Therefore, Internet appears to be a very useful tool for these school administrators in terms of school administration.

Digital Competency 3 has the greatest average value. This item examines the perceived Internet surfing proficiency of samples for school administration and management. The findings underscore the importance of the Internet in school administration. To ensure the success of a digital school, not only teachers but also students must possess a high degree of digital competency [12]. Using instructional design, role models, and real experience effectively enhances pre-service teachers' digital competency [13]. The same strategies may also be applicable to school administrators.

3.2 Cloud Storage Usage

With a mean of 1.978 and a standard deviation of .643, cloud storage utilization has a lower average than the preceding construct. Table 4 contains the particulars of this construct's outcome.

Table 4
Items, mean and standard deviation for cloud storage usage

Item	Mean	Standard deviation
Usage 1	2.071	.715
Usage 2	2.048	.685
Usage 3	2.033	.702
Usage 4	1.913	.724
Usage 5	1.838	.695
Usage 6	1.951	.738
Usage 7	1.924	.753
Usage 8	1.857	.701
Usage 9	1.985	.781
Usage 10	2.157	.813

Usage 4 has the lowest mean value. This item measures teachers' sample utilization of cloud storage for information gathering and data collection. It appears that administrators overlooked one of the cloud storage's most useful applications. This might impede the flexibility of information exchange in school administration, and without it, the decision-making process could be compromised.

Usage 10 is the item having the greatest mean value for this construct. This item measures cloud storage utilization through smart phone. The mean value is significantly lower than other variables. It may indicate that administrators have not yet adopted technology in a pervasive manner. This may be attributed to the absence of a persuasive feature in the adoption of the technology prior to the Covid-19 event [14]. It is also evidenced that technological uptake before the pandemic is not really high [15].

3.3 Awareness

The mean knowledge and awareness on the significance of cloud storage for school management and administration is the greatest at 2.703, with a standard deviation of .625. Table 5 displays the mean and standard deviation for each item.

Table 5
 Items, mean and standard deviation for awareness

Item	Mean	Standard deviation
Awareness 1	2.778	.689
Awareness 2	2.782	.671
Awareness 3	2.665	.692
Awareness 4	2.661	.682
Awareness 5	2.744	.702
Awareness 6	2.778	.694
Awareness 7	2.736	.704
Awareness 8	2.759	.685
Awareness 9	2.793	.671
Awareness 10	2.530	.722
Awareness 11	2.507	.753

Item Awareness 9 has the greatest mean for the awareness of the benefits of cloud storage in relation to the ICT knowledge of users. This demonstrates that administrators are aware of the improvement in digital school-related abilities that cloud storage facilitates.

The item with the lowest mean is 11. This question assesses their perception of the influence of cloud storage training on their organization's management and administration efficiency. It suggests that training for school administrators should also focus on the emotive aspects of the trainee. Before or after the training, it is recommended to elaborate on the impact or significance of the abilities acquired via this program. The limited level of awareness may have been attributed to the lack of demand for digital education at the time. Since following Covid-19 the need to support digital education, particularly those with a student-centered focus, has emerged [16].

3.3 The Relationships

We had run Pearson's correlation test to determine the link between the three variables. At $r = .663$, $p = .001$, the correlation between digital competence and cloud storage usage is substantial. At $r = .449$ and $p = .001$, the link between digital competence and cloud storage awareness is modest. At $r = .501$ and $p = .001$, the link between cloud storage awareness and cloud storage usage is high. The associations were depicted according to Figure 1.

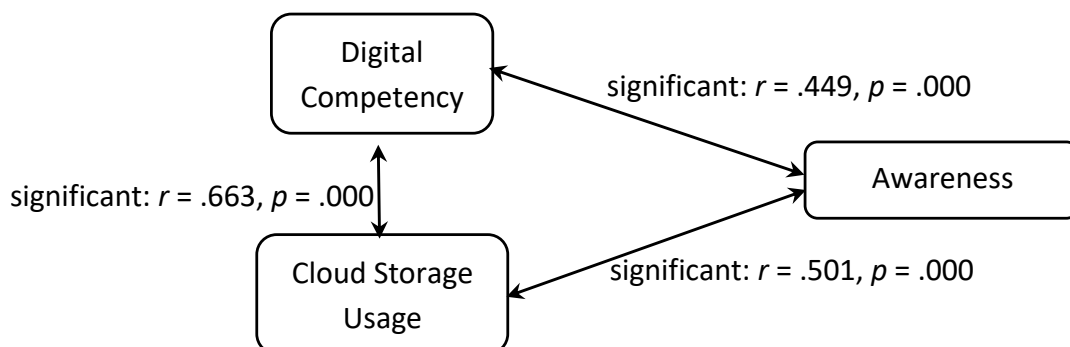


Fig. 1. Graphical representation of the relationships between constructs studied

The findings are inline with the previous study about the acceptance and usage of technology in school ecosphere [17-20]. Recent study further supports our findings, proposing that technical and technological competence are required skills for the digital competence framework for teachers [21].

Digital competence is also essential for ensuring that digital technology is accessible to all individuals [22]. It is proposed that early in their careers, administrators should enhance their digital competence. As demonstrated, university freshmen have a high degree of digital competence [23].

4. Conclusion

Administrators are the primary figures of authority in schools. The ease of digital school implementation in terms of data management and digitalization is highly dependent on the available technological leadership. Prior to the Covid-19 outbreak, educational leaders are very aware of the necessity of cloud storage in administration. These leaders have a modest level of digital proficiency, but their use of cloud storage for school administration and management duties is minimal. As it appears that school administrators are still unable to harness the potential of the technologies, the school digitalization process might be sped with intensive training on cloud storage and other associated digital skills. The conclusion is based on data acquired prior to the Covid-19 outbreak; research undertaken after the pandemic is anticipated to investigate the integration of digital skills into school administration and the advancement of technological leadership.

Acknowledgement

Authors would like to thank Ministry of Higher Education and Universiti Teknologi Malaysia for their sponsor through UTM Fundamental Research (UTMFR) grant with Project Number Q.J130000.2553.21H23.

References

- [1] Oshanova, Nurzhama T., Assel K. Bukanova, Zhadyra S. Kazhiakparova, Makpal T. Salbyrova, and Saltanat R. Sharmukhanbet. "Training Future Computer Science Teachers in the Context of Digitalisation Based on the" History of Informatics" Course." *World Journal on Educational Technology: Current Issues* 13, no. 3 (2021): 354-369. <https://doi.org/10.18844/wjet.v13i3.5919>.
- [2] Yadav, Aman, Chris Mayfield, Ninger Zhou, Susanne Hambrusch, and John T. Korb. "Computational thinking in elementary and secondary teacher education." *ACM Transactions on Computing Education (TOCE)* 14, no. 1 (2014): 1-16. <https://doi.org/10.1145/2576872>.
- [3] Aidarbekova, Kulzhan A., Saltanat K. Abildina, Svetlana A. Odintsova, Aigul O. Mukhametzhanova, and Nagimash A. Toibazarova. "Preparing future teachers to use digital educational resources in primary school." *World Journal on Educational Technology: Current Issues* 13, no. 2 (2021): 188-200. <https://doi.org/10.18844/wjet.v13i2.5653>.
- [4] Ghavifekr, Simin, and Seng Yue Wong. "Technology leadership in Malaysian schools: The way forward to education 4.0–ICT utilization and digital transformation." *International Journal of Asian Business and Information Management (IJABIM)* 13, no. 2 (2022): 1-18. <https://doi.org/10.4018/IJABIM.20220701.0a3>.
- [5] Ellis, Maureen L., Ya-Huei Lu, and Bethann Fine-Cole. "Digital learning for North Carolina educational leaders." *TechTrends* 65, no. 5 (2021): 696-712. <https://doi.org/10.1007/s11528-021-00649-x>.
- [6] Yelubay, Yerkinay, Lazzat Seri, Dina Dzhussubaliyeva, and Ulzharkin Abdigapbarova. "Developing future teachers' digital culture: Challenges and perspectives." *2020 IEEE European Technology and Engineering Management Summit (E-TEMS)* (2020): 1-6. <https://doi.org/10.1109/E-TEMS46250.2020.9111827>.
- [7] Tabieh, Ahmad AS, Mohammad Hamzeh, Basel Kh S. Abu-Foudeh, Niveen Jarrar, Sahar Al-Manaseer, Aysha Al-Shawabkeh, and Rania Seikaly. "Digital literacy and its acquisition by teachers and principals at educational workplaces." *International Journal of Learning, Teaching and Educational Research* 20, no. 5 (2021): 38-55. <https://doi.org/10.26803/ijlter.20.5.3>.
- [8] Omar, Mohd Norakmar, and Siti Noor Ismail. "Empowering teacher self-efficacy on ICT: How does technology leadership play a role?." *MOJEM: Malaysian Online Journal of Educational Management* 9, no. 3 (2021): 1-22.
- [9] Karabatak, Songul, and Murat Karabatak. "Information security awareness of school administrators." In *2019 7th International Symposium on Digital Forensics and Security (ISDFS)*, pp. 1-6. IEEE, 2019. <https://doi.org/10.1109/ISDFS.2019.8757525>.
- [10] Krejcie, Robert V., and Daryle W. Morgan. "Determining sample size for research activities." *Educational and psychological measurement* 30, no. 3 (1970): 607-610.

- [11] Rosli, Mohd Shafie, Nor Shela Saleh, Sultan Hammad Alshammari, Mohd Mokhzani Ibrahim, Azri Syazwan Atan, and Noor Azean Atan. "Improving Questionnaire Reliability using Construct Reliability for Researches in Educational Technology." *Int. J. Interact. Mob. Technol.* 15, no. 4 (2021): 109-116. <https://doi.org/10.3991/IJIM.V15I04.20199>.
- [12] Morze, Nataliia, Olena Kuzminska, M. Mazorchuk, Vitaliy Pavlenko, and Aleksander Prokhorov. "Digital competency of the students and teachers in Ukraine: Measurement, analysis, development prospects." *Information and Communication Technologies in Education, Research, and Industrial Applications, Communications in Computer and Information Science* 2104 (2018): 366-379.
- [13] Howard, Sarah K., Jo Tondeur, Jun Ma, and Jie Yang. "What to teach? Strategies for developing digital competency in preservice teacher training." *Computers & Education* 165 (2021): 104149. <https://doi.org/10.1016/j.compedu.2021.104149>
- [14] Aris, Baharuddin, Alireza Gharbaghi, Maizah Hura Ahmad, and Mohd Shafie Rosli. "A Check List for Evaluating Persuasive Features of Mathematics Courseware." *International Education Studies* 6, no. 9 (2013): 125-134. <https://doi.org/10.5539/ies.v6n9p125>.
- [15] Rosli, Mohd Shafie, Nor Shela Saleh, Baharuddin Aris, Maizah Hura Ahmad, and Shahrudin Md Salleh. "Ubiquitous Hub for Digital Natives." *International Journal of Emerging Technologies in Learning* 11, no. 2 (2016). <https://doi.org/10.3991/ijet.v11i02.4993>
- [16] Suhaimi, Elmi Sharlina Md, Zuhazi Abdullah, Norazreen Muhamad, Nik Khadijah Nik Salleh, and Ahmad Affendy Abdullah. "FIGEE CARD: Pembelajaran Interaktif Kumpulan Berfungsi Kimia Organik: FIGEE CARD: Interactive Learning of Organic Chemistry Functional Groups." *International Journal of Advanced Research in Future Ready Learning and Education* 30, no. 1 (2023): 13-24.
- [17] Rosli, Mohd Shafie, Baharuddin Aris, and Maizah Hura Ahmad. "Online intellectual transformation system." *environment* 5 (2014): 6. <https://doi.org/10.12988/ces.2015.412254>.
- [18] Raub, Latifah Abdul, Nurbiha A. Shukor, Mohammad Yusof Arshad, and Mohd Shafie Rosli. "An integrated model to implement contextual learning with virtual learning environment for promoting higher order thinking skills in Malaysian secondary schools." *International Education Studies* 8, no. 13 (2015): 41-46. <https://doi.org/10.5539/ies.v8n13p41>.
- [19] Baharom, Mohd, Noor Atan, Mohd Rosli, Sanitah Yusof, and Mohd Abd Hamid. "Integration of science learning apps based on Inquiry Based Science Education (IBSE) in enhancing students Science Process Skills (SPS)." (2020): 95-109. <https://doi.org/10.3991/ijim.v14i09.11706>.
- [20] Ramlee, Noraini, Mohd Shafie Rosli, and Nor Shela Saleh. "Mathematical HOTS cultivation via online learning environment and 5E inquiry model: Cognitive impact and the learning activities." *International Journal of Emerging Technologies in Learning (Online)* 14, no. 24 (2019): 140. <https://doi.org/10.3991/ijet.v14i24.12071>.
- [21] Falloon, Garry. "From digital literacy to digital competence: the teacher digital competency (TDC) framework." *Educational Technology Research and Development* 68 (2020): 2449-2472. <https://doi.org/10.1007/s11423-020-09767-4>.
- [22] Nyikes, Zoltán. "Contemporary digital competency review." *Interdisciplinary Description of Complex Systems: INDECS* 16, no. 1 (2018): 124-131. <https://doi.org/10.7906/indecs.16.1.9>
- [23] Reddy, Pritika, Bibhya N. Sharma, and Kaylash C. Chaudhary. "Measuring the digital competency of freshmen at a higher education institute." In *Pacific Asia conference on information systems*. Association for Information Systems, 2020.