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An Analysis of Principals' Digital Literacy Capabilities as Instructional Leaders in Indonesia

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Abstract

The role of principals as instructional leaders requires them to continuously improve their skills in designing and implementing 21st-century learning. This involves developing their digital literacy capabilities as part of technology integration. This research is a case study that aims to analyze the digital literacy capabilities of principals in Kuningan and Cirebon, Indonesia, as instructional leaders in designing and implementing 21st-century learning. The participants of this study were 20 elementary school headmasters. To collect the data, the authors used a teacher observation checklist, with the observer being the teacher in charge of the training. The results of this study showed that the headmasters, as supervisors and instructional leaders, had strong digital literacy capabilities. They were able to easily use technology, and the applications were clear and understandable to them. Furthermore, the participants found it easy to become skilled with the system, learn to operate it, and interact with it. They also showed high mental effort, required much care and attention, and found it easy to navigate and remember how to perform tasks with the system. Overall, this study highlights the importance of developing digital literacy capabilities among instructional leaders, particularly in the context of 21st-century learning. The study provides insights for educators and policymakers on how to support principals in improving their digital literacy capabilities to serve as effective instructional leaders in the digital age.

Keywords: Digital Literacy, instructional leaders, principals' capabilities

1 Introduction

Since 2015, the Indonesian government has included digital literacy as one of the six national literacies that need improvement in the National Literacy Campaign [1]. This inclusion is crucial due to the rapid and dynamic technological advancements affecting all sectors, necessitating digital literacy as an integral component of educational life [2-

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4]. Therefore, acquiring new competencies and applications has become imperative to adapt to the ever-changing nature of ICT [5].

Digital literacy, also known as ICT competence or ICT literacy, entails the ability to address issues related to knowledge, information, and communication in a digital environment [6-8]. Similarly, ICT proficiency refers to higher-order learning processing capabilities that align with technological and application skills. These skills encompass the primary usage of software, as well as creative and innovative abilities, problem-solving, and critical thinking using the Internet and various devices [9-10].

Overall, the Indonesian government's focus on digital literacy as a crucial aspect of the National Literacy Campaign reflects the increasing importance of digital competencies in modern society. This underscores the need for individuals to develop and enhance their digital literacy skills to effectively navigate the digital landscape and take advantage of its many opportunities.

Therefore, it is necessary for principals to improve their self-quality by mastering digital literacy, as it is crucial for their survival in the twenty-first century [11]. Strengthening the role of literacy facilitators is one of the training programs available to principals. This training is designed to enhance their abilities in using and utilizing ICT to develop schools. Digital literacy encompasses more than just equipping oneself with high-tech capabilities to operate digital devices, menus, and tools, and searching for sources on the Internet. It comprises a range of knowledge, abilities, and attitudes required to enhance practical skills in a digital atmosphere [12], [13].

Thus, the education system must adjust its regulations by incorporating digital competence into the curricula and assessments [14-15]. By doing so, students will be better equipped to navigate the digital landscape and succeed in the ever-changing world of technology. Moreover, principals who have acquired digital literacy competencies will be better equipped to lead their schools effectively, integrating technology into their pedagogy and creating a more engaging and effective learning environment for their students.

One thing being inquired is the importance of technology in education and to what extent teachers' capabilities to integrate technology vary in learning activities [16-17]. Examining how teachers acknowledge and manage the acceptance of technology is

claimed to be one of the problems in education [18]. Meanwhile, other studies have investigated and found that both pre-service and in-service teachers can receive technology well [19]. However, certain aspects of major construction and the significance of external variables contrast with what individuals believe about the Technology Acceptance Model (TAM).

Based on the findings, it can be said that the acceptance of technology by teachers falls into a good category, which is analyzed using the Technology Acceptance Model (TAM). However, from the number of studies that have been conducted, it is found that analyses of the acceptance of technology focusing on principals' capabilities are still rare. Even though principals rarely teach in class, they have to be a model for their teachers as subordinates. This involves the capabilities to operate Microsoft Office, email, use online applications, or select appropriate media as the digital learning source.

Referring to the lack of research focused on principals' capabilities in implementing digital literacy to improve the quality of education, the authors aimed to analyze the principals' digital literacy capabilities. Through this study, the researchers aimed to ensure that the participants could easily use technology and that the applications were clear and understandable to them. Additionally, the study aimed to help participants become skilled with the system, allowing them to easily perform desired tasks, learn how to operate and interact with it. Another important goal of this study was to help participants handle high mental effort, requiring much care and attention, providing easy navigation, and reminding them how to operate functions within the system..

2 Material and Methods

This study was initiated due to recent issues that sparked the authors' interest in delving deeper into the case of principals' capabilities in using technology. Therefore, a case study was conducted, involving twenty principals of elementary schools. The principals were randomly selected from Cirebon and Kuningan in West Java, Indonesia. To investigate the capabilities of principals in implementing digital literacy, a teacher observation checklist was used for data collection.

The reliability and validity of the teacher observation checklist are crucial for ensuring accurate and meaningful data collection. The checklist was designed based on established theories, including the Theory of Reasoned Action (TRA), which has been validated in previous studies [12-13]. This theoretical foundation lends credibility to the instrument's content validity. However, it is essential to conduct further empirical validation to confirm its reliability and validity in this specific context.

To assess reliability, the consistency of the checklist across different observers and over time should be evaluated. In this study, the same observer (the training teacher) conducted all observations, which reduces inter-observer variability but may introduce observer bias. Future studies should consider using multiple observers and calculating inter-rater reliability coefficients to enhance the reliability of the findings. In terms of validity, the checklist's ability to accurately measure principals' digital literacy capabilities was supported by its alignment with key components of digital literacy, such as operating Microsoft Office applications, creating email accounts, and using digital media. The observation checklist included ten specific statements to guide the observer, which enhances its construct validity by covering various aspects of digital literacy implementation.

After conducting the observations, the researchers analyzed the data by calculating the percentages and explicitly describing the findings. This quantitative approach allows for a clear presentation of the results, but it also relies on the accuracy of the observer's initial judgments. Therefore, ensuring the reliability and validity of the observation checklist is fundamental to the integrity of the study's conclusions. Overall, while the teacher observation checklist used in this study has a solid theoretical foundation and covers relevant aspects of digital literacy, its reliability and validity could be further strengthened through empirical validation and measures to reduce observer bias.

3 Results and Discussions

This research involved several stages of implementation, starting with data collection by sharing an observation checklist with teacher training to guide the analysis of the principals' capabilities in implementing digital literacy. The digital literacy

implementation conducted by the principals included operating Microsoft Office, which involved Word files, Excel, and PowerPoint, creating an email account, saving files in Google Drive, and using digital media as a learning source from the internet browser.

The compiled observation checklist was adopted from several theories, including the Theory of Reasoned Action (TRA), which has been used in previous studies [12-13]. The indicators for the usage level focused on the perception of ease of use, where each indicator had a choice of Yes or No responses, as shown in Table 1.

Table 1. Teacher Observation Checklist for perspective ease of use

No.	Indicator	Condition	
		Yes	**No**
1.	Participants could easy to use		
2.	The applications are clear and understandable		
3.	Participants are easy to become skilful with system		
4.	Participants are easy to get it to do what they want it to		
5.	Participants are easy to learn to operate		
6.	Participants could interact with		
7.	Participants got a low mental effort		
8.	Participants do not demand much care and attention		
9.	Participants got navigation is easy		
10.	Participants are easy to remember how to perform tasks with system		

After distributing and collecting the questionnaire, the researchers entered the data into an Excel form for analysis. The analysis focused on the perception of ease of use, as indicated in Table 1. It was found that 70% of participants could easily operate Microsoft Office, create email accounts, save files in Google Drive, and use learning sources from internet browsers. After receiving explanations from the teacher training, 90% of participants claimed that the applications were clear and understandable. Additionally, 80% of participants became skilled with the system of each application. As they became more skilled, 95% of participants were able to accomplish their desired tasks, and 90% found it easy to learn how to operate after receiving explanations and practice from the teacher training as Perceived Usefulness and Perceived Ease of Use are important factors

that influence technology acceptance [19]. Moreover, 95% of participants were able to interact with each other through email accounts created during the training.

These findings suggest that principals possess robust digital literacy capabilities. However, several factors could influence these results. The immediate effects of the teacher training might have significantly impacted the participants' reported ease of use and proficiency, which may not reflect long-term capabilities. Participants' prior experiences with digital tools could have also influenced the results; those with more experience might have found it easier to become proficient, while those with less experience might have struggled more, even if the training temporarily boosted their skills.

Furthermore, despite these positive findings, 5% of participants exerted low mental effort in using the system, which was influenced by their age. These participants preferred to ask for assistance with operational necessities [20]. Age has been identified as a significant factor affecting technology use by teachers, as Iranian teachers with more experience tend to use technology less frequently [21]. In contrast, teachers from the millennial era have better understanding and ability to use technology, and they are more accepting of technological progress [22]. Furthermore, all participants demanded much care and attention from the system, as they all had their own computers. This highlighted the importance of providing adequate facilities to integrate education and technology to improve the quality of education. Appropriate technology policies and perceived institutional support have been found to influence technology use by teachers/principals [23]. However, teachers may not be able to apply technology in their teaching activities if their schools do not provide adequate facilities or if they lack experience in operating available technology [24].

After practicing with Microsoft Office, email, Google Drive, and internet browsers, 95% of the participants easily remembered how to use the systems. This was likely due to their prior experiences, as people tend to improve with practice. The success of integrating technology into language learning depends on various factors, including teachers' experience. Previous studies have shown that experience can positively influence technology use, but it can also hinder integration if teachers are not adequately trained on how to use technology for positive outcomes [23, 25].

Based on the above description, it can be concluded that elementary school principals in Cirebon and Kuningan, Indonesia are capable of effectively implementing digital literacy. They have demonstrated proficiency in operating various applications such as Microsoft Office (Word, Excel, and PowerPoint), creating email accounts, saving files in Google Drive, and using learning resources from internet browsers. These findings align with the results of the Technology Acceptance Model (TAM) analysis, which suggests that teachers (both pre- and in-service) generally accept technology well. However, the study also highlights the importance of certain intrinsic and extrinsic factors in technology acceptance, which contradicts some assumptions made about the TAM [26].

4 Conclusions

In conclusion, the findings of this study highlight the positive impact of technology integration on teaching strategies and the digital literacy capabilities of principals. However, challenges such as the age factor affecting mental effort in operating technology were identified. To address these challenges, it is recommended that educational institutions provide ongoing training and support for principals to enhance their digital literacy skills. Additionally, developing user-friendly interfaces and providing assistance through assistants can facilitate the effective use of technology in educational settings. Overall, preparing educators with adequate digital literacy skills is essential to ensure the successful integration of technology in education.

Future research should explore the long-term impact of these training programs and identify best practices for their implementation on a broader scale. By focusing on practical skills, providing ongoing support, considering age and experience, ensuring institutional support, incorporating feedback mechanisms, and addressing potential biases, digital literacy training programs can be improved to enhance the digital capabilities of principals, ultimately leading to better integration of technology in educational settings.

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