The Impact of Digital Leadership on Teachers' Acceptance and Use of Digital Technologies

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A B S T R A K

Minimnya kompetensi digital guru menyebabkan pembelajaran tidak terlaksana secara maksimal. Dengan demikian, tantangan bagi guru semakin berat karena di era digital ini, penguasaan teknologi sangat berperan dalam menciptakan pendidikan yang berkualitas. Mengingat pentingnya teknologi dan peran kepemimpinan dalam pendidikan, penelitian ini bertujuan untuk menganalisis dampak kepemimpinan digital pada penerimaan guru dan penggunaan teknologi digital. Penelitian ini dilakukan di 27 Sekolah Dasar di satu kota. Enam guru dari masing-masing sekolah dipilih secara acak untuk menjadi sampel penelitian. Jadi, ada 162 guru yang terlibat dalam sampel penelitian. Data penelitian dikumpulkan dengan menyebarkan kuesioner untuk mengukur kepemimpinan digital dan kuesioner untuk mengukur penerimaan guru dan penggunaan teknologi digital. Data yang terkumpul dianalisis menggunakan analisis regresi sederhana dengan bantuan SPSS 20 for windows. Hasil penelitian menunjukkan bahwa signifikansi arah regresi adalah 8.581 dengan signifikansi (sig.) sebesar 0,000 yang menunjukkan bahwa arah regresi signifikan. Oleh karena itu, dapat disimpulkan bahwa kepemimpinan digital secara signifikan mempengaruhi penerimaan dan penggunaan teknologi digital oleh guru. Karena kepemimpinan digital diperlukan untuk meningkatkan kualitas pendidikan, disarankan agar kepala sekolah meningkatkan kepemimpinan digital mereka. Karena penelitian ini hanya terbatas pada dua variabel, maka perlu dilakukan penelitian lebih lanjut dengan melibatkan variabel yang lebih independen, mengingat berbagai faktor yang dapat mempengaruhi penerimaan dan penggunaan teknologi.

A B S T R A C T

Teachers' lack of digital competence causes learning not to be carried out optimally. Thus, the challenge for teachers is getting tougher since, in this digital era, technology mastery plays a significant role in creating quality education. Considering the importance of technology and the role of leadership in education, this study aimed to analyses the impact of digital leadership on teachers' acceptance and use of digital technologies. This research was done involving 27 elementary schools in one city. Six teachers from each school were randomly selected to be the study samples. So, there were 162 teachers involved in the research samples. The research data were collected by distributing questionnaires to measure digital leadership and questionnaires to measure teachers' acceptance and use of digital technology. The collected data were analyzed using simple regression analysis with the help of SPSS 20 for windows. The study showed that the significance of the regression direction was 8,581 with a significance (sig.) of 0.000, which indicates that the regression direction is significant. Therefore, it can be concluded that digital leadership significantly influences teachers' acceptance and use of digital technology. Since digital leadership is needed to increase education quality, it is suggested that the school principals enhance their digital leadership. Since this research was only limited to two variables, it is necessary to do further research involving more independent variables, considering the various factors that may affect the acceptance and use of technology.

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1. INTRODUCTION

Education is a structured and designed activity that aims to complete the targeted objectives. In general, this activity aims to produce quality human capital (Atalay, 2015; Benos & Karagiannis, 2016). This activity is conducted through an instructional process that involves teachers' and students' interactions at schools (Basilaia & Kvavadze, 2020; Mariana, 2015; Muhtar & Dallyono, 2020). In running the educational activities, the principal's leadership has a crucial role in producing quality human capital. The task and function of the principal are to enhance the teacher's professionalism in doing their jobs since the leadership of the principal resources potentially determines the effectiveness of the school organization (Díez et al., 2020; Karkouti et al., 2022; O'Shea, 2021). The running of a conducive and comfortable organization cannot be separated from the principal's capability in planning, controlling, and mobilizing teachers and staff, which becomes the principal's primary task (Nash et al., 2021; U-Sayee & Adomako, 2021). Therefore, the school principal is responsible for ensuring the quality of the school, including improving the quality of students' and teachers' professionalism in conducting the instructional process (Ramos-Pla et al., 2021; Taghavinia et al., 2021). Various efforts are needed to achieve the intended results in those roles (Aditya Dharma, 2019; R. N. K. Rambe, 2018).

The school principals' responsibility becomes even more severe, throughout the Covid-19 pandemic, in ensuring that the implementation of education goes well through online learning (Beilstein et al., 2021; Bradley & Sellars, 2020). The application of online learning as a substitute for face-to-face learning, which is done in real-time, caused problems for teachers (Abuhammad, 2020; Lemay et al., 2021; Noori, 2021). The issues included teachers' lack of digital competence and supporting facilities for online learning (Garzón-Artacho et al., 2021; Tomczyk, 2020). Other studies also confirmed that the current issue is teachers' lack of digital competence who can support online learning (Hibana & Surahman, 2021; Jannah et al., 2020). The challenge for teachers is getting tougher because mastery of technology plays a role in creating quality education. Teachers should ideally first understand technology better than students. This digital competence is indispensable as an information base supporting instructional activities (Danniels et al., 2020; Teräs et al., 2020). Moreover, currently, teachers have to conduct online learning (Laksana et al., 2019; Mali & Lim, 2021; Subedi et al., 2020).

The teacher's lack of understanding of technology will impact learning activities that are still conventional and do not keep up with the times (Batubara, 2017; Budiyono, 2020). As a result, students will experience learning saturation in the long term because they feel they do not have an impressive learning experience (Dinayusadewi et al., 2020; Priantini, 2020). It causes the digitalization in instructional activities is necessary to maximize learning outcomes. Digitalizing the education system is a response from Education 4.0 and is in line with the industrial revolution 4.0, which requires teachers to have additional capabilities, namely digital competence (Anggraeni et al., 2019; Shodiq & Zainiyati, 2020). In other words, the role of digitizing learning is needed as an effort to maximize learning outcomes. Some previous studies also confirmed that current technology has a crucial role in education (Ghory & Ghafory, 2021; Wijaya et al., 2021). This requires principals to play an active role in ensuring that every teacher can use the latest technology to organize online learning (AlAjmi, 2022a; Konstantinidou & Scherer, 2022).

In realizing schools are accustomed to using the latest technology in the teaching and learning process, the principal's leadership has an important role (Liao et al., 2021; Navaridas-Nalda et al., 2020). Principals must be able to optimally utilize all available resources to reach the education goals (Agustina et al., 2020; Flores & Derrington, 2017). Leadership deals with organizing and motivating others to do new things and enhancing the effectiveness of the school organization. Principals must have skills in influencing, encouraging, guiding, directing, and mobilizing others who have to do with the implementation and development of education so that activities can run effectively and efficiently so that they can reach the educational objectives that have been appointed (Effendi et al., 2020; Honig & Rainey, 2019; Ramos-Pla et al., 2021). The principal is the major actor responsible for managing inputs, processes, and outputs following the national education standards (Ratmini et al., 2019; Subandi, 2018).

Leadership related to the use of current technology is called digital leadership (AlAjmi, 2022a; Karakose et al., 2021). Digital leadership is the art of directing, influencing others, initiating sustainable change through access to information, and building relationships to anticipate changes critical to future school success (Agustina et al., 2020; Karakose et al., 2021). For that, it takes a dynamic combination of mindsets, behaviors, and skills that are used to change or improve school culture through the help of technology (Cortellazzo et al., 2019; Hamzah et al., 2021). This digital leadership structure is designed based on a combination of technology, motivation, and leadership style. Digital leadership is a strategy that school leaders can implement to improve student achievement and increase school competitiveness. Digital leadership is one of the most appropriate, fast, cross-hierarchical, workgroup-oriented, and collaborative approaches, focusing on innovation (Oberer & Erkollar, 2018; Tian et al., 2020). Thus, in

making it happen, intense and two-way communication between stakeholders in educational institutions is needed (Boahene et al., 2019; Sheninger, 2014).

Digital leadership will bring about change because it uses digital tools in all education management (Ilomäki & Lakkala, 2018; Karakose et al., 2021). Digital devices are also needed as learning media through a strategic planning process aligned with the school's vision. The International Society for Technology in Education (ISTE-A) standards define five dimensions of digital leadership: visionary leadership, digital era learning culture, excellence in professional practice, systemic improvement, and digital citizenship (Hamzah et al., 2021; Navaridas-Nalda et al., 2020). The advantage of this kind of leadership is that it is mandatory to integrate digital technology in teaching activities so that learning becomes more accessible and more flexible. The teacher quality factor is also essential for a successful instructional process to enhance learning outputs (AlAjmi, 2022b; Cunningham et al., 2022). Principals must allocate continuous training with teacher competencies to ensure the smooth implementation of the vision of expanding digital education.

Previous research findings state that today's digital leadership strategy is essential to implement (AlAjmi, 2022a; Navaridas-Nalda et al., 2020). Although much has been written about leadership, the concept of digital leadership vision has not been reached broadly, deeply, and comprehensively (Ismail et al., 2021; Ndalamba et al., 2018). Studies on digital leadership are still limited. No study was conducted to thoroughly see how digital leadership affects the acceptance and application of technology, especially at the elementary school level. For this reason, this study aims to analyses the influence of digital leadership, acceptance, and use of digital technology for online learning.

2. METHODS

This study used a quantitative approach by following the survey research model through the distribution of questionnaires (Hermawan, 2019). This research was conducted in 27 elementary schools in Singaraja City. The samples of the study were chosen using a sample quota technique. A total of six teachers were taken from each school using a simple random technique. Thus, in this study, 162 teachers became the research sample.

The instrument used to collect data in this study consisted of two questionnaires. The first questionnaire is a questionnaire that was used to measure the digital leadership of school principals, and the other was used to measure the acceptance and use of technology. The questionnaire to measure digital leadership was developed using digital leadership theory with aspects and indicators as shown in Table 1.

Table 1. Aspects and Indicators Measured in Digital Leadership

Aspect	Indicator
Visionary Leadership	Support and provide digital tools to make changes to optimize the achievement of learning goals
	Take an active role in all sustainable activities, especially in the development, implementation, and communication of technology-based strategic plans
	Deliver the program and provide funds for the implementation of the technology integration plan
Digital-Age Learning Culture	Improve the implementation of digital learning in a sustainable manner
	Provide examples and invite all teachers to use technology that is proven effective to improve the quality of learning
	Ensure the availability of a learning environment that supports the implementation of technology and technology-based learning resources according to the needs of students
	Assure that effective technology has been applied throughout the curriculum
	Disseminate and play an active role in learning communities that embody innovation, creativity, and digital collaboration
Excellence in Professional Practice	Provide time, resources, and access so that sustainable teacher professionalism can be realized, which will later be able to enable them to implement technology effectively and efficiently
	Provide facilities and play an active role in the learning community that initiates the realization of technology development
	Disseminate and set an example in communicating and collaborating on the wishes of stakeholders by utilizing current technology

Aspect	Indicator
Systemic Improvement	Realizing the trend of using effective technology and encouraging the creation of new technologies that can improve the quality of learning implementation and student learning outcomes
	Ensure that the application of technology always follows developments in the world of education
	Initiating change to realize the goals of technology-based learning and the creation of media-rich resources.
	Realizing cooperation in the application of metrics, data collection and analysis, and finding results to improve teacher performance and student learning outcomes
	Employing human resources who have competence in the application of technology to achieve academic and operational goals
	Realizing strategic partnerships to improve systemic quality
Digital Citizenship	Develop and ensure the maintenance of infrastructure supporting the implementation of technology that supports the realization of quality management, operations, teaching, and learning
	Ensure the availability and ease of access to obtain the necessary digital tools and resources according to the needs of teachers and all students
	Promote, develop models, and formulate policies to realize the availability of safe, legal, and ethical digital technology
	Disseminate and exemplify responsible social interactions regarding the implementation of technology and information
	Model and support the formation of shared cultural understanding and various global issues by using communication and collaboration tools

Meanwhile, the questionnaire measuring acceptance and use of technology was developed using UTAUT theory. Aspects and indicators measured for acceptance and use of technology according to UTAUT theory can be seen in Table 2.

Table 2. Aspects and Indicators Measured in UTAUT

Aspect	Indicator
Effort Expectation	Ease of Interaction
	Complexity
	Perception of Ease of Use
	Easy to learn
Performance Expectation	Perception of Ease of Management
	Speed in working
	Performance advantage
	Motivation
Social Influence	Family Factor
	Friend Factor
	Social Factor
	Influential people
Facilitating Condition	Facilitating conditions
	Knowledge
	Suitability
	Widely accepted
Behavioral Intention to Use the System	Intend to use it more often
	Predict to use
	Planning to use
	Have high confidence in using

The technology referred to in this study is Google Classroom which includes Google Meet because Google Classroom is an application used by elementary school teachers in carrying out learning online. To ensure that the data collected were valid and reliable. Both instruments were tested for validity and reliability first. After being proven valid and reliable, then the instrument is used. The data collected from the two questionnaires were then analyzed using simple regression analysis with the help of SPSS 20.

3. RESULT AND DISCUSSION

Result

According to the research objective, which is to identify the influence of digital leadership on teachers' acceptance and use of digital technology, the researchers conducted a simple linear regression analysis according to the data obtained from the two questionnaires used in this study. Before performing simple linear regression analysis, the researcher conducted several prerequisite tests to perform regression analysis. After declaring the data to meet the requirements, the researchers continued using simple linear regression analysis. The results of the correlation coefficient test can be seen in Table 3.

Table 3. Correlation Coefficient Test Results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.140	0.271		7.885	0.000
	Digital_Leadership	1.011	0.004	0.999	282.254	0.000

Based on Table 3, the analysis results found that the t-test coefficient for the constant (b1) was 282.254 with a significance level (sig.) of 0.000. This shows that the significance of the coefficient b1 is smaller than (0.05). In other words, the correlation between digital leadership and acceptance and use of digital technologies proved significant. The contribution of digital leadership to the acceptance and use of digital technology can be seen in Table 4.

Table 4. Contribution of Digital Leadership to Acceptance and Use of Digital Technologies

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics					Durbin-Watson
					R Square Change	F Change	df1	df2	Sig. F Change	
1	0.899	0.898	0.798	0.346	0.898	7.967	1	160	0.000	1.367

Based on Table 4, show the regression analysis results, it was found that the correlation coefficient R was 0.899, and the coefficient of determination or R^2 was 7.98. The correlation coefficient is significant with an F coefficient of 7.967 with a significance of (sig.) 0.000 <, which is 0.05. So it can be said that the contribution of Digital Leadership to the Acceptance and Use of Digital Technologies is 79.8%. Based on the results of the linearity analysis and the significance of the regression direction as shown in Table 5.

Table 5. Linearity and Significance of Regression Direction

Statistic			Sum of Squares	df	Mean Square	F	Sig.
UTAUT * Digital_Leadership	Between Groups	(Combined)	9573.160	25	382.926	3.434	0.000
		Linearity	9569.109	1	9569.109	8.581	0.000
		Deviation from Linearity	4.051	24	0.169	1.514	0.073
	Within Groups		15.167	136	0.112		
	Total		9588.327	161			

Based on Table 5, it is known that the significance of the regression direction (linear) is 8,581 with a significance (sig.) of 0.000. So, when compared with the value (0.05), then the value of sig. obtained was smaller. This means that the regression model is proven to be linear; furthermore, for the significance of the regression direction, sig. (0.000), which indicates that the direction of the regression is significant.

Discussion

This study indicates that the digital leadership applied by the principal influences the teachers' acceptance and use of digital technology. From the results obtained, it can also be said that the better the digital leadership applied by the principal, the better the acceptance and use of digital technology for teachers will be. The creation of digital leadership that can provide moral support and various supporting facilities needed for technology integration will motivate teachers to implement technology in their instructional activities (Aldawood et al., 2019; Cunningham et al., 2022). However, if digital leadership is not formed in schools, which makes the unavailability of support for technology implementation, teachers will be reluctant to use technology in the instructional activities (Corbett & Spinello, 2020; Ilomäki & Lakkala, 2018). Effective leadership is critical to an organization and school institution (Cunningham et al., 2022; Effendi et al., 2020; Hamzah et al., 2021). Leadership is effective if the principal has a high spirit, so he has a strong sense of self-confidence to carry out leadership and has clear goals. Digital leadership combines the concept of leadership with technological developments. In implementing the strategy, the principal must plan using technology to facilitate learning in schools.

Digital leadership in education will assist the advance of a shared vision for comprehensive technology integration and encourage an environment and culture conducive to achieving the objectives (Benitez et al., 2022; Cunningham et al., 2022). The leadership vision can be identified through the following points; first, identifying and applying research related to education and technology, learning psychology, and instructional design rules in directing the use of computers and technology in educational activities. Second, applying strategies and knowledge of problems associated with organizing school alteration processes. Third, apply effective group skills. Fourth, applying effective leadership in developing and evaluating district technology planning and implementing group process skills. Fifth, engaging in supervised field-based experiences with an accomplished technology facilitator or director.

This study found that digital leadership had an effect of 79.8% on the acceptance and use of digital technology by teachers. Thus, it confirms that the school principal's leadership is vital in making teachers willing to accept and use technology in the learning process (Arokiasamy et al., 2015; Ismail et al., 2021). The study also confirmed that the principal's leadership would influence the behavior of teachers. The better the leadership quality of the principal, the better the behavior of teachers and other school members (Dekawati, 2020; Kin et al., 2018). In general, the leadership quality of the principal will affect the teachers' performance and will further determine the school's success in achieving learning objectives (O'Shea, 2021; Sammons, 2010). For this reason, school principals are required to continuously improve their leadership abilities to realize quality leadership.

Schools must carry out online learning if it is related to the Covid-19 pandemic. Then digital leadership is mandatory for school principals to implement. Moreover, in the Covid-19 pandemic, many teachers are still experiencing problems implementing online learning (Saha et al., 2022; Scherer et al., 2021; Selvaraj et al., 2021). For this reason, support from the principal as a leader in the school is urgently needed to ease the burden on the main teachers in implementing online learning. The application of digital leadership will reduce the problems of teachers in carrying out online learning, which requires them to use the latest technology in the learning process (AlAjmi, 2022b; Hamzah et al., 2021). Because with the implementation of digital leadership, teachers will get the support they need to ease their burden in online learning (Ilomäki & Lakkala, 2018; Saputra et al., 2021). Previous research also stated that teachers must apply technology to optimally run online learning (Khatoony & Nezhadmehr, 2020; Mali & Lim, 2021; Nartiningrum, 2020). Several studies have confirmed that the implementation of digital leadership is essential to improve the quality of education (AlAjmi, 2022b; Hamzah et al., 2021; Ismail et al., 2021).

Currently, there are still many schools that have not been able to apply distance learning to the fullest due to the lack of teacher skills in integrating technology and the lack of supporting facilities owned by schools (Barrot et al., 2021; Dhawan, 2020; Yan et al., 2021). This shows that digital leadership in the school may not have been implemented properly. Considering the results of this study and the limitations of research that only conducts studies to determine the relationship of digital leadership to the acceptance and use of digital technology by teachers in the city of Singaraja, further research is needed that identifies the level of implementation of digital leadership in schools with a wider reach. Thus, data will be obtained regarding the extent to which school principals have implemented digital leadership. From further research, appropriate steps can be formulated to improve the quality of digital leadership carried out by school principals. With good mapping, appropriate solutions can be formulated to improve digital leadership, which will impact efforts to realize quality online learning. In addition, another research that involves more independent variables may also need to be done since various factors may affect teachers' acceptance and integration of digital technology.

4. CONCLUSION

Based on the results of this study, it can be concluded that digital leadership has a significant influence on the acceptance and use of digital technology by teachers. This is evident from the results of the analysis, which show that digital leadership contributes as much as 79.8% to the acceptance and use of digital technology, especially the use of Google Classroom during the online learning process during the Covid-19 pandemic. So it can be suggested to school principals to apply good digital leadership so that implementing online learning that requires educators to integrate digital technology can be carried out properly.

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