The Influence of Digital Literacy on Learning Effectiveness Through Classroom Management: Moderating Effect of IT Infrastructure

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Abstract

Digital Literacy is essential in the post-pandemic era. Teachers use Digital Literacy to provide learning materials, conduct the teaching process, and conduct evaluations online. However, Digital Literacy requires adequate information technology infrastructure to produce classroom management and learning effectiveness on an ongoing basis. This research examines the relationship between digital literacy and learning effectiveness through classroom management and the moderating effect of IT infrastructure. The study used questionnaires to obtain data on Christian-based schools in Surabaya. The questionnaires were distributed to as many as 363 through a Google form, and 132 were filled out again. Data processing used partial least square. The results showed that digital literacy has an impact on classroom management. Classroom management influences learning effectiveness. Digital literacy affects learning effectiveness through classroom management. Digital Literacy has not influenced classroom management and learning effectiveness with information technology infrastructure as a moderating variable. This research provides a practical contribution for education managers to understand the adjustment of IT infrastructure to make digital literacy the basis for managing class management. In addition, teaching staff must be educated to keep abreast of technological developments to support the teaching process and improve class management. The study enriches the theory of the use of technology in education and interactional education in the classroom.

Keywords: Class Management, Digital Literacy, Information Technology Infrastructure, Learning Effectiveness.

1. Introduction

The digital era requires everyone, including teachers in schools, to get used to using digital devices to support their work and activities. Digital devices used in preparing teaching materials are essential to training yourself to be accustomed to operating and using them. At the beginning of 2020, the world was shocked by one very precarious event: the COVID-19 pandemic. This condition changes all activities previously carried out outside the home to activities carried out inside the house. The impact of COVID has resulted in the complexity faced by every organization in carrying out its activities because, in a short time, it must be able to use digital devices (Nikou et al., 2022). The pandemic changed the way most who work on the job site work, changing by using and relying on the sophistication of technology. Activities carried out using digital tools will gradually be able to understand and improve each individual's abilities, called Digital Literacy. Policy makers in organizations are trying to provide digital tools to carry out work activities adequately (Farrell et al., 2021).

The Indonesian government also imposed the limits by calling it PSBB (large-scale social regulations) and then changing it to PPKM (enforcement of rules on community activities). The government carries out restrictions to overcome the spread of the virus (Djalante et al., 2020). The implementation of these restrictions requires activities carried out using technology that suits your needs. Teachers also experience this condition in teaching and learning activities using digital devices. The ability of schools to provide information technology as a digital device to support the learning process is the main thing to support these activities. The same thing also happens for teachers who must master digital devices in providing and delivering teaching materials digitally in online classroom management.

The learning process in online classes using digital devices can determine the effectiveness of ongoing learning. Teachers and students must use digital devices to run online classes to support learning effectiveness (Panigrahi et al., 2021). Learning effectiveness is determined by the teacher's ability to use digital devices adequately. The ability of teachers to understand digital literacy well can maintain adequate teaching quality so that classroom management carried out online can run well (Coiro et al., 2016).

Teacher creativity is essential in using digital devices to maintain quality learning. Teachers who master digital devices can encourage students to follow the learning and produce dynamic classroom changes. The learning process carried out online continuously can improve the ability to master digital devices (Castek

& Manderino, 2017). Teachers can use digital devices schools provide as information technology infrastructure to support their activities (Kaushik & Agrawal, 2021). Teacher activities in supporting the learning process using digital devices include providing adequate teaching materials for students, conducting the learning process online, providing interesting assignments for students, conducting tests or exams for students, announcing grades for students, providing announcements for students and parents, and others.

Teachers can use digital tools to organize all learning tasks more neatly, and assignments can be quickly delivered to students. Omiunu (2019) stated that digital literacy is a person's expertise in using digital tools continuously as a means of mediation. The ability of a person to use digital devices will make it easier to communicate and collaborate well. Teachers can train students online through activities outside of teaching hours by providing additional classes. Teachers can teach students online, and teachers can also search for teaching materials and access the internet easily to manage classes well. Tejedor et al. (2020) state that digital literacy is something that a person perceives to acquire the right digital tool facilities to be able to manage, access, and identify digital services to build new knowledge, create media expression, and communicate with others, in the context of situations in a particular life, to allow constructive social actions; and to reflect on the process. Digital Literacy is a skill a person has when using technological sophistication to effectively develop competence (Cartelli, 2010; Ala-Mutka, 2011).

Digital literacy used to carry out the learning process requires transformation by using digital tools such as laptops, tablets, smartphones, and other social media tools to support better and provide suitable means of motivating learning (Mahfud, 2021). The ability to create a website using HTML (hypertext markup language) is the basis, and the use of Photoshop for graphic works and MS Office makes the importance of digital Literacy (Techataweewan & Prasertsin, 2018). Teachers use Digital Literacy by providing online learning materials, conducting online teaching processes, and conducting evaluations. Also, online can improve educators' performance and competence (Ramadhan et al., 2019). Mardiana & Suyata (2017) stated that digital literacy involves a combination of several types of literacy, namely, information technology literacy, information literacy, technological Literacy, media literacy, and visual Literacy, so it becomes increasingly important with the emergence of the digital environment. Literacy can be interpreted as a person's ability to understand and see and understand the content of what is written. Through moderation of the information technology, Infrastructure can collect data,

process information, be accessible, and be shared in the form of information, which can be used as an information center to create reliable reports (Westonlie et al., 2018; Firmansyah & Siagian, 2022). Effective learning makes the learning process used to provide knowledge and understanding for teachers to students to achieve the goals set (Panigrahi et al., 2021). Educators will become more active when training themselves and more agile in understanding digital tools such as laptops, tablets, smartphones, and other social media tools (Mahfud, 2021).

Based on the explanation above, few studies have discussed the relationship of digital literacy affecting class management and learning effectiveness with information technology infrastructure as a moderator variable. Therefore, this study aimed to investigate the influence of digital literacy on learning effectiveness and class management. Second, understanding the effect of class management affects learning effectiveness. Third, the importance of digital literacy affects learning effectiveness through class management. Fourth, the magnitude of the influence of digital literacy on class management and learning effectiveness with IT Infrastructure as a moderation variable.

2. Literature Review

2.1. Digital Literacy

A person's ability to use digital tools consciously and can train himself to create, collaborate and communicate using text in digital form is referred to as digital Literacy (Farrell et al., 2021). The ability to use digital technology in the millennial era can help a person perform tasks quickly and help to learn (Muthupoltotage & Gardner, 2018). Understanding the practice using text and digital tools can be done online (Coiro et al., 2016; Nikou et al., 2022). Digital Literacy can also be expressed as a person's ability to understand and use information technology to be helpful in activities (O'Byrne & Pytash, 2017; Castek & Manderino, 2017; Ramadhan et al., 2019). Digital Literacy is a constellation of knowledge, skills, and competencies needed to thrive in a technology-dominated culture (Hobbs & Moore, 2013; Abdulai et al., 2021; Techataweewan & Prasertsin, 2018).

Castek & Manderino (2017) state that digital literacy can be determined by how many people collaborate, create, and communicate using text and digital tools. The skills and competencies required to use the internet and digital technology effectively improve resilience (Hosman & Pérez Comisso, 2020; Ala-Mutka, 2021). According to Coiro et al. (2016), digital literacy can provide benefits to increase cooperation in the learning process in the classroom, produce something

as a fruit of thought for teachers, and primarily facilitate communication between fellow teachers. Hobbs & Moore (2013) and Chan et al., 2017) argue that digital Literacy is an order to master the use of technology. Digital Literacy is the ability of users to find, understand, and use the information and interpret it correctly (Abdulai et al., 2021; Nikou et al., 2022). The research indicators used in this study adopted the research of Ramadhan et al. (2019) and Chan et al. (2017): able to adapt to digital technology (DL1), familiar with the use of digital file format (DL2), able to upload material to internet sites (DL3), able to organize digital devices in learning (DL4), and able to provide evaluations with digital devices (DL5).

2.2. Infrastructure of Information Technology (IT)

Information technology (IT) Infrastructure is defined as the extent to which data and applications used in information technology systems (Vélez et al., 2017; Westonlie et al., 2018). Information technology using its infrastructure requires expertise and the ability to find, evaluate, use, and find information sharing (Nikou et al., 2022; Jang et al., 2021; Djiantoro & Tarigan, 2022; Firmansyah & Siagian, 2022). Information technology infrastructure is used to collect and process information, as a data center can be accessed and shared (Westonlie et al., 2018).

Information technology infrastructure used in digital literacy can be digital technology, protocols, communication tools, and internet access on the network (Vélez et al., 2017). The information technology infrastructure owned by the organization is important in providing services to customers (Kundu et al., 2020). Technology for online learning requires software and hardware used to support online learning environments (Johnson et al., 2015; Agrawal, 2021). Information technology infrastructure is an integrated information technology companies use (Broadbent & Poon, 2015; Kumar & Reinartz, 2016).

his research adopted the study by Hatlevik and Hatlevik (2018) in assessing the information technology infrastructure as follows: the use of information technology systems used for classroom practice (II1), presenting information technology through teacher instruction (II2), providing enrichment support to students (II3), assessing student learning through tests using information technology (II4), providing learning tasks to students through information technology systems (II5), exploring learning materials for students using information technology systems (II6) and collaborating with students using information technology (II7).

2.3. Class Management

Classroom management is the teacher's actions to produce an environment that supports and provides academic and social-emotional learning (Habibi et al., 2017). Classroom management can be defined as teachers' ability and skill to create and maintain optimal learning conditions (Rusman, 2018). Ibrahim et al. (2016), and Benawa et al., (2014). stated the efforts made by teachers to create a compelling and fun teaching and learning atmosphere for students to understand learning objectives.

Classroom management can also be defined as the teacher's actions in creating a learning environment that respects, cares, is orderly (Gultom & Saun, 2016). Haloi (2022) states that classroom management using information technology in education aims to improve educational outcomes. Each teacher can differ in understanding and handling problems and situations in specific contexts (Sternberg, 2017). Classroom management is needed in the learning process between teachers and students through images, digital, books, and journal forms (Chan et al., 2017; Hoy et al., 2013).

The indicators used for classroom management are teaching materials according to the predetermined curriculum, students can access teaching materials, teachers can provide teaching materials, and teachers provide materials before lectures (Haloi, 2022; Özdamli, 2011; Pandipa, 2019). Classroom management comprises four sub-themes: seating arrangements, fostering students' interest, and organizing the learning process (Habibi et al., 2017). Established classroom management includes: providing teaching materials (CM1), helping students to obtain teaching materials (CM2), providing learning with materials (CM3), quickly understanding the difficulties (CM4), providing repetition of learning materials (CM5), providing positive feedback (CM6), and high learning motivation (CM7).

2.4 Learning Effectiveness

Learning effectiveness can be defined by the extent to which the learning process can achieve predetermined goals; students are expected to know, understand, and demonstrate after the learning process (Panigrahi et al., 2021; Merriam & Bierema, 2014). Choi et al. (2013) show social trust creates a context of predictability and stability for original, open dialogue, as well as for critical reflection and risk-taking when the individual is faced with the need for change.

The indicators used for effective learning are as follows: the teacher uses teaching materials following school provisions (LE1), the teacher provides teaching materials to students before class starts (LE2), teachers can give teaching well (LE3), teachers evaluate the implementation of learning on an ongoing basis (LE4), and teachers provide learning assessment results to students (LE5) (Regulation of the Minister of National Education of the Republic of Indonesia number 41 of 2007; Fullan, 2017).

2.5. The Relationship Between Concepts

Proficiency in using digital devices can innovate according to teaching needs and as a good learning environment (Kaushik & Agrawal, 2021). Digital literacy can be used online using IT infrastructure in the health sector to understand and interpret the information correctly, efficiently, and under health values (Abdulai et al., 2021; Vélez et al., 2017. Digital Literacy is vital for students to have the knowledge and skills to find information, communicate, and make transactions using technology (Techataweewan & Prasertsin, 2018) (Jang et al., 2021). Literacy practices applied to texts and digital tools have been conceptualized and labeled as online comprehension (Coiro et al., 2016).

H$_1$: Digital Literacy affects learning effectiveness.

Information technology enriches teaching materials in digital form through short videos, images, and materials (Chan et al., 2017; Djiantoro & Tarigan, 2022). Digital Literacy finds, understands, and uses all health information provided on the platform to interpret it correctly and according to health values (Abdulai et al., 2021). Digital Literacy positively impacts students in obtaining essential learning materials for a successful learning process (Techataweewan & Prasertsin, 2018; Ramadhan et al., 2019; Benson & Kolsaker, 2015). Of course, various skills are needed to use this technology appropriately and participate in learning activities without significant obstacles.

H$_2$: Digital Literacy affects classroom management.

Learning effectiveness can be defined by the extent to which the learning process can achieve predetermined goals; namely, students are expected to know, understand, and demonstrate after the learning process (Panigrahi et al., 2021; Chan et al., 2017; Abdulai et al., 2021). Digital Literacy students who strongly do not may face poor academic achievement and fewer job opportunities because it will be difficult to obtain information sources wholly and quickly (Techataweewan & Prasertsin, 2018; Ramadhan et al., 2019). According to Lankshear & Knobel (2016; O'Byrne & Pytash, 2017), digital literacy is necessary to be a digital tool for more effective learning, curation, and knowledge generation.

H$_3$: Classroom management affects learning effectiveness.

Teachers can properly use information technology infrastructure in computer devices, such as hardware and other software, to edit videos and teaching materials more effectively (Chan et al., 2017; Ramadhan et al., 2019; Johnson et al., 2015). The ability of students to provide teaching materials on the website can provide an easy learning process for students (Özdamli, 2011) (Kundu et al., 2020; Vélez et al., 2017; Westonlie et al., 2018; Özdamli, 2011).

The role of teachers is to prepare learning instruments; teaching aids as effectively deliver materials (Pandipa, 2019) effectively. Clow and Makriyannis (2011) and Tannady et al. (2019), learning effective analytics is a computer-based instructional system for documenting the assessment of learning outcomes for learning effectively.

H$_4$: Digital Literacy affects Learning Effectiveness through classroom management.

H$_5$: Digital Literacy affects classroom management with IT Infrastructure as a moderation variable.

H$_6$: Digital Literacy affects Learning Effectiveness with IT Infrastructure as a moderating variable.
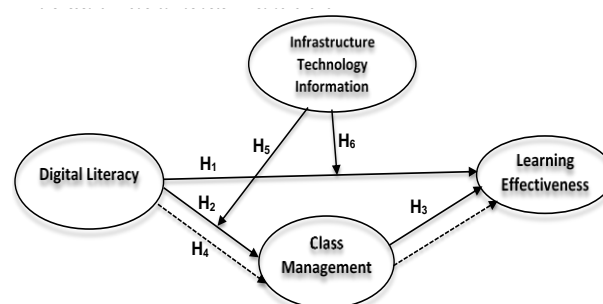

Figure 1. Research concept framework

3. Methods

This research uses quantitative methods, which are interpreted as research methods through the efforts of a researcher to find knowledge by presenting data in the form of numbers. Quantitative research is systematically compiled against parts and tries to find causality to know the interrelationships involving theory, design, hypothesis, and determining the subject. The population is a generalized area consisting of objects or subjects with a certain quantity and characteristics determined by the researcher to be studied and then concluded. This study took the population in Surabaya in several X schools randomly. It characterized Christian school education, which already has adequate information technology infrastructure with 363 teaching teachers in 7 Christian-based education schools. The samples obtained from the population must be truly representative (representative) so that researchers using the Slovin formula approach obtained a minimum of 79 samples. It collects research data by distributing closed questionnaires through Google Forms used on a Likert scale to measure predetermined items. The method used is explanatory research with a methodical approach that uses partial least squares (PLS) with the help of SmartPLS version 3.00 software (Hair et al., 2014).

Table 1. Respondent profile

Criterion	Sub Criteria	Number of respondents	Percentage
Gender	Man	65	49%
	Woman	67	51%
Age	20 – 30 years	14	11%
	31 – 40 years old	41	31%
	40 – 50 years old	44	33%
	Over 50 years old	33	25%
Digital Literacy Used	Google Meet	68	60%
	Zoom	108	95%
	Learning Management System	28	25%
	Literacy	26	23%
	Other	7	6%
Subject Teacher	Religion	26	13%
	English	16	14%
	Computer	12	11%
	Homeroom Teacher	25	22%
	Indonesian	3	3%
	Civic	1	1%
	PJOK	3	3%
	Thematic	1	1%
	IPA	2	2%
	Electrified	2	2%
	Cultural Arts and Skills	1	1%
	Shadow Teacher	1	1%
	Javanese	1	1%
	PAK (Ethics)	1	1%
	Mathematics	1	1%
	Not written down	18	15%

The questionnaire given to schools by sending a Google form link was obtained by research respondents who work as teachers actively teaching in Christian schools. The questionnaire obtained through the Google form was 132 respondents. However, 114 questionnaires can be further processed, and the remaining 18 do not fill out completely. Therefore, profiles based on demographics consist of age, digital literacy used, and teachers of subject areas. Respondent profiles by demographics can be seen in Table 1.

The number of respondents based on age who answered the questionnaire was mainly teachers aged 31-50 years, totaling 85 respondents (64 %) who were categorized as senior and experienced teachers and could still use digital devices properly. The use of digital applications used so far, the majority of teachers use Zoom application as many as 108 people (95%), followed by teachers who use Google Meet application as many as 68 people (60%), and the Learning Management System (LMS) as many as 28 people (25%). Based on profile data aged 40-50 years and 31-40 years, it is appropriate because it influences digital literacy on learning effectiveness by using an IT infrastructure system for reporting and preparing teaching materials for elementary school students. Teachers can make a perfect impact in every job at

school. Most respondents' occupations were teachers in specific subject areas, as many as 71 people (63%), and homeroom teachers, 25 people (22%). Most respondents are purely teachers in the X generation and Millennials (born 1967-1997) who are experienced in the field of study and as full homeroom teachers to take responsibility every day in the class. Most respondents were elementary school teachers with bachelor's degrees in English, mathematics, religion, and others and bachelors of elementary school teacher education who worked in elementary schools, even S2 (Education Management). Based on the result illustrated in Table 1, the respondents complied with the sample criteria regarding age, digital literacy, and competency in various subjects. Hence, the data obtained is valid for further processing and analysis.

4. Results

Data analysis in this study used the Partial Least Square (PLS) statistical method approach and used the SmartPLS software program. Analysis of research data includes evaluation of the outer model and inner model. Validity testing includes convergent validity expressed using the average variance extracted (AVE) value with the outer loading value. The discriminant value uses the

Table 2. Goodness of fit

Research Variables	Composite Reliability	AVE	Measurement Items	Loading Factor
Digital Literacy	0.918	0.693	DL1	0.760
			DL2	0.838
			DL3	0.853
			DL4	0.862
			DL5	0.843
IT vs Digital Literacy to TLM (Teaching Learning Material)	1.000	1.000		
Infrastructure IT	0.900	0.573	II1	0.861
			II2	0.888
			II3	0.812
			II4	0.795
			II5	0.848
			II6	0.513
			II7	0.558
Learning Effectiveness	0.932	0.733	LE1	0.768
			LE2	0.872
			LE3	0.884
			LE4	0.871
			LE5	0.879
Moderating Effect IT vs Digital Literacy to LE	1.000	1.000		
Class Management	0.812	0.599	CM1	0.757
			CM2	0.601
			CM3	0.819
			CM4	0.785
			CM5	0.597
			CM6	0.564
			CM7	0.502

criteria that Fornell-Larcker conveyed. Reliability testing used composite reliability and Cronbach's alpha with a minimum magnitude of 0.7 (Hair et al., 2014). Based on the analysis used with Partial Least Square (PLS) obtained, the outer model value is in Table 2.

Indicators with a loading factor value greater than or equal to 0.5000 and variables with a greater reliability of 0.7000 and AVE above 0.5000 have acceptable goodness of fit. The inner model aims to predict relationships between hypothesized latent variables. The value of Q-square determines the predictive size of the model, while the path coefficient assesses the significance between variables. The R-Square for learning effectiveness is 0.420, which means that the percentage of learning effectiveness can be explained by digital literacy, class management, and IT infrastructure of 42.0%. The R-Square value for class management of 0.396 means that the percentage of the value of the management class can be explained by the variables of digital Literacy and IT infrastructure is 39.6%. The Q-Square value obtained on this model is 0.650. The result is greater than 0, thus suggesting the model has predictive relevance. This result indicates that the model has a predictive relevance value.

4.1. Hypothesis Analysis

Research hypothesis testing is shown at a t-statistical value. If the t-statistical hypothesis testing value is above or equal to 1.960 or the significance value (p-value) is below or equal to 0.050 (5%) it is stated that the hypothesis is accepted. The hypothesis test results are shown in Figure 2 and Table 3.

Based on Figure 2 and Table 3 can answer pre-established research hypotheses. The first hypothesis (H₁) established that digital literacy affects learning effectiveness with p-values of $0.041 < 0.050$ (t-statistics of $1.974 > 1.960$). These results suggest that the first hypothesis is accepted. Furthermore, this study states that digital literacy affects learning effectiveness by 0.204, so an increase in understanding of digital literacy in teachers can increase learning effectiveness. The second hypothesis (H₂) expressed by digital literacy affects class management with p-values of $0.018 < 0.050$ (t-statistics of $2.367 > 1.960$). The second hypothesis is also accepted, so it can be stated that digital literacy positively affects class management by 0.299. Therefore, increasing teachers' understanding of digital literacy affects providing exciting teaching materials for students, and the learning process occurs well.
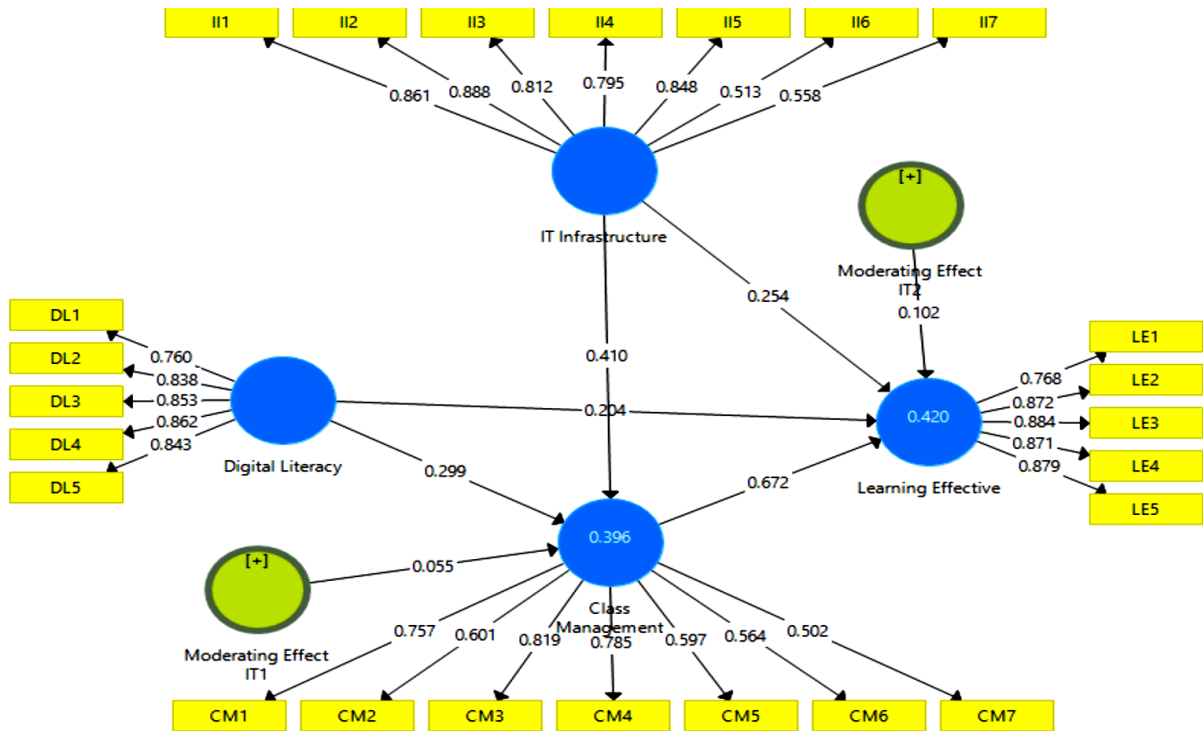
Figure 2. Path coefficient analysis result

Table 3. Hypothesis test result

Hypothesis	Relationship	Path Coefficient	T Statistics	P Values	Remarks
H_1	Digital Literacy → Learning Effectiveness	0.204	1.974	0.041	Accepted
H_2	Digital Literacy → *Class Management*	0.299	2.367	0.018	Accepted
H_3	*Class Management* → Learning Effectiveness	0.672	7.730	0.000	Accepted
H_4	Digital Literacy → *Class Management* → Learning Effectiveness	0.201	2.467	0.014	Accepted
H_5	IT Digital Literacy → *Class Management*	0.055	0.828	0.408	Rejected
H_6	Moderating effect IT vs. Digital Literacy → Learning Effectiveness	0.102	1.392	0.164	Rejected
H_7	Infrastructure IT → Learning Effectiveness	0.254	2.322	0.021	Accepted
H_8	IT Infrastructure → Class Management	0.410	3.226	0.001	Accepted

The third hypothesis (H_3) expressed by class management affects learning effectiveness with p-values of $0.000 < 0.05$ (t-statistics of $7.730 > 1.960$), so it can be concluded that the third hypothesis is accepted. Based on this, class management affects learning effectiveness by 0.672. The ability of teachers to provide exciting and easy management classes influences improving learning effectiveness. The magnitude of the influence of information technology infrastructure directly affects class management with p-values of $0.021 < 0.050$ (t-statistics of $2.322 > 1.960$). Therefore, the ability of the school to empower teachers to use information technology infrastructure adequately can have an impact on preparing attractive management classes for students. The fifth hypothesis (H_5), namely that digital literacy affects class management and information technology infrastructure as a moderation variable with p-values of $0.408 > 0.050$ (t-statistics of

$0.828 > 1.960$). These results show that digital literacy does not significantly influence class management with information technology infrastructure as a moderation variable. Besides, Information technology infrastructure increases learning effectiveness obtained with p-values of $0.021 < 0.050$ (t-statistics of $2.322 > 1.960$). These results show that providing adequate information technology infrastructure continuously improves school learning effectiveness. Information technology infrastructure contributed 0.254 to learning effectiveness.

The sixth hypothesis (H_6) is supported by the fact that digital literacy affects learning effectiveness with IT infrastructure as a moderation variable with p-values of $0.164 > 0.050$ (t-statistics of $1.392 < 1.960$). These results show that digital literacy does not significantly affect learning effectiveness with information technology infrastructure as a moderation variable. Both hypotheses have been rejected based on the results of

the fifth hypothesis (H₅) and the sixth hypothesis (H₆). The role of information technology infrastructure as a moderation variable is not proven. Still, it can be used as a free variable that can significantly influence class management and learning effectiveness. The fourth hypothesis (H₄) expressed by digital literacy affects learning effectiveness through class management p-value of 0.014 < 0.050 (t-statistic of 2.467 > 1.960). Therefore, it can be said that the fourth hypothesis (H4) has been accepted. Improving the ability of teachers to understand digital literacy can improve complete and adequate class management to increase learning effectiveness. The seventh (H₇) and eighth (H₈) hypotheses are obtained by using the PLS version 3 analysis tool as an additional form of results because IT Infrastructure is a moderation variable. The results of the seventh hypothesis (H₇) show that IT Infrastructure has a positive and significant impact on learning effectiveness with a p-value of 0.021 < 0.050 (t-statistic of 2.322 > 1.960). The results of the eighth hypothesis (H₈) show that IT Infrastructure influences class management of 0.410 with p-values of 0.001 < 0.050 (t-statistics of 3.226 > 1.960). H₇ and H₈ are accepted, thus indicating that IT Infrastructure can significantly increase learning effectiveness and class management.

5. Discussion

Improving the ability of teachers to use Digital Literacy can provide teaching materials to their students before class starts (LE2), and teachers can teach better (LE3). This research shows that increasing digital literacy has a positive effect on increasing learning effectiveness. The results of this study confirm the results of research that state that digital literacy has an influence on Learning Effectiveness in producing outstanding students and schools (Vélez et al., 2017; Techataweewan & Prasertsin, 2018; Jang et al., 2021; Muthupoltotage & Gardner, 2018). Therefore, instructors' increased grasp of digital literacy impacts providing engaging instructional materials. For students, the learning process occurs well.

Digital Literacy that teachers optimally utilize by uploading material to internet sites (DL3) and being able to organize digital devices in learning can have an impact on improving class management. Digital Literacy owned by schools with the ability for teachers to manage it can make it easier for teachers to understand the difficulties of learning materials for students. In addition, teachers can proactively redo the learning material adequately. This study's results support the research that states that digital literacy affects class management (Chan et al., 2017; Techataweewan & Prasertsin, 2018).

Class management, described as the biggest loading factor in teachers, can help understand the difficulties

of learning materials faced by students (CM3), and teachers provide repetition of learning materials to strengthen understanding (CM4) can influence learning effectiveness. The ability of teachers to understand student development in establishing class management can provide teaching materials to their students before class starts and provide good teaching. As a result, class management reduces the effectiveness of learning. Learning efficacy is improved when teachers can deliver engaging and simple management lessons. The results of the study can confirm the results of research that state that class management has a positive and significant effect on learning effectiveness (Chan et al., 2017; Techataweewan & Prasertsin, 2018; Lankshear & Knobel, (2016); Hobbs & Moore, 2013; Wei et al., 2021).

They are increasing teachers' understanding of digital literacy with the ability to upload material to internet sites (DL3) and organize digital devices in learning impact class management. Improvements in class management can impact effective learning by evaluating the implementation of learning on an ongoing basis and can provide good teaching. The results of this study confirm the results of the research of Chan et al. (2017), Ramadhan et al. (2019), Özdamli (2011), and Kundu et al. (2020), which states that digital Literacy affects learning effectiveness through class management.

The data processing results found that digital literacy did not significantly affect class management with information technology infrastructure as a moderation variable. These results show that the role of information technology infrastructure as a moderation of the relationship between digital literacy and class management is not proven. The role of information technology infrastructure as a moderator is not appropriate but as a direct variable that influences class management. Chan et al. (2017) stated that teachers could properly use information technology infrastructure in computer devices, such as hardware and other software, to edit videos and teaching materials more effectively. Ramadhan et al. (2019) stated that the ability of lecturers to upload learning materials on the internet and websites is primarily determined by the organization's hardware and software devices in uploading articles; it is very dependent on the information technology infrastructure they have. Johnson et al. (2015) stated that the capabilities of IT infrastructure consisting of hardware and software, as well as networks used for online learning, can provide learning materials as an increasingly complete repository of data and information for participants. The ability of students to provide teaching materials on the website using information technology infrastructure can provide an easy learning process for students (Özdamli, 2011).

Data processing results found that digital literacy affects class management with information technology infrastructure as a moderation variable is not proven. The role of information technology infrastructure as a moderation variable does not affect class management and learning effectiveness. The results of data processing found that information technology infrastructure affects learning effectiveness. The role of information technology infrastructure with the use of information technology in practice in the classroom and the presentation of material to students using information technology can affect learning effectiveness. The results of the research follow the results of Özdamli's study (2011), namely, the ability of teachers to develop, design, and provide material that can help students in obtaining the material will provide an initial understanding for students to improve effective learning process and the role of teachers in preparing learning instruments, teaching aids as a form of delivering learning materials and preparation of teaching materials that can be owned earlier by students can provide the learning process in the classroom to be effective and motivate students (Pandipa, 2019). This research provides the first practical contribution for education managers to understand the adjustment of IT infrastructure with the ability to teach staff to make digital literacy the basis for managing class management. Second, teaching staff must be educated to keep abreast of technological developments to be utilized and support the teaching process and improve class management. The theoretical contribution is to enrich the theory of the use of technology in education and interactional education in the classroom. For this reason, it is necessary to conduct further research with information technology infrastructure as a free variable and intervening variable. Class management can increase learning effectiveness, so school management needs to maintain the availability of learning materials with adequate structure and evaluation. Teachers must provide material in the school's complete information technology system before the learning process starts each semester. School managers must build cooperation with universities by improving their abilities through training related to the provision of learning materials and digital training on an ongoing basis. School administrators are also advised to update their information technology related to hardware, software, and the ability to use it. The results showed that information technology infrastructure could not be a moderation variable between digital literacy and class management but can have a direct influence so that it can be used as a free variable that impacts class management.

6. Conclusions

As stated previously, the objective of this study is to examine the influence of digital literacy on learning effectiveness through classroom management with the moderation of IT infrastructure. Based on the analysis result, the conclusions were withdrawn as follows. Digital Literacy impacts learning effectiveness and class management in students' teaching and learning process. Second, class management affects learning effectiveness. This condition also determines class management by the teacher's ability to understand the difficulties of the learning material faced by students and provide repetition of the material learning influences learning effectiveness. Third, Digital Literacy affects learning effectiveness through class management. Digital Literacy does not significantly influence class management and learning effectiveness with information technology infrastructure as a moderation variable. The findings demonstrated that information technology infrastructure can directly impact class management and cannot be utilized as a moderating variable between digital literacy and class management. Instead, it can be used as a free variable.

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