Jurnal Inovasi Teknologi Pendidikan
Volume 11, No. 3, September 2024 (299-309)
Online: http://journal.uny.ac.id/index.php/jitp

Social media learning strategies, teachers' digital competencies and online learning quality: A correlational study

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ARTICLE INFO

Article History
Received:
8 May 2024;
Revised:
7 August 2024;
Accepted:
13 August 2024;
Available online:
30 September 2024.

Keywords
Social media learning strategies; Digital competency; Learning quality; Teacher

ABSTRACT

Digital competence for teachers needs special attention because learning today cannot be separated from the use of technology, so learning is of high quality. However, conditions in Indonesia show the opposite, where not all teachers have mastered digital technology. This study examines the relationship between social media-based learning strategies teachers' digital competencies and learning quality in Indonesia. The quantitative method with a correlational approach was used in this study. A total of 1001 teachers in Indonesia were the respondents. Data was obtained through questionnaires completed by the respondents. The results showed a positive relationship between social media-based learning strategies and teachers' digital competencies. A positive relationship is also seen between social media-based learning strategies and learning quality. The implication is that teachers should maximize the use of social media in learning to increase their digital competence and improve learning quality. On the other hand, schools should also provide facilities, training, and mentoring to encourage teachers to implement social media-based learning strategies.

How to cite:
Widhanarto, G.P., Prihatin, T. & Kusumawardani, S. (2024). Social media learning strategies, teachers' digital competencies and online learning quality: A correlational study. *Jurnal Inovasi Teknologi Pendidikan*, *11*(3), 299-310. https://doi.org/10.21831/jitp.v11i3.73020

INTRODUCTION

The quality of teachers is the key to the success of education in the present and future (Inkeeree et al., 2020). Qualified teachers determine the quality of graduates (Betlem et al., 2019). Competencies from various domains must be possessed by teachers to create a meaningful learning process (Ibrahim et al., 2019). Not only that, the development of technological aspects must also be followed by teachers having various technological competencies, one of which is digital competence (Huang, 2022). An understanding of the digital world is needed because digital tools are very important to be implemented to develop the required competencies by educational agents involved in the teaching and learning process (Prestridge et al., 2019). This has led to the importance of digital competencies as one of the challenges facing today's teachers, who must implement ICT integration in their teaching practices (Meroño et al., 2018). Digital competence is utilizing digital technology to learn, work, and participate in society (Bergum et al., 2023). However, teachers' digital competence in Indonesia should receive special attention because not all teachers can use technology for learning and self-development (Saluky et al., 2022).

The quality of learning is determined by the quality of the teacher (Ariawan et al., 2019). This means that qualified teachers will produce a quality learning process (Raikes et al., 2019). Learning must be built by addressing the needs of students and determining the times so that it will produce quality outputs and outcomes. However, if you look at the condition of education in Indonesia, the learning process needs to be improved because based on the results of the National Assessment in 2023, the results of learning quality achievements for primary and secondary school levels are still in the medium category where for primary schools it only increased by 6.35, junior high schools only by 2.16 and senior high schools by 1.62 compared to 2021 (Kemdikbud, 2023). Although there has been an increase compared to the previous year, the increase is insignificant. This means that the quality of learning at various levels must receive attention.

To improve the quality of learning that produces better educational outcomes, it is important to integrate digital technology into the teaching and learning process (Dey & Bandyopadhyay, 2019). This is where teacher digital competence becomes a vital domain that must be developed to build a quality learning process according to today's demands (Vogt & Hollenstein, 2021). Thus, teachers must be able to keep up with technological changes through various online platforms for learning and performance improvement (Dai et al., 2020). As the division between digital and traditional pedagogies dissolves, teacher capacity to seamlessly integrate technology becomes imperative. Not only does this strengthen responsiveness to shifting student behaviors and preferences, but it facilitates more engaging, collaborative, and self-directed modes of education aligned with 21st-century demands. Strong teacher digital proficiency therefore remains a core contributor to improved educational outcomes.

Social media is one of the developments in the digital world, and it occupies a central position in people's lives today (Cowan & Kostyk, 2023). The use of social media in Indonesia has increased drastically from year to year. In 2024, as many as 49.9% use social media sites such as Facebook, Twitter, and Instagram (Wearesocial, 2024). Not only adults, social media has also spread to elementary and middle school-age children, increasing the number of users every year. Many people, including teachers and students, use social media to communicate, especially after the pandemic (Zucker & Kontovounisios, 2018). Adults are increasingly using social media for professional and academic development in addition to entertainment purposes (Griffiths et al., 2022). Although social media has evolved over the last few decades, educators have only recently started using social media for learning (Porat et al., 2018). The use of social media in the classroom can help reinforce practice behaviors, improve digital literacy, and develop professional networks (Ruddy & Ponte, 2019).

Social media has the potential to be used as a learning tool. Several studies have shown the positive implications of social media in education, where, in addition to entertainment, it is also used for academic purposes, especially for publishing assignments and announcements (Bannister et al., 2020). Even research by Liu & Yu (2019) shows that using Facebook as a learning tool helps in information retrieval, improving learning ability, and encouraging student self-reflection. Other research shows that social media, such as Twitter, positively correlates with great point average and student engagement in higher education (Quadir et al., 2022; Teixeira & Hash, 2017). However, existing research only sometimes shows the positive success of using social media in learning. Among them, research by Šerić shows that using social media for academic purposes does not affect educational performance measured by student learning outcomes (Šerić, 2019). Even research by Siebert supports these findings where there is a negative relationship between social media use and learning outcomes (Siebert, 2019). This means a gap exists between previous studies empirically assessing social media for learning.

Further research on social media-based learning needs to be conducted so that it will minimize the existing gap. Therefore, this study examines the relationship between social media-based learning strategies and teachers' digital competencies and learning quality in Indonesia. This research is essential because the current condition of education in Indonesia, which is running the national curriculum with several innovations, requires active, creative, effective, and fun learning with technology integration. This means that teachers with digital competencies are needed to build an effective learning process according to the demands of the times. On the other hand, learning

today must facilitate flexible and sustainable learning. The use of social media becomes a bridge in building a quality learning process with quality human resources. However, empirical evidence is needed on how social media-based learning is closely related to the quality of learning and teachers' digital competencies that support their role as educational facilitators. This study contributes to technology-enhanced learning and educational innovation by providing new insights into the interplay between social media-based learning, teacher digital competencies, and learning quality, and offers practical recommendations for policymakers, educators, and researchers seeking to leverage social media to enhance teaching and learning in Indonesia.

METHOD

Quantitative correlational research or ex post facto method (Creswell, 2009) was used in this study to reveal the relationship between social media-based learning strategies and teachers' digital competencies and learning quality. The research begins with the development of instruments, which are then tested on a small scale to groups outside the research respondents; valid questionnaires are then distributed to respondents through online forms. The data obtained is then tabulated and then analyzed with statistical calculations. Finally, conclusions are drawn based on the research results which are associated with existing theories. This research design is presented in the following Figure 1.

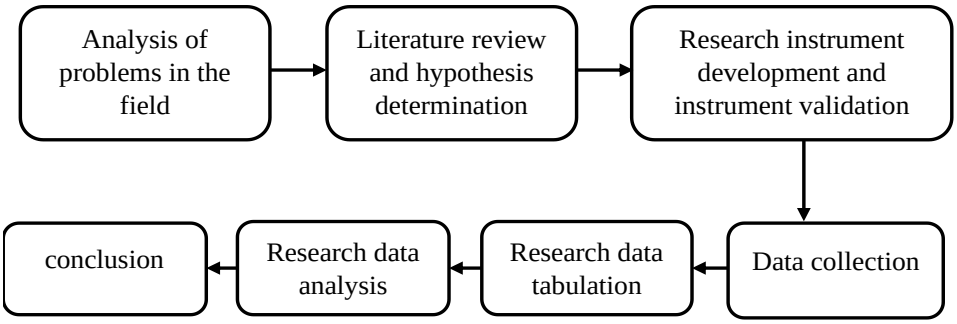

Figure 1. Research Flow Chart

Participants

The study sample comprised 1.001 teachers from both public and private schools located across several regions in Indonesia. These participants were recruited using a simple random sampling method (Sugiyono, 2019). Schools and teachers were randomly selected from various public and private educational institutions located in different areas of the country. This ensured the sample was representative yet still feasible, given resource constraints. The names of the schools and the research respondents remained confidential in observance of ethical research protocols protecting anonymity and privacy. Simple random sampling allowed conclusions from this dataset to be generalized to the broader population of Indonesian educators whilst minimizing potential bias from non-random selection. Maintaining respondent confidentiality aimed to encourage open and honest participation without fear of identification or consequences.

Questionnaire Design

The questionnaire serves multiple purposes, including gathering demographic data to gain a deeper understanding of the background of the teachers involved in the study. By better understanding these teachers, we can conduct a more comprehensive and accurate analysis and correlation. Additionally, the questionnaire measures teachers' use of social media as a tool for enhancing learning and analyzes its effectiveness based on outlined aspects, thereby assessing their social media-based learning strategy. Furthermore, the questionnaire evaluates teachers' digital competency, encompassing digital literacy, communication, collaboration, and their ability to create digital content. Lastly, it assesses different dimensions of learning quality, including the management of the learning environment, learner feedback, the effectiveness of communication

processes, and engagement in learning activities. The following Table 1 presents the indicators in detail for each variable under consideration.

Table 1. Variable Instrument

No.	Variable	Aspect	Based on
1	Social Media-Based Learning	Using social media as a learning tool	Roohani & Vincheh (2023)
2	Teacher Digital Competency	Information and Data Literacy Communication and Collaboration Digital Content Creation	Instefjord & Munthe (2016)
3	Learning Quality	Learning Management Learner Response Communicative Process Learning Activities	Bistari (2018)

The questionnaire used a 10-point Likert scale, ranging from 1 (strongly disagree) to 10 (strongly agree), to definitively gauge respondents' attitudes and opinions. The scoring system was interpreted as follows: a score of 1 represented a very strong negative perception, while a score of 10 represented a very strong positive perception. A total of 1.001 teachers participated in the study, and the questionnaire was administered electronically via a Google Form, ensuring a convenient and accessible data collection process.

Validity and Reliability Results of the Research Instruments

The validity of the research instrument was tested by giving the survey to 25 people. The obtained data was calculated using product moment correlation. The results were compared to the r Table. An item is considered valid when the calculated r value is greater than the r Table value. A summary of the instrument validity calculation results is as follows:

Table 2. Instrument Validity Test Results

No.	Variable	Number of Items Tested	Valid Items	Invalid Items
1.	Social Media-Based Learning	15	15	-
2.	Teacher Digital Competency	15	15	-
3.	Learning Quality	15	15	-

Based on Table 2, it is known that the number of questionnaire items that were tested for each variable was 15 items. The number of valid items to measure the Social Media-Based Learning variable was 15 items. All of the questionnaire items for the Teacher Digital Competency were declared valid. The 15 items of the questionnaire for the learning quality were also declared valid.

Reliability testing of the instrument was done using SPSS software. The instrument is considered reliable if the Cronbach's Alpha value calculated is more than 0.60 (Sugiyono, 2019). The results of the instrument reliability testing can be seen in the following Table 3.

Table 3. Instrument Reliability Testing Results

No.	Variable	Cronbach's Alpha
1.	Social Media-Based Learning	0.932
2.	Teacher Digital Competency	0.946
3.	Learning Quality	0.956

The results of the reliability testing are presented in Table 3 For the Social Media-Based Learning variable, the Cronbach's alpha value was 0.932. Since this exceeds the cut-off point of 0.60, the instrument measuring this variable can be considered reliable. The Teacher Digital Competency variable had a Cronbach's Alpha value of 0.946 > 0.60, indicating this instrument is also reliable. The Cronbach's alpha value for the Learning Quality variable was 0.956. This met the reliability threshold of 0.60.

In summary, all variables tested through the research instruments met or exceeded the benchmark value of 0.60. The Social Media-Based Learning, Teacher Digital Competency, and Learning Quality instruments all demonstrated good reliability based on Cronbach's Alpha results. Therefore, it can be stated that the overall set of instruments used in this study exhibited reliability that was sufficiently high for the purposes of the research. The instruments consistently measured their respective variables in a dependable and repeatable manner.

Data Collection

A two-part questionnaire was used to collect data from teachers involved as respondents in this study. The first part of the questionnaire was used to collect demographic data. Thirty items were used to measure the variables in this study. The scale items of these variables were developed based on existing theories. The questionnaire items for the social media-based learning strategy variable are based on Roohani & Vincheh (2023) theory with the revealed aspects including using social media as a learning tool. Meanwhile, items to reveal teacher digital competency variables were developed from aspects of Information and data literacy, Communication and collaboration, and Digital content creation (Instefjord & Munthe, 2016). Questionnaire items for learning quality variables were developed from aspects of learning management, learner response, communicative process, and learning activities (Bistari, 2018).

Data Analysis

The data was analyzed according to the research approach. Descriptive and inferential statistics, as well as the underlying relationships between variables, were obtained by calculating appropriate statistics using SPSS-26 software. Descriptive statistics (mean and standard deviation) were employed to uncover the relationship between the study variables. A pairwise correlation analysis was conducted by calculating Spearman-rho correlation coefficients to evaluate the association between social media-based learning strategy variables and teachers' digital competencies, as well as learning quality. This provided a quantitative understanding of how integrated social media strategies are linked to educators' digital skills and quality of instruction. The Spearman-Rho test, a nonparametric measure, determined the strength and direction of any monotonic relationships between ordinal variables. By leveraging the analytical capabilities of SPSS, inferential analysis illuminated patterns in the data, thereby supporting conclusions regarding the research questions.

RESULTS AND DISCUSSION

Result

This study employed descriptive and inferential statistical analysis using SPSS software. Descriptive statistics helped summarize and organize the data to identify patterns and relationships. Inferential statistics including correlation analysis tested hypotheses regarding associations between variables. The results of the descriptive statistical calculations in this study are shown below:

Table 4. Results of Descriptive Analysis of Social Media-Based Learning Strategies

Descriptive Statistics								
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
SosmedLearning	1001	3	10	6.90	1.901	-.210	.077	-.693	.154
Valid N (listwise)	1001								

Table 4 shows that the data for the social media-based learning strategy variable obtained from 1.001 respondents shows a minimum value of 3 and a maximum value of 10. Meanwhile, the average answer of the research respondents is 6.90, with a standard deviation of 1.901. The

Skewness and Kurtosis values presented in Table 4 are used to determine whether the data from the research variables are normally distributed. Table 4 shows that the Skewness value is 0.210 and the Kurtosis value is 0.693, where both values are not close to zero, which means that the data is not normally distributed. This abnormal distribution makes hypothesis testing carried out with non-parametric statistics.

Table 5. Results of Descriptive Analysis of Teacher Digital Competence

Descriptive Statistics									
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Digitalcom	1001	2	10	6.33	1.346	-.176	.077	.236	.154
Valid N (listwise)	1001								

Table 5 shows the minimum value for the teacher digital competency variable based on data from 1001 respondents is 2 with a maximum value of 10. The teacher digital competency variable measures the skills and abilities of teachers in utilizing digital technology. The average value of the digital competency variable is 6.33 indicating that on average the digital skills of teachers who responded are in the mid-range. The standard deviation of 1.346 shows that most teachers' digital competency scores are close to the mean. Meanwhile, the skewness value of 0.176 shows the data distribution is slightly positively skewed with most scores concentrated below the average. The kurtosis value of 0.236 indicates a relatively flat data distribution compared to a standard normal distribution. Overall, the data provides insight into teacher's preparedness and capability to use technology for educational purposes based on self-assessment.

Table 6. Results of Analysis of Teachers' Digital Competence in terms of Level of Education

ANOVA					
DigitalCom					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	44.216	5	8.843	4.977	.000
Within Groups	1767.962	995	1.777		
Total	**1812.178**	**1000**			

The results presented in Table 6 show a sig. value of 0.00 which is less than 0.05 and an F-count value of 4.977 which is greater than 2.37. These findings indicate there are statistically significant differences in the digital competency of teachers in Indonesia when compared based on their level of education. Specifically, a teacher's educational background impacts their competency in digital skills. The study respondents represented various levels of education including Senior High School/Equivalent, Diploma, Applied Bachelor, Bachelor, Master, and Doctorate. Therefore, there are differences in digital competencies. This highlights the role of formal education qualifications in developing educators' technical aptitude and ability to integrate digital tools into their pedagogical approaches. The results emphasize the importance of continuous training to close competency gaps dependent on a teacher's educational attainment.

Table 7. Results of Descriptive Analysis of Learning Quality

Descriptive Statistics									
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
LQuality	1001	2	10	7.75	1.373	-1.381	.077	3.445	.154
Valid N (listwise)	1001								

Based on Table 7 data on learning quality variables from 1.001 respondents shows a minimum value of 2 and a maxim value of 10. The table also shows that the average value for learning quality variables is 7.75 with a standard deviation of 1.373. The skewness value shown in Table 7 is 1.381, and the kurtosis value is 3.445. The resulting skewness and kurtosis values are not close to zero, meaning the learning quality variable data is not normally distributed. This makes the calculation process to answer the hypothesis of this study using non-parametric statistics.

Table 8. Correlation Analysis Results

Correlations					
			SosmedLearning	**Digitalcom**	**LQuality**
Spearman's rho	SosmedLearning	Correlation Coefficient	1.000	.285**	.087**
		Sig. (2-tailed)	.	.000	.006
		N	1001	1001	1001
	Digitalcom	Correlation Coefficient	.285**	1.000	.164**
		Sig. (2-tailed)	.000	.	.000
		N	1001	1001	1001
	LQuality	Correlation Coefficient	.087**	.164**	1.000
		Sig. (2-tailed)	.006	.000	.
		N	1001	1001	1001

**. Correlation is significant at the 0.01 level (2-tailed).

Table 8 demonstrates the correlation between the study variables where the correlation value between social media-based learning strategies and teacher digital competence is 0.285 with a significance value of 0.00 < 0.01. This indicates there is a positive and statistically significant relationship between the use of social media-based learning strategies and a teacher's level of digital competence. As presented in Table 8 as well, a similar relationship exists between social media-based learning strategies and learning quality. The correlation value between these two variables is 0.087, representing a positive relationship. The significance value of 0.006 < 0,05 demonstrates this association is meaningful. Therefore, the findings suggest that when teachers implement social media platforms in their teaching practices, it improves their digital skills while also enhancing the learning experience and outcome for students. The statistically significant correlations reinforce the influence of technology-driven instructional techniques.

Discussion

The level of education (low, medium, and high) reflects the skills and quality profile of people (Grigorescu et al., 2020). Each level of education teaches different skills from simple stages to complex stages so the competence of graduates of each level is different and increasing (Lee et al., 2019). This is not much different from the findings of this study which show that the digital competence of teachers has differences in terms of education level. Between Diploma, Applied Bachelor, Bachelor, Master, Doctorate, and Senior High School graduate teachers have different abilities in mastering digital devices, digital content, and understanding of the digital world.

Research by McNamara et al., (2021) found that social media can be utilized as a medium in competency development for teachers so that mastery of creative instructional planning can be possessed by teachers. Social media can be a means of learning through content sharing and is proven to retain knowledge, and critical thinking skills, make real-world connections with classroom material, empower students, and improve communication skills (Sohoni, 2019). The findings align with this study, which shows that social media-based learning strategies positively correlate with teachers' digital competencies in Indonesia. The more frequently teachers apply learning strategies with social media, the better their digital literacy level, ability to communicate and collaborate online, and creativity in developing digital content will increase. In other words, integrating social media into learning plays a significant role in improving teachers' digital competence.

The existence of social media can be used as a medium for delivering direct feedback so that interaction and collaboration can be established (Khachan & Özmen, 2019). Teachers can

collaborate and share learning resources through groups or social media accounts such as WhatsApp, Facebook, and Instagram. Similar conditions were also found in this study where teachers used social media features such as WhatsApp and Facebook groups to conduct discussions with other teachers. Sharing information related to training is also done by teachers through WhatsApp groups and sharing posts on Instagram. Learning that integrates creative processes such as memes, infographics, and podcasts in social media can develop the ability to design digital learning content for teachers (Davidson et al., 2019). This study also found similar conditions where teachers package learning materials into digital content such as videos and infographics to be shared on social media. The use of social media in learning can enhance collaborative learning among teachers and mastery of digital features (Lee, 2023). Similar conditions are also found in this study where teachers who use social media for learning master the use of computers, video editing applications, graphic design, and features on WhatsApp, Facebook, and Instagram.

Using Facebook (FB) for professional purposes can improve student communication and collaboration during distance learning (Zarzycka et al., 2021). Social media is beneficial in increasing student engagement and interaction in the classroom (Xue & Churchill, 2020). This is also found in this study, where teachers build the learning process by providing material in WhatsApp groups and posting content through YouTube and Instagram; students can discuss, and submit questions, and comments in groups and comment columns. So that there is an increase in student involvement and interaction in learning. Student engagement and the process of student interaction in learning also increased along with the utilization of online commenting and discussion through social media (Zou et al., 2022). Research by Šerić (2019) shows that using social media can increase effectiveness in learning and provide information that can make learning better. Other findings show that social media serves as a mediating agent to reach students in their Zone of proximal development (ZPD) (Alghamdi & Alanazi, 2019). The findings of previous research are in line with this study, which shows a positive relationship between social media-based learning and learning quality. This means that the use of social media elements in learning, such as online study groups on Facebook or Instagram, material sharing through YouTube, and online quiz evaluation through applications, contribute to improving learning quality.

Pittman & Haley (2023) stated that social media can increase important emotional, cognitive, and behavioral aspects of engagement in learning. Students' use of social media is positively related to their creativity and academic engagement through intrinsic motivation (Gulzar et al., 2021). This research also shows the same condition where the use of social media in learning helps teachers develop students' creativity through video-making assignment projects to be shared on Instagram and YouTube. Students are also given the freedom to comment and ask questions on Instagram and WhatsApp groups.

The use of social media as a learning tool can make the process more fun and meaningful with easy access to real content by learning materials (Pusey, 2018). This study also found the same findings where teachers disseminate digital materials such as videos and infographics to students through groups and Instagram posts. On the other hand, teachers also give students the freedom to access learning content on social media to help them understand the material delivered by the teacher.

CONCLUSION

This study successfully revealed a positive and significant relationship between social media-based learning strategies and teachers' digital competencies. The better the learning strategy by integrating social media, the better teachers' digital competence. This means that learning strategies carried out by teachers by integrating social media elements such as social media groups, online learning videos, and online competency tests have a positive effect on the development of teachers' digital competence. In addition, there is also a positive and significant relationship between social media-based learning strategies and learning quality. The use of social media in learning contributes to improving the quality of learning processes and outcomes. The findings of this study are consistent with the theoretical framework and previous research on the role of technology-based learning strategies on teachers' digital competencies and learning quality.

However, further research with a more robust design must emphasize the causal relationship between the research variables. It is also necessary to expand the scope of the sample to strengthen the generalizability of the research results.

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