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Professional Engagement and Digital Competence in Teacher Performance; with the Moderating Variable of Supportive Work Environment (Case Study of MGMP Teachers in East Java)

Original Article

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Abstract

Context and Relevance. Teacher performance is a key determinant of a teacher's success in implementing the learning process in schools. Not all teachers can adapt to technological changes, including digital transformation. Although the school environment provides adequate support facilities, obstacles still exist to the effective use of these learning technologies. This is no exception for MGMP teachers in East Java, who still face these obstacles. Objective. This research aims to improve teacher education programs by developing effective learning models to prepare future teachers professionally, including the application of the Digital Competence Framework for Educators. Hypothesis. To determine the direct effect of professional engagement and digital competence on teachers' performance. Furthermore, this study focuses on whether a supportive work environment can strengthen the effect of professional engagement and digital competence on teacher performance. Methods and Materials. This research employs an explanatory research approach with purposive sampling, involving 100 MGMP teachers across East Java, and analyzes the data using Structural Equation Modeling (SEM). Results. This study indicates that professional engagement and digital competence have a positive and significant effect on teachers' performance. Meanwhile, a supportive work environment can strengthen the effect of professional engagement on teachers' performance. However, a supportive work environment cannot enhance the effect of digital competence on teachers' performance. Conclusions. In this study, the results indicated an increase in professional engagement and digital competence among MGMP teachers. These results become a focus for improving teacher professional development programs. Therefore, both educational institutions and local governments need to support the creation of a supportive work environment through managerial support. Digital infrastructure and teacher collaboration will affect the sustainability of academic progress in the modern era.

Keywords: Professional Engagement, Digital Competence, Teacher Performance, Supportive Work Environment.

1. Introduction

The skills and knowledge required to live in today's society are essential, one of which is a model for teacher learning development. This is very useful for training and improving teacher competence (Loureiro et al., 2024; Momdjian et al., 2025). To determine teacher competence and skills, it is necessary to measure teacher performance to achieve quality results (Aningrum et al., 2022; Ghomi & Redecker, 2019). The training results will support student learning outcomes (Andriani et al., 2018; ÖZGENEL, 2019). A teacher can improve their performance by demonstrating loyalty and commitment to their duties at school

(Andriani et al., 2018). Professional engagement is associated with effective communication, fostering learning interactions among students, and professional responsibility (Falloon, 2020; Jin et al., 2023).

In the era of technological progress, teachers must effectively integrate technology into the learning process (Belay et al., 2022). This research is essential because the development of educational technology necessitates teachers' adaptation to digital learning systems (Ghomi & Redecker, 2019). Several previous studies have investigated the relationship between professional engagement and teacher performance, but few have explored the moderating role of a supportive work environment in the context of digital competencies. Professional engagement can increase teacher motivation and productivity (Bakker & Demerouti, 2017). Digital competence is an essential factor in improving the effectiveness of technology-based learning (Spante et al., 2018).

The main purpose of this research is to analyze the effect of professional engagement and digital competence on teacher performance and to examine the moderating of a supportive work environment. The novelty of the research lies in integrating three main variables into a single empirical model. The phenomenon on the ground shows that not all teachers who are members of MGMP can adapt quickly to using digital transformation. The teachers in the MGMP of East Java faced obstacles to optimally using learning technology for digital-based learning.

2. Literature Review

This research is using a supportive work environment moderation, it is expected to increase a positive climate for teachers, which will encourage teachers to create comfort in working, thereby having a positive effect on teacher performance. With the presence of supportive work environment, it is expected to strengthen the effect of professional engagement and digital competence on teacher performance.

2.1. Teacher Performance

Technological advances affect the skills and knowledge required of teachers in education during the era of digital transformation, necessitating a teacher-training model that promotes the development of competencies aligned with new educational requirements (Loureiro et al., 2024; Momdjian et al., 2025). Teacher performance is an essential component of achieving high-quality education (Aningrum et al., 2022; Ghomi & Redecker, 2019). Teacher performance is used to measure an individual's work performance in carrying out, describing, and producing something, whether physical or non-physical, in accordance with instructions (Andriani et al., 2018; ÖZGENEL, 2019).

2.2. Professional Engagement

The existence of professional engagement underscores the importance of understanding how to leverage personal and professional networks to develop collaborative networks and environments (Falloon, 2020). Professional engagement is associated with competence in communicating about new developments, caring for students, and fulfilling professional responsibilities (Jin et al., 2023). Professional engagement is a teacher's strategic participation in communication networks and in a continuously evolving collaborative environment (Falloon, 2020; Momdjian et al., 2025).

2.3. Digital Competence

Education and training for teachers in the use of digital technology are expected to enable them to master and utilize digital media in the learning process and in their work to optimize performance (Andriani et al., 2018; Marbawi et al., 2024). Teachers' proficiency with digital media will encourage them to continually explore and create a range of digital learning materials for use in the learning process (Dogbe & Marwa, 2024; Rubio-Gragera et al., 2023; Seifert & Lindmeier, 2024). To continuously improve the quality of education, teachers must continue to take advantage of opportunities, including the use of technology in instructional models and learning (Andriani et al., 2018; Marbawi et al., 2024).

2.4. Supportive Work Environment

A Supportive Work Environment supports an individual's performance through management and colleagues' support (Kundu & Lata, 2017; Phuong et al., 2021). Management support focuses on activities that provide opportunities and encourage teachers in their teaching and in improving their capacity, while peer support is evident in reciprocal relationships between colleagues (Kundu & Lata, 2017; Tripathi & Kalia, 2024). With a supportive work environment, teachers will have the ability and skills to use digital media to continuously create a variety of learning materials for the learning process.

3. Methods

This study adopts an explanatory research design with using a quantitative approach. Data were collected by distributing questionnaires in East Java members of MGMP. The validity and reliability of the questionnaires were first assessed using CFA before structural analysis.

3.1. Research Variable

Independent variables are variables that can effect dependent variables and do not have depencies among variables. Professional engagement (X1) and digital competence (X2) are independent variables in this study. Dependent variables are variables that are effect by independent variables. Teacher performance (Y) is dependent variables in this study, and a supportive work environment (Z) serves as a moderation in this study.

3.2. Population and Sample

The population consisted of teachers who were members of the Subject Teacher Working Group for Management and Business Services for the Office (MGMP-MPLB) in the East Java region. The sampling employed was purposive sampling, in line with the set criteria for active participants. Teachers are members of MGMP activities and have attended digital-based training. In total, 100 MGMP teachers were representative for the structural model analysis. Data were collected by distributing questionnaires in East Java. The validity and reliability of the questionnaires were first assessed using CFA before structural analysis.

3.3. Data Analysis Techniques

The likert scale is frequently used assessment method in surveys to measure professional engagement, digital competence, teacher performance and supportive work environment. The SEM model was chosen because it can comprehensively test the simultaneous relationships among latent variables and analyze their moderating effects (Hair et al., n.d.). In this study, the researchers identified the problem's sources and conducted a literature review to inform and compare previous studies on the research variables. The following are the hypotheses: (1) The effect of professional engagement on teachers performance; (2) The effect of digital

competence on teachers performance; (3) Supportive work environment moderates the effect of professional engagement on teacher performance; (4) A supportive work environment moderates the effect of digital competence on teachers performance. The description of the indicators for each variable based on previous research references includes

4. Results and Discussion

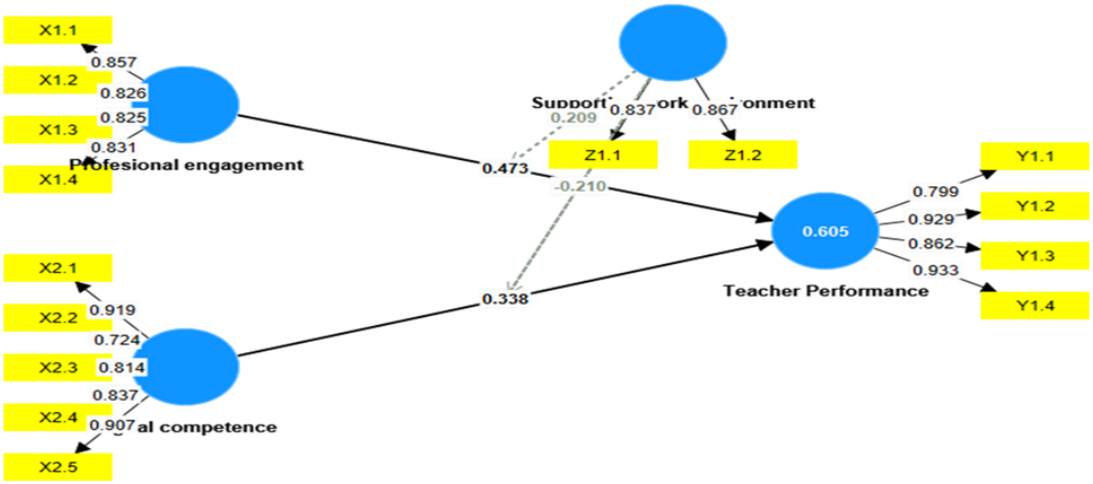

Figure 1: Data Analysis Results

Table 1. Outer Loadings

	X1.	X2.	Y1.	Z1.	Z1. x X2.	Z1. x X1.
X1.1	0.857					
X1.2	0.826					
X1.3	0.825					
X1.4	0.831					
X2.1		0.919				
X2.2		0.724				
X2.3		0.814				
X2.4		0.837				
X2.5		0.907				
Y1.1			0.799			
Y1.2			0.929			
Y1.3			0.862			
Y1.4			0.933			
Z1.1				0.837		
Z1.2				0.867		
Z1. x X1.						1,000
Z1. x X2.					1,000	

The outer loading analysis indicates that four indicators measure the professional engagement construct (X1), each with high factor loadings: X1.1 = 0.857; X1.2 = 0.826; X1.3 = 0.825; X1.4 = 0.831. All values exceed the threshold of 0.7; the results confirm that the validity of these indicators is associated with professional engagement. This confirms that aspects of professional engagement and dedication, and the indicators used, effectively measure professional commitment.

Outer loading digital competence (X2) has five indicators, with high loading factor values for X2.1 (0.919) and X2.5 (0.907). The other indicators also show relatively strong values: X2.2 = 0.724, X2.3 = 0.814, and X2.4 = 0.837. All indicators are biased because they

exceed the threshold of 0,7. Although the value of X2.2 is lower than that of the others, it still meets the specified requirements. This result indicates that the teachers' digital competence in this study is valid and consistent.

Teacher performance (Y1) yielded excellent results accros four strong indicators for Y1: Y1.1= 0.799; Y1.2 = 0.929; Y1.3 = 0.862; and Y1.4 = 0.933. This means teacher performance is accurately measured using indicators such as teaching effectiveness, achievement of learning targets, and overall professional appearance.

On the other hand, the supportive work environment (Z1) was measured using two indicators: Z1.1 = 0.837 and Z1.2 = 0.867. These values indicate that a supportive work environment, whether from colleagues, supervisors, or available facilities, is a well-established predictor of improvements in teacher performance. Finally, the interaction variables Z1xX1 and Z1xX2 each have a factor loading value of 1.000.

Finally, the interaction variables Z1xX1 and Z1xX2 each have a factor loading value of 1.000. These results indicate that the moderation model is perfectly formed, meaning that a supportive work environment strengthens the relationship between professional engagement and digital competence in teacher performance.

4.1. R-square

Table 2. R-square

	R-square	Adjusted R-square
Y1.	0.605	0.584

Based on the output, the R-squared for teachers performance (Y1) is 0.605, with an adjusted R-squared of 0.584. These results indicate that the independent variables are professional engagement (X1), digital competence (X2), and then moderating effect of a supportive work environment (Z1), can explain 60.5% of the variation in teachers performance. Meanwhile, the value 39.5% is attributable to other variables in the research model. Thus, R-square of 0.605 falls in the moderate-to-strong range. This shows that the model has good explanatory for teachers performance. The adjusted R-squared of 0.584, which is not substantially different from the R-squared, the results indicate that the model exhibits adequate stability sign of overfitting.

4.2. Reliability and Validity

Table 3. Reliability and Validity

	Cronbach 's alpha	Composite reliability (rho_a)	Composite validity (rho_c)	Average variance extracted (AVE)
X1.	0.855	0.857	0.902	0.697
X2.	0.896	0.904	0.924	0.711
Y1.	0.904	0.912	0.934	0.779
Z1.	0.623	0.627	0.841	0.726

The results of the reliability and construct validity testing it is proven that variables in the research model is the adequacy criteria. Professional engagement (X1) has a Cronbach's Alpha of 0.855. Composite reliability is 0.902, and AVE is 0.609. These values indicate that the indicators effectively measure teachers' professional engagement, with variance explained exceed 69.7%.

Furthermore, digital competence (X2) demonstrates excellent reliability and validity, with a Cronbach's Alpha of 0.896. Composite reliability is 0.924, and AVE is 0.711. This indicates that teachers' ability to master digital technology, in terms of literacy, skills, and the validity and consistency of measures of digital media use.

The teachers performance (Y1) is highest Cronbach's Alpha among the variables of 0.904. The composite reliability was 0.934, and the AVE was 0.779. This value indicates that indicators of teaching effectiveness assess teacher performance, the achievement of learning objectives, and the professional quality of task execution.

For the supportive work environment variable (Z1), the Cronbach's alpha value of 0,623. However, the composite reliability (0,841) and AVE (0,726) meet the minimum requirements, indicating that the construct is valid and reliable. This condition is appropriate because variable Z1 only has two indicators, so its alpha value tends to be lower.

4.3. Heteroit Monotrait Ratio (HTMT)

Table 4. Heterotrait-Monotrait ratio (HTMT)

	X1.	X2.	Y1.	Z1.	Z1. x X2.	Z1. x X1.
X1.						
X2.	0.957					
Y1.	0.840	0.802				
Z1.	0.893	0.725	0.672			
Z1. x X2.	0.587	0.601	0.420	0.616		
Z1. x X1.	0.541	0.575	0.482	0.746	0.806	

The relationship between professional engagement (X1) and digital competence (X2) shows an HTMT value of 0.957, exceeding the recommended limit, suggesting potential overlap or a lack of clear differentiation between the two constructs. In other words, the presence of professional engagement and digital competence among teachers in this study is closely related.

Meanwhile, the HTMT values between other constructs are within a safe range, such as X1-Y1 (0.840), X2-Y1 (0.802), X1-Z1 (0.893), X2-Z1 (0.725), and Y1-Z1 (0.672). These values indicate that although there are strong relationships between the variables, they can still be conceptually distinguished. For the interaction (moderation) variables, the results are also within acceptable limits, for example, Z1xX2 with Y1 (0.420) and Z1xX1 with Y1 (0.482), so that they do not cause discrimination problems.

Overall, this model meets the criteria for discriminant validity, except for the relationship between X1 (professional engagement) and X2 (digital competence), which is too high. The discussion highlights an important point: among teachers, professional engagement and digital competence appear closely related and difficult to disentangle.

4.4. Model Fit

Table 5. Model Fit

	Saturated model	Estimated model
SRMR	0.106	0.106
d_ULS	1.358	1.357
d_G	5.017	5,022
Chi-square	1,289.767	1289.762
NFI	0.434	0.434

The model fit test results indicate an SRMR of 0.106. This value is slightly above the ideal threshold of 0.08, indicating that the model does not yet have a good fit. However, in this PLS-SEM-based study, a value of approximately 0.10 is still acceptable, particularly in exploratory studies involving moderating variables. Furthermore, the d_ULS value of 1.357 and the d_G value of 5.022 indicate differences between the empirical and theoretical models.

However, a deeper interpretation of these two measures requires bootstrap testing to assess their significance.

Additionally, the obtained chi-square statistic is highly significant (X^2 = 1289.762). This is understandable because the chi-square test is sensitive to sample size, making it less suitable as a reference for PLS-SEM. Furthermore, the Normed Fit Index (NFI) is 0,434, which remains well below the ideal criterion of 0,90—indicating that the model has not yet achieved a high level of fit.

4.5. Path Coefficient

Table 6. Path coefficients

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
X1. -> Y1.	0.473	0.469	0.131	3.616	0.000
X2. -> Y1.	0.338	0.348	0.127	2.651	0.008
Z1. -> Y1.	-0.008	-0.003	0.086	0.098	0.922
Z1. x X2. -> Y1.	-0.210	-0.213	0.120	1.756	0.079
Z1. x X1. -> Y1.	0.209	0.206	0.092	2.266	0.023

The path coefficient analysis results indicate that variable X1 has a significant effect on Y1, with a coefficient of 0.4073, a t-value of 3.616, and a p-value of 0.000 (< 0.05). Variable X2 also has a significant effect on Y1 with a coefficient of 0.338, a T value of 2.651, and a p value of 0.008, which is also below the significance threshold of 0.05. This indicates that both X1 and X2 are significant predictors of Y1.

Conversely, variable Z1 does not have a significant effect on Y1 with a coefficient of -0.008, a T value of 0.908, and p = 0.922 (above 0.05). For moderation, the results indicate that the interaction term Z1xX2 on Y1 is not significant, with a coefficient of -0.210, a t-value of 1.756, and p = 0.079 (> 0.05). However, the interaction of Z1xX1 on Y1 is proven to be significant with a coefficient of 0.209, a T value of 2.266, and p = 0.023 (< 0.05). Thus, the independent variables X1 and X2 have a significant positive effect on Y1, while Z1 does not directly affect Y1. However, Z1 acts as a moderator, strengthening the effect of X1 on Y1 but not that of X2.

4.6. The Effect of Professional Engagement on Teacher Performance

The analysis results that professional engagement has a positive and significant effect on teachers performance, with a coefficient of 0.473, a t-statistic of 3.616, and a p-value of 0.000 (<0.05). This means that higher level of professional engagement, the higher the teachers performance. This shows that teachers who actively communicate, collaborate, and develop professionally are better able to design and implement effective learning (Dilekçi & Limon, 2020).

The results of the research by Misu et al. (2022), which shows that professional engagement by teachers in collaborative learning has a positive and significant on teacher performance. Thus, improved communication and collaboration positively affect teacher performance. Collaboration demonstrates reflection on learning practices that can strengthen teacher performance. In addition, professional engagement refers to teachers' active participation in professionally conducted learning activities at school (Zhang & He, 2024). The existence of professionally conducted learning activities reflects on teaching and learning practices in schools and supports self-development, thereby improving performance in the teaching and learning process (Belay et al., 2022).

Meanwhile, the research by Futterer et al. (2024), shows that professional engagement is influenced by teacher quality and the motivation that drives teacher behavior. Incorporating positive emotions and work-related motivation is part of teachers' engagement in instructional activities (Wu et al., 2024). Being motivated facilitates goal-oriented, task-focused behavior (Bakker & Demerouti, 2017). This explains the motivation required to improve educational institutions' progress, as well as the motivation that arises from teachers' educational practice. This indicates that, to improve educational institution development, it is also necessary to provide professional development programs to enhance teacher quality.

4.7. The Effect of Digital Competence on Teacher Performance

The analysis of digital competence shows a positive and significant effect on teacher performance, with a coefficient of 0.338, a t-statistic of 2.651, and a p-value of 0.008. This indicates that the higher a teacher's ability to use digital technology, the more effective the teacher's performance in the learning process. Teachers with digital competence can use technology to develop interactive, innovative learning plans, implement them, and evaluate their effectiveness. Among MGMP teachers in East Java, some actively use digital technology to design learning, communicate instructional material digitally, and integrate digital tools and media into instruction, achieving high performance in pedagogical, technical, social, and personal competencies.

This study aligns with Skantz-Åberg et al. (2022), who show that digital competence significant effect on teachers performance. This means that teachers ability to use digital technology in educational institutions remains low to moderate, which will affect learning outcomes. Developing teachers' proficiency with digital technology is an important aspect of modern education, supporting learning and development programs in schools (Momdjian et al., 2025). In addition, this study aligns with Basilotta-Gómez-Pablos et al. (2022), who explain that many teachers possess digital competence but remain highly limited in their pedagogical effectiveness. Teachers' technical proficiency is more than instrumental; it also involves reflection in and on their professional practice (Ferrando-Rodríguez et al., 2025). These results indicate that teachers participate in training only to fulfill their obligations, which does not guarantee that they will apply what they have learned in relevant and innovative teaching practices (Palacios-Rodríguez et al., 2025). Therefore, this study shows that support from multiple stakeholders, including educational institutions, training providers, and local governments, is needed to sustain these activities aimed at improving teacher performance.

4.8. Supportive Work Environment Moderates The Effect of Professional Engagement on Teacher Performance

This analysis shows that a supportive work environment strengthens relationship between professional engagement and teacher performance. The moderation coefficient value is 0.209. The t-statistic value is 2.266, and the p-value is 0.023. These results show that a supportive work environment increases the effective of professional engagement in improved teachers performance. With support from management, open communication, and colleagues, a favorable work climate can be created to encourage teacher activity, particularly among MGMP teachers in East Java.

The results of this study indicate that the supportive work environment reinforce the relationship between professional engagement and teachers performance. When teachers receive support from the school environment, including school leaders and fellow teachers, they are motivated to improve instruction, thereby enhancing teacher performance. This the research by Zhang & He (2024), which shows that a supportive work environment reinforce

teachers performance. A supportive work environment a factor in determining employee engagement and job happiness (Akdeniz & Korkmaz, 2023). A supportive work environment will increase employees' loyalty and professionalism (Srinivas et al., 2024).

In addition, the program includes supportive supervision, teacher collaboration, and an inclusive work culture, which will strengthen professional engagement in activities that ultimately improve the performance of MGMP teachers in East Java. In their research, Wu et al. (2024) explain that a strong supportive work environment affects professional engagement and teacher performance. This indicates that improving teacher performance requires attention to professional engagement and a supportive work environment (Kundu & Lata, 2017). Support from superiors and colleagues is also a significant factor in fostering a sense of a supportive work environment (Phan Tan & Pham Xuan, 2024). School and educational institution environments must foster calm, conducive conditions to support a supportive work environment. A supportive work environment will boost innovation in learning (Phuong et al., 2021). A supportive work environment addresses social and emotional needs by providing benefits and rewards in exchange for employees' contributions (Naz et al., 2020). In creating a supportive work environment, the implementation of learning programs through professional development should not rely solely on teacher motivation; it should also consider conditions that enable teachers to perform optimally (Tripathi & Kalia, 2024).

4.9. Supportive Work Environment Moderates The Effect of Digital Competence on Teacher Performance

This analysis shows that a supportive work environment does not moderate effect of digital competence on theachers performance. The coefficient value obtained was -0.210. The t-statistic value was 1.756, and the p-value was 0.079. These results show a supportive work environment enhances teacher performance but not digital competence, which is more dependent on individual factors, including personal motivation and readiness (Masoumi & Noroozi, 2025). This result that MGMP teachers in East Java show the moderation a supportive work environment on the effect of digital competence on teacher performance has not clearly proven, which means that even though MGMP teachers in East Java have good digital competence, it cannot strengthen the supportive work environment for teachers performance.

A supportive work environment focuses more on employees than on determining their perceived climate, supervisory relationships, and perceived organizational support (Kundu & Lata, 2017). A supportive work environment supports mental health and working conditions that provide comfort (Wu et al., 2024). Self-professionalism will affect workplace professionalism, ultimately enhancing performance (Alwerthan, 2024). The presence of digital competence will support the implementation of innovative digital services in public-sector institutions, as the service aspect lies with the service provider (Ingsih et al., 2024). The digital competence, including information and data literacy, communication and collaboration, and digital creation, influences perceptions of digital technology for learning (Singh, 2016).

The results of this study show that digital competence has a direct effect on teacher performance but does not strengthen the moderating effect of a supportive work environment. This indicates a supportive work environment dosn’t automatically strengthen the association between digital competence and teachers performance (Basilotta-Gómez-Pablos et al., 2022).

5. Conclusion

Professional engagement have a significant and positive effect on teachers performance. This show that higher levels of professional engagement are associated whit higher performance among MGMP teachers. Additionally, digital competence has significant and positive effect on teaches performance. This indicates that higher the digital competence, the more effective the MGMP teachers learning performance will be. A supportive work environment reinforce the association between professional engagement and teacher performance. This explains that a supportive work environment can increase professional engagement in improving MGMP teachers performance. A supportive work environment does not moderate the effect of digital competence on teachers performance. This show that a supportive work environment does not reinforce the relationship between digital competence and teachers performance.

Limitations. This study has several limitations. First, this research focuses on MGMP teachers; therefore, it remains to be generalized to other teacher associations for further research. Second, these research variables are limited to professional engagement, digital competence, and a supportive work environment. At the same time, other factors within the DigComEdu framework that may influence teacher performance have not been studied in depth.

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