

Digital Era Teacher Performance: The Influence of TPACK and Transformational Leadership

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Abstract: This research aimed to examine the influence of Technological Pedagogical Content Knowledge and school principal leadership on teaching performance in the digital era at State Junior High Schools in Trenggalek District, Trenggalek Regency. This research involved 165 State Junior High School teachers as the population. Using a simple random sampling technique, 117 State Junior High School teachers in Trenggalek District were selected as the research sample. This research used closed-ended questionnaires to collect data. The data were analyzed through descriptive statistics and inferential methods, including Pearson's correlation coefficient and multiple linear regression analysis. Research findings indicate that, TPACK and transformational principal leadership partially influence teaching performance in the digital era. Simultaneously, both TPACK and transformational principal leadership influence teaching performance in the digital era. Based on these results, it can be concluded that it is important to improve teacher capabilities through both TPACK and the quality of transformational leadership support from principals in order to improve teaching performance in the digital era.

Keywords: TPACK, Transformational Principal Leadership, Teaching Performance, Digital Era

INTRODUCTION

Education plays a crucial role in shaping students' experiences and the knowledge they gain, while learning is a means by which students to acquire education through the teacher's role. The quality of a teacher is often reflected in the effectiveness of their teaching performance, which directly contributes to the achievement of school goals (Dewi et al., 2018). Teachers need strong teaching performance to manage the learning process effectively and support students in reaching their full potential. Teaching performance is considered good when students are able to achieve optimal learning outcomes through improved learning

quality. The benchmark for good performance is reflected in the alignment between the results achieved and the standards that have been set (Prahara et al., 2022). Teachers are always expected to deliver optimal teaching performance as a demonstration of professionalism in their work.

The development of increasingly sophisticated technology has demanded teaching skills that are integrated with technology. The digital era has brought significant transformations to the education landscape, particularly through the implementation of innovative learning methods that simplify the teaching and learning process and enhance the effectiveness of interactions between teachers, students, and learning content (Sibagariang et al., 2023). As central figures in this transformation, teachers play an important role in developing and implementing diverse and creative teaching strategies. Therefore, teaching methods need to be continuously updated to keep pace with the times, including by integrating technology to create learning experiences that are engaging, interactive, and easy to understand (Karoso, 2024; Sumarsono et al., 2019). As educators, teachers need to adapt to the realities of the digital era to equip students with the skills and knowledge relevant to today's technological advancements. Integrating technology into learning requires creativity, where teachers design engaging lessons, develop innovative subject matter, and apply them in ways that suit the unique situations and contexts of their classrooms (Koehler & Mishra, 2009). This is due to the existence of three fundamental elements in teaching that are effectively integrated with technology, consisting of content, pedagogy, and technology, as well as the interaction between them. These elements come together to form the Technological Pedagogical Content Knowledge (TPACK) framework, which reflects teachers' understanding of how educational technology can be effectively combined with pedagogical and content knowledge to create meaningful and impactful learning experiences. The TPACK framework serves as a bridge that helps integrate content, pedagogy, and technology in ways that enhance teachers' performance in the digital era. By applying TPACK, teachers can ensure that technology is used effectively and meaningfully to support the learning process, ultimately providing maximum benefits for students (Sanjaya & Syefrinando, 2024). So that students acquire competencies aligned with the demands of the digital era, as well as teachers who can improve the effectiveness and quality of their teaching methods.

The shift toward the digital era in schools is closely tied to the role of the principal's leadership. As a central figure, the principal has the ability to mobilize all elements within the school to achieve its educational goals. Their role goes beyond administrative duties, they are also responsible for creating an environment that nurtures and maximizes students' potential

in line with the school's vision and expectations (Hayudiyani et al., 2022). In addition, principals serve as agents of change, encouraging teachers' professional development and facilitating collaboration to support 21st-century skills-based learning (Amanulloh et al., 2024). The quality of principals who can effectively manage the school will positively impact the teaching performance of teachers (Djarwal et al., 2025). The transformational leadership style plays a vital role in helping teachers enhance their teaching performance through the integration of technology into the learning process. By providing motivation, guidance, and personal attention, principals with a transformational leadership approach can inspire their teachers, increasing their awareness, enthusiasm, and willingness to grow (Yaminah et al., 2023). Through transformational leadership, principals can inspire teachers to adapt their teaching practices to the demands of the digital era, where integrating technology into every lesson is essential. By offering meaningful support, motivating teachers, and fostering a positive and dynamic work environment, transformational leaders can drive meaningful improvements in teaching performance, enabling educators to meet the challenges of modern education.

Education in the current digital era shows the condition of teachers who have difficulty adapting to technology. Several factors can influence the difficulty teachers face in integrating technology into the learning process. These factors include limited supporting facilities, such as limited internet access, limited availability of technological devices in schools, and low teacher competence in using learning technology (Mariati et al., 2022). This situation affects teachers' readiness to meet the demands of educational modernization. There are still some teachers who lack the readiness and skills necessary to keep pace with the modernization of education, as seen by students who are more capable and familiar with technology (Latif, 2020). Students today can access information quickly through various digital platforms, while some teachers still rely on slower and more limited sources due to a lack of technological proficiency. This challenge is particularly common among senior teachers who have been in the profession for many years. In the era of Society 5.0, the role of teachers has significantly evolved, as they are no longer regarded as the sole source of knowledge. Students are now able to access and even master information that may exceed the teachers' own understanding (Fitriana et al., 2023). Therefore, teachers with limited literacy and technological competence often face challenges in facilitating effective learning and adapting to the growing demands of technology-driven education. In response to this, it is essential for teachers to master the TPACK framework so they can design learning experiences that meet the needs and expectations of digitally savvy students. Through the TPACK approach, teachers can provide

learning variations to create an effective learning process (Mardhiati, 2023). Teachers certainly need the principal's support to ensure a smooth transition in integrating technology into the teaching and learning process. The transformational leadership style of the principal will encourage and support teachers in mastering technology to be applied in their teaching activities. Transformational leadership approach not only empowers teachers to develop and apply technological skills but also motivates them to create meaningful and high-quality digital learning experiences for their students (Saputra et al., 2022).

Numerous studies have been carried out on various aspects of the digital era, including research closely related to the topic explored in this study. Research by Pramana et al. (2023) suggest that a relationship exist between TPACK and spiritual intelligence in the performance of State SMA and MA teachers in Payakumbuh City. Then, research by Kusumaningrum et al. (2020) resulted in the finding that the teaching performance of junior high school teachers in pesantren-based institutions across East Java is significantly affected by instructional leadership, change leadership, spiritual leadership, school culture, and professional ethics (Kusumaningrum et al., 2020). Research by (Prestiadi et al., (2020) found that in the era of Education 4.0, transformational leadership plays a crucial role. This can be achieved by a strong sense of commitment and raising awareness among all members of the educational community, enabling them to effectively utilize advancements in technology, information, and communication as an integral part of the learning process (Tan et al., 2025).

Previous studies have shown that no research has simultaneously examined the role of TPACK and transformational leadership as independent variables influencing teacher performance in the digital era. This gap in the literature underscores the urgency of the present study. Ms. Novita Hardini, known as the “Mother of Teachers” in Trenggalek, is committed to promoting digital transformation in education, both in terms of infrastructure and human resources (Sakti, 2025). This commitment highlights the importance of assessing the extent of education digitization, particularly in relation to the readiness of educational human resources in the region. This study targets state junior high school teachers in Trenggalek District, Trenggalek Regency. This location was chosen because, as the urban center of the regency, its educational institutions are presumed to adapt more rapidly to the digital era compared to other districts. By focusing on a distinct geographical and contextual setting, this research offers a novel perspective and serves to complement existing studies. Therefore, investigating how TPACK and transformational leadership affect teaching performance in the digital era is not only relevant and timely but also constitutes a significant and valuable contribution to the field.

RESEARCH METHODOLOGY

This study adopts a descriptive-correlational design combined with multiple regression analysis within a quantitative research framework to examine how teachers' TPACK levels and principals' transformational leadership influence teaching performance in the digital era. The research was conducted among State Junior High Schools in Trenggalek District, Trenggalek Regency. The study population consisted of 165 teachers, from which the sample was determined using a simple random sampling technique. Applying the Slovin formula with a 5% margin of error, a total of 117 teachers were selected as respondents.

This study involves three main variables: Technological Pedagogical Content Knowledge (TPACK) (X1), the transformational leadership of school principals (X2), and teachers' teaching performance in the digital era (Y). Each variable is further broken down into sub-variables and indicators, which serve as the basis for developing the research questionnaire. Data were collected using a closed-ended questionnaire with a Likert scale as the measurement tool. Each statement item was rated on a four-point Likert scale, ranging from very positive to very negative responses, with scores from 1 to 4. The scores was chosen to avoid neutral bias and facilitate analysis.

The data in this study were analyzed using descriptive statistical methods, Pearson Product-Moment correlation, and multiple regression analysis. All analyses were carried out with IBM SPSS Statistics version 24. Before the analysis process, expert validation and field trials were conducted to ensure the quality of the instruments. The field trial results were then tested for validity and reliability, revealing that 9 out of 91 statements were invalid. Consequently, 82 valid statements were retained and used for data collection.

RESULTS

The descriptive analysis in this study includes several key statistical indicators, namely the mean, median, mode, standard deviation, minimum, and maximum values for each variable. The variables examined consist of Technological Pedagogical Content Knowledge (TPACK) (X1), principals' transformational leadership (X2), and teachers' teaching performance in the digital era (Y). The results were obtained through descriptive data processing using IBM SPSS Statistics version 24. These findings are summarized in the Table 1.

Table 1. Descriptive Data Analysis Results

Aspect	Result		
	X1	X2	Y
Number Of Statement Items	39	24	19
Mean	124,42	80,01	58,91
Median	122	76	58
Modus	117	72	57
Minimum Value	100	61	41
Maximum Value	156	96	76
Standard Deviation	11,559	10,291	5,672

The Table 1 illustrates that variable X1 measured by 39 statement items tested on 117 teachers as respondents obtained a mean value of 124.42; a median value of 122; a mode value of 117; a minimum value of 100; a maximum value of 156; and a standard deviation of 11.559. Variable X2 was measured by 24 statement items tested on 117 teachers as respondents, obtained a mean value of 80.01; a median value of 76; a mode value of 72; a minimum value of 61; a maximum value of 96; and a standard deviation of 10.291. The variable Y measured by 19 statement items, obtained a mean value of 58.91; a median value of 58; a mode value of 57; a minimum value of 41; a maximum value of 76; and a standard deviation of 5.672.

Based on these descriptive results, the data was further processed to determine the interval ranges and category groupings for each variable. The results show that the level of teachers' TPACK knowledge and understanding falls into the high category for 70 respondents (60%) and the very high category for 47 respondents (40%). For principals' transformational leadership, 63 respondents (54%) are in the high category and 54 respondents (46%) are in the very high category. Meanwhile, teachers' teaching performance in the digital era is categorized as low for 3 respondents (3%), high for 81 respondents (69%), and very high for 33 respondents (28%). These findings are summarized in the Table 2.

Table 2. Data Intervals and Category

Variable	Category	Interval	Frequency	Percentage
Technological Pedagogical Content Knowledge (X1)	Very High	125 - 126	47	40%
	High	97 - 125	70	60%
	Low	68 - 96	0	0%
	Very Low	37 - 67	0	0%
	Total		117	100%
Kepemimpinan Transformasional Kepala Sekolah (X2)	Very High	78 - 96	54	46%
	High	60 - 77	63	54%
	Low	42 - 59	0	0%
	Very Low	23 - 41	0	0%
	Total		117	100%
Kinerja Mengajar Guru Era Digital (Y)	Very High	61 - 76	33	28%
	High	47 - 60	81	69%
	Low	33 - 46	3	3%
	Very Low	17 - 32	0	0%
	Total		117	100%

Before conducting hypothesis testing, a classical assumption test is performed to determine whether the data meets the prerequisites for regression analysis. This process included tests for normality, multicollinearity, heteroscedasticity, and linearity. The Kolmogorov-Smirnov normality test results produced a Monte Carlo sig. >0.05 value of 0.074 so that the data was declared normally distributed and qualified for hypothesis testing.

The multicollinearity test results in a tolerance value of 0.663 (>0.10) and a VIF value of 1.508 (<10). These outcomes lead to the conclusion that there are no symptoms of multicollinearity between the independent variables and that the requirements for hypothesis testing have been met. Meanwhile, the heteroscedasticity test produces p-values greater than 0.05, specifically 0.336 for X1 and 0.476 for X2. These outcomes lead to the conclusion that there are no symptoms of heteroscedasticity of the independent variables in the regression model, and the model meets the requirements.

The linearity test for variable X1 shows a significant linearity value of 0.000 (<0.05) and a significant deviation from linearity value of 0.027 (<0.05). The scatterplot also displays a generally linear pattern for X1. Based on these results, it can be concluded that the relationship between X1 and Y follows a linear pattern, although it is not perfectly linear due to slight deviations. For variable X2, the significant linearity value is 0.000, while the significant deviation from linearity value is 0.628. These outcomes lead to the conclusion that the relationship between variables X2 and Y is entirely linear. Therefore, the linearity test meets the requirements for hypothesis testing. Although there is a slight deviation from the linear pattern in variable X1, it is minimal and does not significantly affect the overall regression model, even if it makes the model slightly less perfect.

The results of the classical assumption test show that all requirements for conducting hypothesis testing have been met. In the hypothesis testing process, the relationship between variables was examined using the Pearson product-moment correlation and multiple linear regression analysis to ensure the validity and strength of the findings. The results of the correlation test show that the p-value of variable X1 on Y is 0.000 (<0.05) with a Pearson Correlation coefficient of 0.784, indicating a strong and significant positive relationship between the two variables. Similarly, the p-value for X2 and Y is 0.000 (<0.05) with a Pearson Correlation coefficient of 0.551, which also reflects a significant positive relationship. Furthermore, the combined analysis of X1, X2, and Y shows a p-value of 0.000 (<0.05) and a Pearson Correlation of 0.758, confirming that both X1 and X2 are positively and significantly related to Y.

Hypothesis testing aims to determine how the independent variables influence the dependent variable through multiple linear regression analysis. The results show that the coefficient of determination (R^2) is 0.629 or 62.9%, meaning that X1 and X2 together explain 62.9% of the variation in the dependent variable (Y). The remaining 37.1% is influenced by other factors outside the model. Of this 62.9%, the largest contribution comes from X1, which accounts for 54.97%, while X2 contributes 7.92%. This indicates that although both variables play a role in influencing Y, X1 has a stronger effect than X2. Then the calculated F significance value is known to be 0.000 (<0.05), indicating that H3 is accepted, variables X1 and X2 simultaneously affect variable Y. The partial effect of each independent variable is reflected in the t-test results. The significance value of t for variable X1 is 0.000 (<0.05), indicating a significant relationship between X1 and Y. Therefore, H1 is accepted, confirming that X1 has a meaningful influence on Y. Then, in variable X2, the calculated t significance value is 0.042 (<0.05), so that H2 is accepted, X2 has an effect on variable Y. These outcomes of the hypothesis test, lead to the conclusion that the three initial hypotheses can be accepted. A multiple linear regression model obtained based on these results: $Y = 9.773 + 0.344X1 + 0.080X2$.

DISCUSSION

The Level of Technological Pedagogical Content Knowledge (TPACK)

Based on descriptive data analysis the TPACK level of teachers at State Junior High Schools in Trenggalek District, Trenggalek Regency in the high category. This finding shows that teachers have effectively applied the TPACK framework in creating meaningful learning experiences for students, in line with the rapid advancement of technology. Teachers with higher levels of TPACK are better able to design and deliver learning that integrates technology, pedagogy, and content knowledge into their teaching practices, enabling students to actively construct knowledge through meaningful interactions with digital tools and real-world contexts (Tan et al., 2025). The TPACK framework itself highlights the key areas of knowledge educators need to seamlessly integrate technology into their teaching and the process through which this expertise is developed (Andyani et al., 2020). Through the application of TPACK in classroom learning, teachers not only design learning strategies according to the material but also utilize technology to provide learning experiences that are more interactive and relevant to the demands of the time. In line with this, research on fourth-grade students at SD Negeri 183 Gresik found that interactive learning media oriented towards TPACK is effective in improving student learning outcomes (Handayani et al., 2022).

The statement items used in the TPACK variable refer to the framework model developed by Koehler & Mishra (2009) and the literature of Sanjaya & Syefrinando (2024). The TPACK framework model consists of (1) *Content Knowledge* (CK), (2) *Pedagogical Knowledge* (PK), (3) *Technological Knowledge* (TK), (4) *Technological Content Knowledge* (TCK), (5) *Pedagogical Content Knowledge* (PCK), (6) *Technological Pedagogical Knowledge* (TPK), and (7) *Technological Pedagogical Content Knowledge* (TPACK). The three main components of TPACK consist of *Content Knowledge* (CK), *Pedagogical Knowledge* (PK), and *Technological Knowledge* (TK), play a crucial role in creating effective learning experiences through interaction and integration between the three components in the teaching context (Sanjaya & Syefrinando, 2024). A high level of TPACK mastery indicates teachers' ability to apply each TPACK component in the learning process. Teachers at State Junior High Schools in Trenggalek District demonstrate a solid understanding of the curriculum and subject matter they teach, while also keeping up with and adapting to the latest developments in their fields. This ability to stay current and flexible has a positive impact on the quality of teaching and greatly enhances students' learning and comprehension. By mastering *Content Knowledge* (CK), teachers are able to build students' understanding more effectively. In Trenggalek District, State Junior High School teachers demonstrate *Pedagogical Knowledge* (PK) by applying appropriate teaching strategies, using effective methods, and managing classrooms well. The data collected shows that most teachers have a solid command of these strategies and classroom management skills. PK serves as a core competency that supports teachers in delivering quality learning experiences. Based on Peraturan Menteri Pendidikan Nasional Republik Indonesia Nomor 16 Tahun 2007 tentang Standar Kualifikasi Akademik dan Kompetensi Guru Pasal 1, it is stated that teachers are expected to possess four core competencies to carry out their professional responsibilities, one of which is pedagogical competence. In Trenggalek District, this includes teachers' ability to effectively use various digital tools both hardware and software to support and enhance the learning process in State Junior High Schools.

The interaction and integration of the three core elements lead to the formation of additional components, namely TCK, PCK, TPK, and TPACK. The TPACK framework represents the essential knowledge areas that teachers need to master in order to effectively blend technology, pedagogy, and content, creating meaningful and well-structured learning experiences for their students (Spector et al., 2014). A high level of TPACK means that teachers can understand the TPACK framework well so that they can integrate the three main components into a cohesive unit that supports the effectiveness of the learning process.

The Level of Principal's Transformational Leadership

The level of principal's transformational leadership is in the very high category. This indicates that, from the teachers' perspective, principals at State Junior High Schools in Trenggalek District have effectively demonstrated and applied the key characteristics of transformational leadership in their roles. These qualities reflect how transformational leaders act as positive role models in using technology, inspiring and motivating teachers to embrace and stay updated with new advancements in education. They encourage teachers to think creatively and innovatively when integrating technology into their work, while also providing the support and resources needed to strengthen their digital skills. Transformational leaders have the power to shape situations, influence personal habits, set ambitious goals to achieve collectively, and uphold core values like freedom, justice, and equality as their guiding principles (Rahayu et al., 2018). The very high level of transformational leadership of principals in State Junior High Schools in Trenggalek District, Trenggalek Regency based on teacher perceptions, shows that principals have been able to empower and mobilize teachers to realize the vision and goals of digital schools.

The statement items of the research instrument were developed from the literature Bass & Riggio, (2006) and Djafri, (2024). Transformational leadership is built on four key elements. First, *Idealized Influence* reflects how leaders serve as role models, demonstrating values and behaviors their followers aspire to emulate. Second, *Inspirational Motivation* highlights their ability to spark enthusiasm and inspire their teams to pursue shared goals with passion and confidence. Third, *Intellectual Stimulation* shows how they encourage creative and innovative thinking, challenging their followers to approach problems from new perspectives. Finally, *Individualized Consideration* emphasizes their attentiveness to each follower's unique needs, potential, and personal growth (Bass & Riggio, 2006). Transformational leadership has the main dimensions, which include charismatic nature, the ability to generate inspiration, to stimulate intellectual, and to understand the needs of subordinates and increase subordinate satisfaction (Djafri, 2024).

The Level of Teachers' Teaching Performance

The descriptive analysis of the teachers' teaching performance is in the high category. This indicates that teachers at State Junior High Schools in Trenggalek District, Trenggalek Regency, are capable of effectively planning, implementing, and evaluating learning in the digital era, while also meeting their established performance targets. Technological

advancements demand that teachers become more adaptable and creative in integrating digital tools into the learning process. In this digital era, it is crucial for educators to build the skills and confidence needed to keep up with and effectively respond to rapid technological changes (Saidi et al., 2022).

The statement items in the research instrument to measure the level of teaching performance of digital era teachers are modifications and developments based on Peraturan Pemerintah Nomor 19 Tahun 2017 tentang Perubahan atas Peraturan Pemerintah Nomor 74 Tahun 2008 Tentang Guru Pasal 23 Ayat 1 and Fathoni et al., (2023). Peraturan Pemerintah Nomor 19 Tahun 2017 tentang Perubahan atas Peraturan Pemerintah Nomor 74 Tahun 2008 Tentang Guru Pasal 23 Ayat 1 states that the teacher's workload consists of five primary activities. However, as the research instrument is designed to evaluate teaching performance, only three key activities are considered to be significant. The learning process involves three key activities: (1) *planning lessons or mentoring*, (2) *implementing lessons or mentoring*, and (3) *evaluating learning outcomes*. Based on the collected data, teachers at State Junior High Schools in Trenggalek District, Trenggalek Regency, have shown the ability to design lesson plans that integrate relevant technology, use diverse methods and digital media, and adapt them to suit students' needs. Well-designed lesson plans play an important role in creating meaningful and effective learning experiences for students (Nasution et al., 2024). Therefore, lesson plans need to be adapted to students' needs to better support the achievement of learning goals. At State Junior High Schools in Trenggalek District, Trenggalek Regency, teachers have begun integrating technology into their teaching, which helps encourage students to participate more actively in class. By leveraging technological advancements, teachers can enhance the efficiency, accessibility, and overall quality of the learning process (Zebua, 2023). Several learning approaches suited for the digital era, including blended learning, gamification, flipped learning, and game-based learning (Fathoni et al., 2023). These methods allow teachers to create more engaging learning experiences and boost student participation. To assess student progress and provide feedback, teachers can make use of various digital tools and platforms, such as email, learning management systems, or other online media.

The Influence of TPACK (X1) on Teachers' Teaching Performance (Y) in the Digital Era

The results revealed that teachers' understanding of TPACK had a significant partial effect on the teaching performance of State Junior High School teachers in Trenggalek District, Trenggalek Regency, during the digital era, with an effective contribution of 54.96%. These findings support the acceptance of H1 and highlight that a strong grasp of TPACK tends to

enhance teachers' overall teaching performance.. Teachers who are aware of their capacity to integrate technology into the learning process effectively tend to develop greater confidence and a stronger belief in their ability to apply the principles of TPACK (Rahayu et al., 2024). Teachers who have TPACK skills will be able to produce a more interesting, effective, and efficient learning process for students (Aisyah, 2020). Therefore, mastery of TPACK plays a significant role in enhancing teachers' performance quality and fostering their self-sufficiency in designing learning processes that align with the demands of the digital era.

According to Nadifa et al. (2024), teacher performance in the digital era is shaped by six key determinants, among which pedagogical technology plays a crucial role, as it enables educators to effectively integrate digital tools into the learning process. TPACK and organizational support have a significant effect on teacher performance in online learning in prospective SMK teachers in economics and business who already have teaching experience (Maipita et al., 2023). The results show that TPACK plays an important role in improving teacher performance in online learning settings. By strengthening teachers' skills and readiness, TPACK helps them effectively navigate and sustain the teaching and learning process during the challenges of the COVID-19 pandemic. Similar findings of Rahmi et al. (2023) state that Teachers' TPACK competence and emotional intelligence positively influence the performance of primary school educators in Silau Laut Sub-district. The findings showed that TPACK contributed 14.3% to teachers' performance in primary schools in Silau Laut Subdistrict, while the remaining 85.7% was influenced by other factors. This indicates that the stronger a teacher's TPACK skills, the more positively it impacts their teaching performance at SDN in Silau Laut Subdistrict.

The Influence of Principal Transformational Leadership (X2) on Teacher Teaching Performance (Y) in the Digital Era

The study found that principals' transformational leadership significantly influences teachers' teaching performance at State Junior High Schools in Trenggalek District, Trenggalek Regency, with an effective contribution of 7.93%. These findings support the acceptance of H2, confirming that strong leadership from principals plays a meaningful role in enhancing teachers' performance. The transformational leadership of the head of State Junior High School Trenggalek District, Trenggalek Regency, shows that it can encourage teachers to utilise technology in their teaching and empower teachers to improve their teaching performance in the digital era. The transformational leadership behavior of school principals

can enhance teacher performance by providing continuous support for professional training and development programs (Firmansyah et al., 2022).

Research by Nurabadi et al. (2021) found that there is a direct influence of transformational leadership on the performance of elementary school teachers in Malang Raya. The study also revealed that principals' transformational leadership indirectly influences student achievement by improving teacher performance. In other words, when principals lead effectively, teachers tend to perform better, which in turn supports higher student achievement. Octaviarnis et al. (2021) in their research stated that the transformational leadership of principals has an indirect relationship to teacher performance through organizational commitment. The findings also show that principals' transformational leadership does not have a significant direct impact on the performance of vocational high school teachers in Malang City. However, the results suggest that this leadership style plays an indirect role in supporting and improving teachers' performance, likely through other influencing factors such as motivation, work environment, or professional development.

The Influence of TPACK (X1) and Principal Transformational Leadership (X2) on Teacher Teaching Performance (Y) in the Digital Era

The findings revealed that both TPACK and principals' transformational leadership significantly influence teaching performance in the digital era. Together, these two factors (X1 and X2) account for 62.9% of the variation in teaching performance (Y), confirming that H3 is accepted. This means that teachers' TPACK competence and principals' transformational leadership are strong predictors of improved teaching performance among junior high school teachers in Trenggalek District, Trenggalek Regency. Teachers who have a solid grasp of TPACK are better equipped to select and apply learning strategies that meet students' needs in a digital learning environment (Adji et al., 2022). Teachers' mastery of TPACK needs to be supported by strong leadership from school principals to help them apply this knowledge effectively and enhance the quality of their classroom teaching. The transformational leadership of principals plays a vital role in providing the guidance, encouragement, and resources teachers need to thrive. School principals' readiness for leadership can be reflected in their ability to create an environment that fosters professional practice development. This includes actively contributing to improving teacher competence through various training programs, continuous professional development initiatives, and collaboration within learning communities (Roesminingsih & Windasari, 2025). Such abilities align with the principles of

transformational leadership, in which school principals go beyond administrative responsibilities by addressing teachers' needs and empowering them to achieve optimal performance. The study found that the strong synergy between teachers' TPACK skills and principals' transformational leadership plays a crucial role in enhancing teaching effectiveness at State Junior High Schools in Trenggalek District, Trenggalek Regency. This combination becomes even more impactful in navigating the dynamic and challenging demands of the digital era

CONCLUSSION

The results of this study indicate that teachers at State Junior High Schools in Trenggalek District, Trenggalek Regency, demonstrate a high level of TPACK. The transformational leadership of school principals is categorized as very high, while teachers' teaching performance also falls into the high category. These findings suggest that both strong TPACK proficiency and effective transformational leadership contribute to sustaining a high standards of teaching performance. Furthermore, the results show that TPACK significantly influences teachers' teaching performance in the digital era. Similarly, the transformational leadership of school principals plays a crucial role in enhancing teachers' performance. When combined, both TPACK and transformational leadership have a strong and simultaneous influence on improving instructional quality. In essence, higher levels of teachers' TPACK and stronger principal's transformational leadership align with better the teaching performance in the digital learning environment, particularly in Trenggalek District, Trenggalek Regency.

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