

Impact of Transformational Leadership on Teacher's Techno-Pedagogical Competence: The Mediating Role of Motivation

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ABSTRACT

Objective: This study investigates the impact of transformational leadership on teacher's performance in integrating technology into teaching (techno-pedagogy), with motivation as a mediating role. The objective of this study is examining the direct influence of transformational leadership on teacher performance, the role of motivation as a mediator, and the relationship between teacher performance and technology integration. **Method:** A quantitative approach was used in this research. The population were 137 teachers from several schools in East Java, with 104 randomly selected as samples. The SmartPLS 4 program was used for analysis, which included validity and reliability testing as well as the relationship between variables. **Results:** The findings show that transformational leadership significantly enhances teacher motivation, which improves their performance in integrating technology. However, transformational leadership does not directly influence teacher performance. Instead, motivation serves as a full mediator, connecting leadership and teacher effectiveness. **Novelty:** This study emphasizes the crucial role of motivation in enhancing techno-pedagogical practices and provides insights into the necessity of transformational leadership that prioritize teacher support, motivation, and providing resources in order to improve educational outcomes.

INTRODUCTION

Over past decades, digital technologies have increasingly been integrated into classroom [1]. The use of information technology in learning process can contribute to achieve effective and efficient education, this highlight the significant role of technology in enhancing the quality of education [2]. However, this requires educators to carry out their duties with high competence [3]. It can also expand responsibilities and become a challenge for a teacher because they need to master new technologies to remain effective in delivering lessons in the classroom, thereby improving the quality of education [4], [5].

Teacher plays a central role in shaping education and the arts within the learning frameworks [6]. Teachers are expected to have adequate skills in using digital devices to support innovative learning that in line with the current developments. Teachers need to develop an innovative learning environment that allows students to engage with technology and design creative methods to incorporate technology into classroom activities [7]. Moreover, teachers play a crucial role in helping students develop the skills necessary to become competent individuals in the digital world [1]. In order to integrate technology into the teaching process, teachers must master technology itself, as well as possess the knowledge and skills in designing digital-based learning. This understanding will facilitate their ability to design effective learning experiences [8], [9].

Teachers must develop proficiency in TPACK, which emphasize interconnected and interactive relationship between technology, pedagogy, and learning content [10]. Techno pedagogical competency refers to teacher's ability and proficiency in utilizing relevant technology appropriately and effectively within their teaching practices [11]. The TPACK framework highlights the importance of building teacher competence through the integration of pedagogical knowledge, technology, and content, creating a new paradigm for teaching or delivering learning materials by utilizing technology [12]. Thus, the TPACK framework is highly beneficial for teachers in applying digital technology pedagogically to support learning [1]. In addition, teacher competence is very important to optimize the learning process in schools and ensure that students understand the material being taught [13]. By having good pedagogical competence, teachers can design and implement more engaging and effective learning. As teachers, they are expected not only to develop strong skills in planning content delivery, but also to effectively utilize technology in their classroom, while maintaining a positive attitude toward teaching [14].

The integration teachers' pedagogical competence and effective use of technology in the classroom is often influenced by external factors, with the principal's leadership serving as a key element in creating supportive environment that encourage and empower teacher to perform well. The principal's leadership is one of the factors that influence teacher performance [15]. The leadership of a school principal, especially transformational leadership, is not only focused on carrying out daily tasks and responsibilities but also strives to understand the broader impact of every action [16]. Transformational leadership is crucial as it addresses various challenges and fosters positive changes, contributing to the attainment of higher educational objectives [17].

Moreover, transformational leadership plays a pivotal role in advancing education 4.0 in higher education, going beyond simply adopting technology to fundamentally reshape education strategies, teaching methods, and outcomes to align with the demands of the 21st century workforce [18]. A principal with a transformational leadership style consistently motivates, inspires, and guides teachers not only to achieve individual targets but also to realize a greater collective goal, such as improving the quality of education and teaching in the school. Through transformational leadership, teachers are encouraged to do their best and support each other in professional development. The support provided by transformational leader to teachers can enhance the teachers' competencies, enabling them to collaborate well, be more effective, and improve overall performance [19].

The improvement of teachers' competencies also requires support and encouragement from various parties, including the motivation provided by the school principal [20]. This implies that the development of teachers' teaching abilities does not solely depend on their personal efforts but also on external support from the work environment, especially from the school principal. Since motivation is the main factor that influences human behavior, teachers with high motivation will be driven to work

more effectively and efficiently, allowing the planned objectives to be achieved optimally [21]. How a principal lead and makes decisions will directly impact the enthusiasm and dedication of teachers in carrying out their duties. A teacher's motivation is also influenced by the principal's leadership style [22]. When teachers receive support and motivation, they tend to feel confident in applying technology in teaching. Motivation can also help improve teachers' skills in utilizing digital tools, enabling them to create more interactive and engaging learning experiences for students.

Several studies have been conducted to explore the effect of leadership style on teacher performance. The aim of this study is to determine whether principal leadership affect teacher performance [21]. It also examines the impact of work motivation on teacher performance and explores the combined influence of principal leadership and work motivation on teacher performance. This study found that primary leadership and work motivation significantly impact teacher performance. Effective leadership and strong work motivation directly contribute to improve teacher performance. Conducted the study aimed at analyzing the influence of school principal leadership, teacher competence, and organizational commitment on teacher performance [15]. The results of the study indicate that school principal leadership, teacher competence, and organizational commitment have a positive and significant impact on the improvement of teacher performance. This study aims to explore the impact of transformational leadership on teacher performance, with teacher satisfaction as a mediator. The research conclude that transformational leadership positively influences both teacher performance and satisfaction[23]. The study aimed to assess the impact of transformational leadership on enhancing teacher motivation at SMP Muhammadiyah 7 in Medan. The results indicated that the principal's transformational leadership significantly improved teacher motivation and created positive work environment [16]. The research conducted to examine how leadership style and motivation impact employee performance [24]. The findings reveal that effective leadership styles, such as transformational leadership foster a supportive work environment where employees feel appreciated and motivated to give their best effort, the study explores the impact of school principal transformational leadership on the performance of Islamic education teachers [25]. The findings indicate that transformational leadership positively influences teacher's performance by inspiring, motivating, and empowering them to achieve the objectives of Islamic education.

Previous studies have been conducted with both similarities and differences in related variables. However, this research aims to analyze the influence of the principal's transformational leadership style on teachers' performance in integrating technology (techno pedagogy) as mediated by motivation. This research helps to understand how the transformational leadership influences the improvement of teachers' competencies, especially in techno pedagogical aspect. This is important for the professional development of teachers to remain relevant the ongoing changes in the field of education. This research is expected to significantly contribute to improve the quality of education

by strengthening the role of leadership in supporting the integration of technology in learning process. The transformational leadership style is highly relevant to the current educational context, as it can inspire and motivate teachers to adapt to changes, including the use of technology in teaching.

Literature Review and Hypothesis Development

Transformational leadership and motivation

Leadership is the act of guiding and influencing the task and activities of group members related to their work [26]. Leadership is a dynamic force that inspires, motivates, and guides an organization toward achieving its objectives [27]. In this context, transformational leadership has crucial roles, as transformational leaders often inspire and motivate their followers to assume greater responsibility and independence, which in turn boost employees' sense of achievement and job satisfaction [28]. Transformational leadership inspire followers to work together towards a common goal, fostering unity and purpose, by actively engaging with team members, helping them complete task, creating a positive work environment, motivating them to prioritize shared goal over personal interest, and promoting the development of their potential while achieving organizational objectives [24], [29], [30]. Transformational leaders play a crucial role in building a culture of continuous improvement, consistently involving the entire team in achieving common goals, which not only drives collective success but also the personal development of each member [31].

However, the study conducted by [32] shows that there is a positive and significant correlation between leadership style and teacher work motivation, indicating that the principal's leadership style is positively and significantly linked to teacher motivation. Another study related to the relationship between leadership style and motivation conducted by [33] the result showed that there is a positive and significant relationship between transformational leadership and employee motivation. Leadership style and motivation are essential for improving employee performance [34].

This study examines the impact of transformational leadership on teachers' motivation and performance in integrating technology in teaching. Motivation is considered as a mediating variable. Transformational leadership directly influences teachers' motivation, which in turn affects their performance in using technology in the classroom. Thus, a hypothesis can be formulated as follows:

H1 transformational leadership has a positive effect on teachers' motivation

Motivation and Teacher's Performance in Integrating Technology

Most of studies on education management that examine teacher performance consider work motivation as one of the key factor [35]. As a result, it is plausible to suggest that motivation is a primary factor influencing various variables that may impact teacher performance. Motivation is a theoretical concept that encompasses drives, motives, and individual behavior, and explains how individuals react to their needs and take various steps to achieve their goals [36]. Motivation is a crucial factor in influencing teacher performance, performance refers to the outcomes of an individual's work

including task completion target achievement, and the influence on their organization or work environment [37]. Performance is the objective, while motivation is the mean to reach that intended objective [38]. Thus, teacher performance refers to the teacher's ability to combine their experience, teaching methods, instructional materials, knowledge and skills in presenting subject matter to student, both inside and outside the classroom [39]. While teacher's performance in this study refers to teacher's performance in integrating technology in teaching and learning (techno-pedagogy).

Teacher motivation is heavily influenced by effective management, especially at the school level [39]. When the system and structure designed to manage and support teachers are ineffective, teachers may lose their sense of professional responsibility and commitment. In education context, studies on motivation are frequently linked to enhancing performance at both individual and institutional level [40]. Work motivation significantly influences employee performance [41]. When an employee in a company has strong work motivation, it positively impacts their loyalty and productivity, ultimately leading to improved performance. Based on the discussion, the hypotheses for this study is formulated as follow:

H2 Motivation has significant effect on the teacher performance in integrating technology.

Transformational Leadership and Teacher's Performance in Integrating Technology

Leadership plays a crucial role in enhancing both individual performance and the overall growth of an organization [42]. The principal, as the educational leader at school must possess the abilities and skills that can be applied in daily school life [21]. In this study, leadership style defined in terms of transformational leadership. Transformational leaders can inspire individual to collaborate and prioritize collective goals over personal interest by utilizing qualities such charisma, intellectual stimulation, inspirational motivation, and personalized attention [42]. Transformational leadership also plays a crucial role in helping organizations adapt to technological changes [31]. Through effective communication, promoting a learning culture, and empowering employees, transformational leaders can drive the successful integration and use of technology within the organization.

While TPACK refers to the ability to use technology in teaching and learning [43]. It is the skill teacher employ to effectively blend technology with pedagogy in the classroom. Techno pedagogical competency is highly essential for instructor as it facilitates effective teaching and learning [44], [45]. Teacher who have developed expertise in technological pedagogy can effectively apply that knowledge in the classroom [46]. The use technology in teaching and learning enhance efficient, learner-focused, interdisciplinary, and self-paced real time instruction. It addresses to the needs of individual learners and can be applied to various learning methods. TPACK is not just about understanding technology, content, and pedagogy separately, but rather about understanding how these three components interact each other [47]. Gaining techno pedagogical proficiency will make teaching and learning more enjoyable by reducing the

pressure on teachers and allowing students to engage more deeply in the knowledge acquisition process [48]. The relationship between transformational leadership and Teacher techno Pedagogy and Content Knowledge lies in the role of transformational leadership in helping organization navigate technological changes. Transformational leaders effectively communicate the vision for change, highlighting the advantages and opportunities that technology can bring to the organization. They encourage people to adopt new technologies by fostering a collective sense of purpose and enthusiasm [31]. The transformational leadership of school principal plays of crucial role in ensuring the implementation of quality education process, they can empower teachers to perform their teaching duties and motivate them to enhance their pedagogical competencies [13]. Based on these discussions, we hypothesize that:

H3 Transformational Leadership has a positive effect on the teacher performance in integrating technology

RESEARCH METHOD

This study used quantitative approach, as it aims to analyze the influence of the principal's transformational leadership on teachers' performance in integrating technology in teaching (techno-pedagogy) with motivation as a mediating variable. The population on this study includes 137 teachers from several schools in East Java. Total of 104 teachers were randomly selected as the sample. This study employs simple random sampling for selecting the sample [28].

Data was collected through questionnaires distributed to the teachers. The questionnaire is designed to measure three main variables: the principal's transformation leadership, teacher motivation, and teacher performance in integrating technology in teaching. Primary data are gathered using self-administered questionnaire. Each item on the questionnaire is based on a 4-point Likert scale, ranging from "1" for strongly disagree to "4" for strongly agree, covering all variables.

The collected data is processed using SmartPLS 4 Software which involve two stages of analysis: first, assessing the validity and reliability of the data through outer model analysis. This analysis involved evaluating four keys indicators: convergent validity, discriminant validity, composite reliability, and Cronbach's alpha. Second, we carried out an inner model analysis to examine the relationship between latent variable as guided by the theoretical framework.

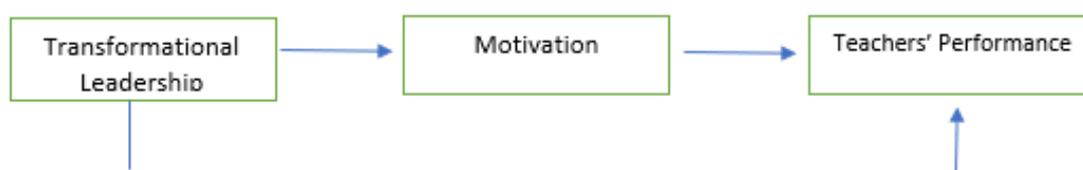


Figure 1. Research models and hypothesis.

1. Transformational leadership has direct effect on teachers' motivation.

2. Motivation has direct effect on the teacher performance in integrating technology.
3. Transformational leadership has direct effect on teachers' performance in integrating technology.
4. Transformational leadership affects teachers' performance in integrating technology indirectly mediated by motivation.

RESULTS AND DISCUSSION

Results

The validity and reliability of the construct

Construct validity is a way to assess whether the construct value for each latent variable is valid. The result of statistical data processing for the outer model are presented as follows:

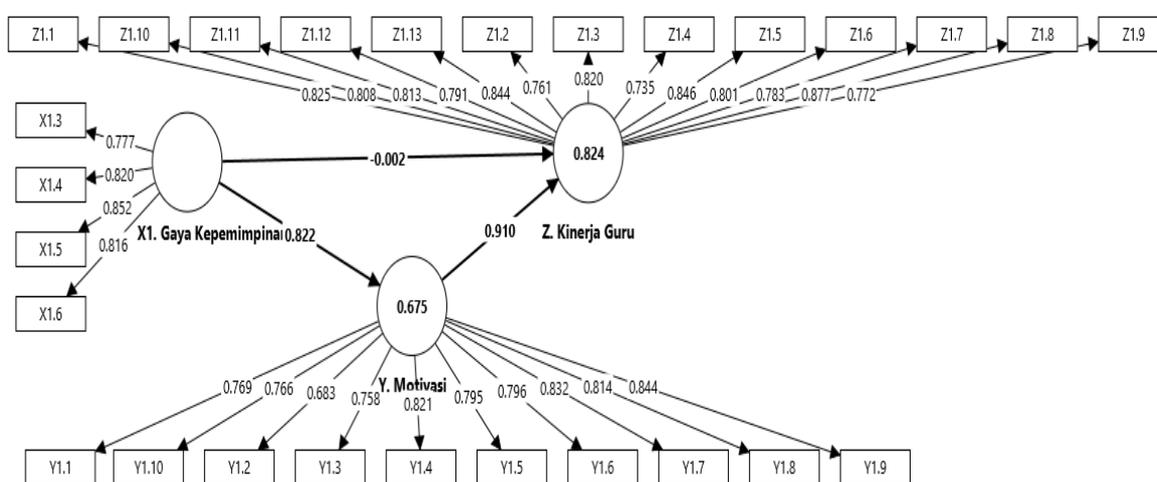


Figure 2. Outer model.

The construct or statement item in X1.1 has a value below 0.5, rendering it invalid and subsequently removed.

Table 1. Validity and reliability construct.

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
Transformational Leadership	0.834	0.841	0.889	0.667
Motivation	0.932	0.934	0.943	0.623
Teacher performance	0.955	0.956	0.960	0.651

Based on the validity testing result for each variable, it can be described that the instrument for measuring transformational leadership provides positive results, with a Cronbach's Alpha value of 0.834 indicating adequate internal consistency. The composite

reliability scores (0.841 and 0.889), which are above 0.7, indicate that the instrument items consistently reflect the measured concept. Additionally, the convergent validity is good, with an AVE of 0.667, indicating that the measured construct accounts for the majority of the variance. Overall, the instrument is reliable and appropriate for use in research.

The analysis results for the motivation variable indicate high reliability and validity. Cronbach's Alpha of 0.932 and composite reliability (0.934 and 0.943) indicate a good level of internal consistency. Although the AVE value of 0.623 is lower than for transformational leadership, it still fulfills the minimum requirement of 0.5, indicating sufficient convergent validity. This instrument can be relied on to accurately measure motivation.

The instrument for measuring teacher performance shows good findings, with a Cronbach's Alpha value of 0.955 indicating very high internal consistency. The composite reliability scores (0.956 and 0.960) are also quite good, indicating that this instrument is both reliable and consistent. An AVE of 0.651 indicates that the measured construct accounts for the majority of the variance, indicating convergent validity. Overall, this instrument is appropriate for further analysis.

Overall, the analysis results show that the instruments for the three variables (transformational leadership, motivation, and teacher performance) are very reliable and valid. Cronbach's Alpha, composite reliability, and AVE values all exceeded the minimum limits, indicating that this instrument can accurately and consistently measure each construct.

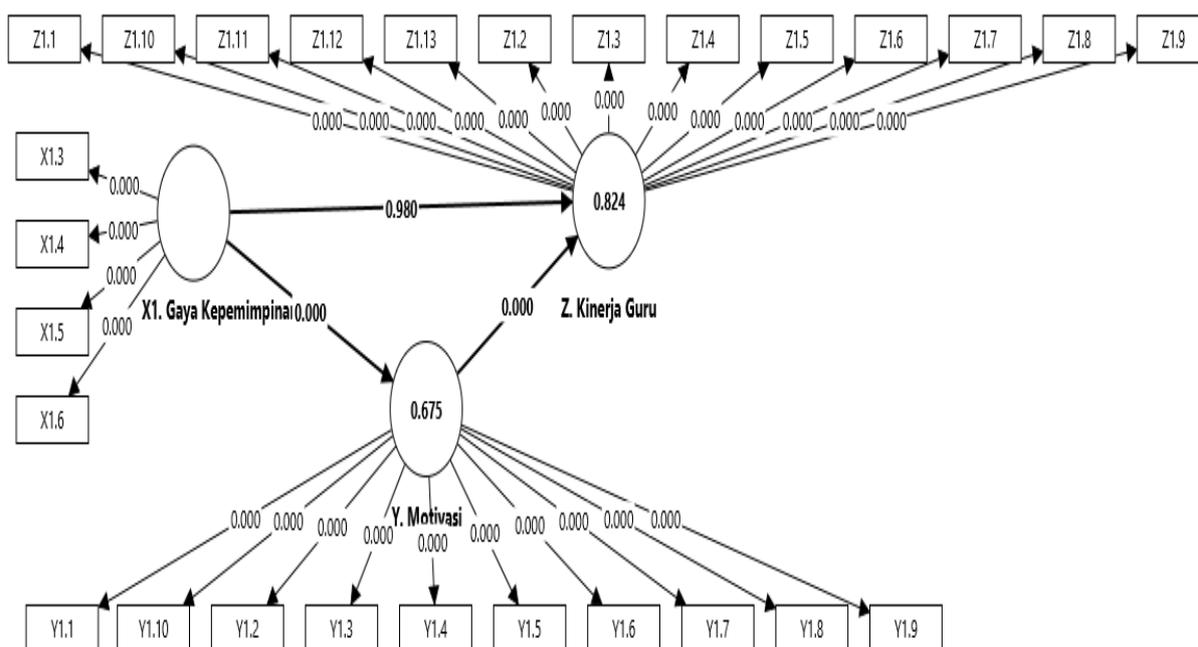


Figure 3. Inner model.

Table 2. Path coefficient.

	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values
Transformational Leadership -> Motivation	0.822	0.824	0.037	22.288	0.000
Transformational Leadership -> Teacher Performance	-0.002	-0.006	0.086	0.025	0.980
Motivation -> Teacher Performance	0.910	0.915	0.075	12.171	0.000

The figure 3 and table 2 show that the original sample of transformational leadership on motivation is 0.822. The path coefficient (0.822) shows a significant positive relationship between transformational leadership and teacher motivation. The T-statistics value of 22.288 (higher than the critical value of 1.96) and p-value of 0.000 (less than 0.05) indicate that this effect is statistically significant. This finding indicates that transformational leadership significantly increases teacher motivation.

While the original sample of transformational leadership on teacher performance is 0.002. The path coefficient (-0.002) indicates a minimal and negative association between transformational leadership and teacher performance. The T-statistics value of 0.025 (far below the critical value of 1.96) and the p-value of 0.980 (much greater than 0.05) show that this effect is not statistically significant. Transformational leadership does not have a direct effect on teaching performance.

Then the original sample of motivation on teacher performance is 0.910. The path coefficient (0.910) shows a substantial positive relationship between motivation and teacher performance. The T-statistics value of 12.171 (far above the critical value of 1.96) and the p-value of 0.000 (less than 0.05) indicate that this effect is statistically significant. This finding implies that motivation is critical for increasing teacher performance.

H1: Transformational leadership has a positive effect on teachers' motivation

The research reveals a path coefficient of 0.822, revealing a significant positive association between leadership style and teacher motivation. The T-statistics value of 22.288, which is significantly higher than the critical value of 1.96, and a p-value of 0.000 indicate that this association is statistically significant. These findings show that an effective transformational leadership style has a direct impact on teacher motivation, it implies that H1 is accepted.

H2 Motivation has significant effect on the teacher performance in integrating technology

The research showed a path coefficient of 0.910, revealing a significant beneficial relationship between motivation and teacher performance. With a T-statistics value of 12.171, significantly beyond the critical value of 1.96, and a p-value of 0.000, the relationship is statistically significant. These findings highlight the crucial role of motivation as a component that directly impacts teacher performance, it means that H2 is accepted.

H3 Transformational Leadership has a positive effect on the teacher performance in integrating technology

The research revealed a path coefficient of -0.002, revealing a very weak and negative association between leadership style and teacher performance in integrating technology. The T-statistics value of 0.025 is significantly lower than the critical value of 1.96, and the p-value of 0.980 is much higher than the significance level of 0.05. These findings indicate that leadership style has no significant direct impact on teacher performance in the context of technology integration. In other words, leadership style does not have a significant impact on how well teachers incorporate technology into their teaching techniques.

H4 Transformational leadership affects teachers' performance in integrating technology indirectly mediated by motivation

The direct effect of transformational leadership on teacher performance is insignificant, while its indirect impact through motivation is significant, indicating that transformational leadership influences teacher performance indirectly by initially raising teacher motivation. Thus, H4 indirect effect of transformational leadership on teachers' performance in integrating technology can be accepted.

R-Square Value

Table 3. R-Square value.

	R-square	R-square adjusted
Y. Motivation	0.675	0.672
Z. Teacher Performance	0.824	0.821

From the table 3, the R-Square value of the path can be seen that 67.5% of the change in teacher motivation can be explained by the independent variables in the research model, such as leadership style and other factors. This means that these factors have a significant influence on teacher motivation. The value of 67.5% indicates that the relationship between the independent variables (such as transformational leadership) and teacher motivation is quite strong, as most of the variation in teacher motivation can be explained by the factors analyzed in this model. However, there is still 32.5% variation that is influenced by other factors not included in this model.

The R-square value of 0.824 indicates that 82.4% of the variation in teacher performance can be explained by the independent variables in the research model. This means that most of the factors affecting teacher performance can be understood through

the variables analyzed in the model. With a high R-square value of 82.4%, the relationship between the independent variables (such as leadership style, motivation, and other factors) and teacher performance can be said to be very strong. This indicates that the model provides a very good explanation of the factors that influence teacher performance.

Discussion

This study aimed to explore the effect of transformational leadership on teacher performance in integrating technology in teaching with motivation as mediating factor. The result shows that transformational leadership has a highly significant and positive impact on teacher motivation. This means that any increase in transformational leadership will significantly increase teacher motivation. Leadership style, behavior, or action become more aligned to what motivates teachers, their motivation improves in a real and measurable way. Motivated teachers are more likely to be effective and productive in their professional positions, hence motivation is an important driver of teacher success. The result of this study in accordance with the finding of research conducted by previous researchers that teacher's work motivation heavily relies on the quality of the principal's leadership, with a leader's success in motivating teachers depending on their ability to understand and effectively utilize the factors that drive work motivation [22]. Who found that there is positive and significant correlation between the principal's leadership style and teacher work motivation, highlighting the key role of principal in enhancing motivation and the necessity of effective leadership strategies [32]. The principal must foster a positive school climate, motivate and guide teachers empower them through collaboration and involvement in decision making, and professional development [26]. However, the result of this study contradict with [49], who found that school principal leadership does not significantly impact teacher's motivation

The research also showed that there is a significant beneficial relationship between motivation and teacher performance in integrating technology in teaching. This finding highlights the crucial role of motivation as a component that directly impacts teacher performance. It implies that when teachers are motivated, their efficacy, productivity, and overall performance in carrying out their professional tasks improve significantly. Motivation acts as a driving factor, encouraging teachers to put in more effort and achieve better results in their teaching practices. The result of this study is in line with [50] who found that there is a positive and significant influence of work motivation on teacher performance. The principal must employ a personalized approach to inspire and motivate teacher, focusing in direct interaction and addressing each teacher's needs [16].

The research indicate that transformational leadership has no significant direct impact on teacher performance in the context of technology integration. In other words, transformational leadership does not have a significant impact on how well teachers incorporate technology into their teaching techniques. This means that simply adopting

a specific transformational leadership will not directly affect how successfully teachers employ technology in their teaching methods. Other elements that may have a greater impact on performance in this area include training, resources, motivation, and mediating variables such as work satisfaction or teacher self-efficacy. The result of this study is contrary to previous researcher, who found that the transformational leadership of principal has significant impact on the performance [15], [25], [49], [50], [51], [52].

Lastly, the research showed that transformational leadership has no direct effect on teacher performance in integrating technology, but it has a positive impact on motivation, which leads to improved teacher performance. As a result, leadership style has a significant indirect impact on teacher performance through motivation. Because the direct association between transformational leadership and teacher performance is not significant (P-value: 0.980), but the indirect relationship through motivation is significant, motivation serves as a full mediator. Furthermore, motivation is the most important component in bridging the gap between leadership style and teacher performance.

CONCLUSION

Fundamental Finding : The study on how transformational leadership plays an essential role in increasing teacher motivation, which in turn enhances teacher performance, particularly in technology integration. Although transformational leadership does not have a direct impact on teacher performance in technology integration, its effect is mediated through motivation. **Implication :** The principal should use transformational leadership styles to motivate and assist teachers, as well as combine this strategy with professional development and resources to improve technology integration. This strategy integrates leadership activities with teachers' motivational drivers, resulting in higher performance. **Limitation :** the findings may not be generally applicable across educational environments. Furthermore, the study did not consider other factors, such as resource availability or teacher self-efficacy, which could influence performance. **Future Research :** Next researcher might look into other mediators such as work satisfaction or teacher self-efficacy, conduct longitudinal studies to examine the long-term effects of transformational leadership, and compare it to other leadership styles.

REFERENCES

- [1] P. Nilsson and J. Lund, "Design for learning - involving teachers in digital didactic design (D3)," *Interact. Technol. Smart Educ.*, vol. 20, no. 1, pp. 142-159, 2023, doi: 10.1108/ITSE-08-2021-0143.
- [2] N. U. Khasanah, A. Fatoni, S. Haryanto, M. Assidiqi, and M. A. Pendidikan, "ACADEMIC SUPERVISION TO ENHANCE TEACHERS' TPACK," vol. 37, no. 2, pp. 119-129, 2023.
- [3] H. Risdiyany and Y. T. Herlambang, "Pengembangan Profesionalisme Guru Dalam Mewujudkan Kualitas Pendidikan Di Indonesia," *Edukatif J. Ilmu Pendidik.*, vol. 3, no. 3, pp. 817-823, 2021, doi: 10.31004/edukatif.v3i3.434.
- [4] P. Silver, J. Dupuis, R. E. Durham, R. Schaaf, L. Pallett, and L. Watson, "Building technology

- integration at an urban school through a PDS partnership," *Sch. Partnerships*, vol. 17, no. 2, pp. 185–204, 2024, doi: 10.1108/sup-10-2023-0041.
- [5] Masnuri and Pgsd, "Peningkatan Teknological Pedagogical Content Knowledge (TPACK) bagi Guru SD 172 Enrekang dalam Menunjang Profesionalitas," vol. 3, pp. 54–59, 2021.
- [6] S. Hota, "Techno- Pedagogical Skills For 21st Century Teacher ' s : Contextual Enabler," *J. Res. Methods Educ.*, vol. 13, no. 5, pp. 42–46, 2023, doi: 10.9790/7388-1305014246.
- [7] I. K. Swasti and E. Sholihatin, "Hybrid Learning Readiness: Techno Pedagogical Skills and Digital Competence Education," vol. 2023, no. 2021, pp. 652–657, 2023, doi: 10.11594/nstp.2023.33105.
- [8] I. Iskandar and C. Riantoni, "Kesulitan Guru Pai Mengintegrasikan Pembelajaran Berbasis TPACK pada Masa dan pasca Pandemi Covid 19," *Edukatif J. Ilmu Pendidik.*, vol. 5, no. 1, pp. 533–542, 2023, doi: 10.31004/edukatif.v5i1.4721.
- [9] O. Setiasih, "Techno-Pedagogy: What Is the Role of Prospective Teachers in Preparing for Learning in the Digital Era?," *Edutech*, vol. 20, no. 3, pp. 237–255, 2021, doi: 10.17509/e.v20i3.40688.
- [10] P. Mishra and M. J. Koehler, "Technological Pedagogical Content Knowledge: A Framework for Teacher Knowledge," *Teach. Coll. Rec. Voice Scholarsh. Educ.*, vol. 108, no. 6, pp. 1017–1054, 2006, doi: 10.1177/016146810610800610.
- [11] J. Parkash and S. R. Hooda, "A Study of Techno-Pedagogical Competency among Teachers of Government & Private Schools of Haryana State," *Int. J. Curr. Adv. Res.*, vol. 7, no. 1(H), pp. 9301–9306, 2018.
- [12] B. Yurinda and N. Widayarsi, "Analisis Teknological Pedagogical Content Knowledge (Tpack) Guru Profesional Dalam Pembelajaran Matematika Di Sekolah Dasar," *FIBONACCI J. Pendidik. Mat. dan Mat.*, vol. 8, no. 1, p. 47, 2022, doi: 10.24853/fbc.8.1.47-60.
- [13] B. Yosjaya and K. Y. Tung, "The Role Of Transformational Leadership In Developing Teacher Pedagogic Competence In XYZ School North Jakarta," vol. 7, pp. 9318–9323, 2023.
- [14] D. Chauhan, "Techno-Pedagogical Competency among teachers in relation to their attitude towards teaching," *Forum Educ. Stud.*, vol. 2, no. 2, p. 566, 2024, doi: 10.59400/fes.v2i2.566.
- [15] A. Bastian and H. Nurfaishal, "Pengaruh Kepemimpinan Kepala Sekolah, Kompetensi Guru Dan Komitmen Organisasi Terhadap Kinerja Guru Di MAN 2 Kota Pekanbaru," *J. Penelit. Pendidik.*, vol. 1, no. 4, pp. 222–229, 2024.
- [16] N. S. Maysarah and M. Fadhli, "The Role of Transformational Leadership in Improving Teacher Motivation at SMP Muhammadiyah 7 Medan," vol. 8, pp. 232–247, 2024, doi: 10.17977/um025v8i32024p232.
- [17] A. Wahyudin, M. Furqon, G. Prabowo, and A. A. Zawawi, "Application of Style Leadership Transformational in Islamic Education Institutions," *Ar-Rosikhun J. Manaj. Pendidik. Islam*, vol. 3, no. 3, pp. 218–226, 2024, doi: 10.18860/rosikhun.v3i3.27705.
- [18] A. Bohari, W. Wider, L. N. Udang, L. Jiang, J. C. M. Tanucan, and S. Lajuma, "Transformational leadership's role in shaping Education 4.0 within higher education," *J. Infrastructure, Policy Dev.*, vol. 8, no. 8, pp. 1–21, 2024, doi: 10.24294/jipd.v8i8.4900.
- [19] S. Supermane, L. M. Tahir, and M. Aris, "Transformational Leadership in Teacher Education," *Int. J. Acad. Res. Bus. Soc. Sci.*, vol. 8, no. 3, 2018, doi: 10.6007/ijarbss/v8-i3/3925.
- [20] A. Syukkur and F. Fauzan, "Improving The Quality of Education Through The Principal's Strategy to Develop Teacher Competence," *Nazhruna J. Pendidik. Islam*, vol. 4, no. 3, pp. 563–

- 574, 2021, doi: 10.31538/nzh.v3i1.402.
- [21] Yuhana, H. Fitria, and A. Wahidy, "The Influence of Principal Leadership and Work Motivation on Teacher Performance BT - Proceedings of the International Conference on Education Universitas PGRI Palembang (INCoEPP 2021)," Atlantis Press, 2021, pp. 635-639. doi: 10.2991/assehr.k.210716.118.
- [22] A. Irawati and M. Saleh, "Relationship Between Principal Role, Work Motivation and Job Satisfaction with Elementary School Teacher Performance," *J. K6, Educ. Manag.*, vol. 2, no. 2, pp. 87-96, 2019, doi: 10.11594/jk6em.02.02.02.
- [23] M. Mardalena *et al.*, "Transformational Leadership on Teachers' Performance Mediated by Teacher Satisfaction," *Scaffolding J. Pendidik. Islam dan Multikulturalisme*, vol. 6, no. 1, pp. 67-88, 2024, doi: 10.37680/scaffolding.v6i1.4314.
- [24] A. W. Saputro, "Pengaruh E-Service Quality Terhadap E-loyalty dengan Brand Image dan E-Satisfaction Sebagai Variabel Mediasi," *J. Ilm. Manaj. Kesatuan*, vol. 11, no. 2, pp. 203-212, 2023, doi: 10.37641/jimkes.v11i2.1750.
- [25] M. A. Wafa, "The Effect of Principal Transformational Leadership on the Performance of Islamic Education Teachers," *J. Ar Ro'is Mandalika*, vol. 2, no. 2, pp. 110-118, 2022, doi: 10.59613/armada.v2i2.2868.
- [26] R. Y. Abadi, "The Role of Principal Leadership in Improving Teacher Performance During a Pandemic," *Proc. 6th Int. Conf. Educ. Adm. Manag. Res. (ICREAM 2022)*, no. Icream, pp. 67-72, 2022.
- [27] Yeli Yikwa, Catrina Yunita Wenda, and Gita Sugiyarti, "The Influence of Leadership Style and Work Motivation on Employee Performance with Job Satisfaction as an Intervening Variable (Study at Prima SR Hotel & Convention Yogyakarta)," *J. Ris. Sos. Hum. dan Pendidik.*, vol. 2, no. 3, pp. 106-123, 2023, doi: 10.56444/soshumdik.v2i3.1057.
- [28] R. Mwesigwa, I. Tusiime, and B. Ssekiziyivu, "Leadership styles, job satisfaction and organizational commitment among academic staff in public universities," *J. Manag. Dev.*, vol. 39, no. 2, pp. 253-268, 2020, doi: 10.1108/JMD-02-2018-0055.
- [29] J. M. V Sasan, G. R. Escultor, and V. N. Larsari, "The Impact of Transformational Leadership on School Culture," vol. 03, no. 8, pp. 1899-1907, 2023.
- [30] D. Soelistya, S. Naim, M. Mulyati, S. Anshorihyah, and M. Syafri, "Exploring the Relationship Between Leadership Styles and Employee Motivation in the Context of Contemporary Management," vol. 3, no. 2, pp. 1111-1123, 2024, doi: 10.55299/ijec.v3i2.1098.
- [31] A. Bohari, W. Wider, L. N. Udang, L. Jiang, and J. C. M. Tanucan, "Transformational leadership 's role in shaping Education 4 . 0 within higher education," vol. 8, no. 8, pp. 1-21, 2024.
- [32] E. Ermita, N. Nelitawati, I. Jaya, and N. A. Ulfi, "Analysis of the relationship between leadership style and teacher work motivation in vocational high schools," *JPPPI (Jurnal Penelit. Pendidik. Indones.)*, vol. 10, no. 1, p. 500, 2024, doi: 10.29210/020243427.
- [33] Q. Fenuku, "International Journal of Advanced Research and Publications The Relationship Between Leadership Styles And Employee Motivation In The Ghana Audit Service," *Int. J. Adv. Res. Publ.*, vol. 3, no. 11, pp. 86-90, 2019.
- [34] *et. al.* Nabilatul Fitriyah, "The Role of Leadership Style and Motivation in Improving Employee Performance," *J. Ilm. Manaj. Kesatuan*, vol. 12, no. 1, 2024, doi: DOI: 10.37641/jimkes.v11i2.1750.

- [35] T. Effiyanti, S. Sukirno, W. Widiastuti, and H. Retnawati, "Confirming the Effect of Motivation on Teacher Performance in Elementary School: a Meta-Analysis," *TEM J.*, vol. 12, no. 1, pp. 519–528, 2023, doi: 10.18421/TEM121-62.
- [36] N. Davidovitch and R. Dorot, "The Effect of Motivation for Learning Among High School Students and Undergraduate Students – A Comparative Study," *Int. Educ. Stud.*, vol. 16, no. 2, p. 117, 2023, doi: 10.5539/ies.v16n2p117.
- [37] S. Wulandari and M. Rahayu, "The Effect of Discipline and Work Motivation on Teacher Performance at Al-Ihsaniyah Foundation Kramat Jati East Jakarta," *Int. J. Econ. Dev. Res.*, vol. 5, no. 2, pp. 1489–1495, 2024.
- [38] D. N. GEORGESCU, G. DUMITRACHE (TORCICĂ), and M. JOIȚA (LEAFU), "The Relationship Between Motivation and Performance of Teachers in Increasing the Quality of Education," *Logos Universality Ment. Educ. Nov. Econ. Adm. Sci.*, vol. 5, no. 1, pp. 38–44, 2020, doi: 10.18662/lumeneas/5.1/20.
- [39] S. M. Trestiza Comighud and M. J. Arevalo, "Motivation In Relation To Teachers' Performance," *Int. J. Sci. Res. Publ.*, vol. 10, no. 4, p. p10071, 2020, doi: 10.29322/ijsrp.10.04.2020.p10071.
- [40] J. Mailool, H. Retnawati, H. J. Rogahang, W. Weol, and M. W. K. Waney, "Synthesis and detection of publication bias in relationship between motivation and teacher performance: A meta-analysis review," *Univers. J. Educ. Res.*, vol. 8, no. 11B, pp. 6208–6216, 2020, doi: 10.13189/ujer.2020.082259.
- [41] R. A. Sabastian, "The Influence of Leadership Style and Motivation on Employee Performance," *Almana J. Manaj. dan Bisnis*, vol. 5, no. 1, pp. 116–125, 2021, doi: 10.36555/almana.v5i1.1587.
- [42] T. K. Diko and S. Saxena, "Mediating Role of Employee Engagement with Transformational Leadership and Turnover Intention," *Public Organ. Rev.*, vol. 23, no. 4, pp. 1639–1660, 2023, doi: 10.1007/s11115-023-00710-8.
- [43] R. Singh and S. Gupta, "Techno - pedagogical competence : Challenges and resolving measures for teachers," *Int. J. Creat. Res. Thoughts*, vol. 10, no. 2, pp. 330–336, 2022.
- [44] M. M. Asad, K. Aftab, F. Sherwani, P. Churi, A. J. Moreno-Guerrero, and B. Pourshahian, "Techno-Pedagogical Skills for 21st Century Digital Classrooms: An Extensive Literature Review," *Educ. Res. Int.*, vol. 2021, 2021, doi: 10.1155/2021/8160084.
- [45] J. Suyamto, M. Masykuri, and S. Sarwanto, "Analisis Kemampuan Tpack (Technolgical, Pedagogical, and Content, Knowledge) Guru Biologi Sma Dalam Menyusun Perangkat Pembelajaran Materi Sistem Peredaran Darah," *INKUIRI J. Pendidik. IPA*, vol. 9, no. 1, p. 46, 2020, doi: 10.20961/inkuiri.v9i1.41381.
- [46] S. Bansal, "Role of Techno-Pedagogical Skills for Enhancing Teaching and Learning," *J. Posit. Sch. Psychol.*, vol. 6, no. 2, pp. 3785–3793, 2022.
- [47] A. Amelia, E. Nurfalih, and D. Mulhayatiah, "Peningkatan Tpack Guru Fisika Melalui Media Pembelajaran Berbasis Google Apps," *J. Teach. Learn. Phys.*, vol. 6, no. 2, pp. 69–76, 2021, doi: 10.15575/jotalp.v6i2.10298.
- [48] N. A. Ngale Lyonga and A. J. Nkeng, "Development of Techno-Pedagogical Skills among Teacher Educators: The Case of Higher Technical Teachers' Training College of the University of Buea, Cameroon," *Innovare J. Educ.*, vol. 10, no. 4, pp. 17–23, 2022, doi: 10.22159/ijoe.2022v10i4.45589.
- [49] S. Maesaroh, F. Yuliaty, D. Mulyanti, S. Sedarmayanti, and V. Paramarta, "Pengaruh

- Kepemimpinan Kepala Sekolah dan Kompetensi Guru terhadap Kinerja Guru melalui Motivasi Guru," *J. Educ.*, 2024.
- [50] R. Zubaidah, "Pengaruh Kepemimpinan Kepala Sekolah Dan Kompetensi Guru Terhadap Motivasi Kerja Guru Serta Implikasinya Pada Kinerja Guru Di Smp Negeri Kota Palembang," *J. Ecoment Glob.*, vol. 1, no. 2, pp. 8-20, 2017, doi: 10.35908/jeg.v1i2.200.
- [51] J. Bulkini, R. Riswan, and S. Qomariyah, "Peran Gaya Kepemimpinan Kepala Sekolah Terhadap Kinerja Dan Kompetensi Guru Di MTs Azzainiyyah Nagrog Sukabumi," *Al-Tarbiyah J. Ilmu Pendidik. Islam*, vol. 1, no. 3, pp. 100-109, 2023.
- [52] I. M. Sulantara, P. K. Mareni, I. Ketut Setia Sapta, and N. K. Suryani, "The Effect of Leadership Style and Competence on Employee Performance," *Eur. J. Bus. Manag. Res.*, vol. 5, no. 5, 2020, doi: 10.24018/ejbmr.2020.5.5.494.

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