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Teacher Performance in the Digital Transformation of Vocational Schools: Mapping the Determinants of Professional Competence, Workload, and Work Motivation

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ABSTRACT
Digital transformation in vocational schools has expanded the demands placed on teacher performance, not only in the pedagogical domain, but also in technological mastery, workload management, and the sustainability of work motivation. However, the map of determinants shaping teacher performance in this context remains dispersed across various empirical findings and has not been specifically synthesized. This study aimed to map the main determinants of teacher performance in the digital transformation of vocational schools by emphasizing professional competence, workload, work motivation, organizational support, and leadership. The method used was a systematic literature review based on the PRISMA guidelines, with Scopus as the data source. Of the 43 initial articles, 13 empirical articles were retained as the basis for the final synthesis after screening by year, document type, language, open access status, and abstract relevance. The review findings show that teacher performance tends to be strengthened by professional competence supported by ICT training, varied instructional strategies, collegial collaboration, and digital infrastructure. Work motivation was found to function as the main mediator linking working conditions, professional development, and leadership with teacher performance. In contrast, high workload, burnout, limited resources, and digital barriers tended to weaken both the quality of teacher performance and occupational well-being. Therefore, digital transformation in vocational schools needs to be directed through competence strengthening, proportional workload management, continuous professional development, and supportive school leadership.

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INTRODUCTION

Digital transformation has become a central agenda in educational renewal because changes in teaching, learning, and performance evaluation can no longer be separated from the use of technology, data, and increasingly digitalized learning environments. At the conceptual level, teachers' digital competence has been viewed as an evolving construct, yet recent reviews still indicate uncertainty regarding the groups that benefit the most, the role of teachers as instructional designers, and the relationship between digital competence and subject domains (Smestad et al., 2023). At the same time, changes in teacher education curricula across countries have also been positioned as a response to the digital competence demands placed on a new generation of educators (Tomczyk, 2024). However, technology integration continues to be constrained by disparities in resources across contexts, particularly in schools facing structural and geographical barriers (Mustafa et al., 2024). Even at the level of school governance, digital transformation has been reported to be associated with teacher performance evaluation through dimensions of planning and leadership readiness (Masaeed et al., 2025). Therefore, the urgency of this study lies in the need to map the determinants of teacher performance more precisely amid a systemic digital transition.

The state of the art shows that discussions of teacher performance in the digital era have generally remained fragmented across partial variables, such as attitudes toward technology, self-efficacy, access to digital facilities, and technology-based pedagogical skills. In vocational education, teachers' digital competence has been shown to be shaped not only by the frequency of digital tool use and attitudes toward technology, but also by workload, which has been relatively neglected in similar studies (Cattaneo et al., 2022). Other studies have positioned attitudes, self-efficacy, and digital competence as important configurations in explaining teachers' ICT integration (Peng et al., 2024). In more recent developments, teachers' digital competence has also been linked to attitudes toward artificial intelligence, while attitudes toward online teaching have been found to correlate positively with technological competence and access to devices (Galindo-Domínguez et al., 2024; Alieto et al., 2024). This pattern of findings indicates that explanatory factors are already available, yet they have continued to be discussed separately and have not produced a coherent synthesis framework for explaining teacher performance.

When this research map is narrowed to vocational schools and professional development, the focus of previous studies appears to remain centered on diagnosing digital competence, identifying training needs, and examining barriers to technology implementation. In the Indonesian context, the low digital competence of vocational teachers has been associated with limited internet access and devices, less supportive online communities, time constraints, insufficient government training, and lower confidence and self-belief among senior teachers (Rahmawati et al., 2025). In the Hungarian agricultural vocational system, the need for thematic workshops that are field-specific and didactically grounded has also been emphasized, along with the importance of realistic self-reflection in competence development (Khademi-Vidra & Bakos, 2025). On the

other hand, the implementation of teacher digital competence frameworks has still been reported as limited, while support for basic psychological needs, training flexibility, and professional development design has begun to be linked to competence, self-efficacy, and teachers' occupational well-being (Chiu et al., 2024; Hörmann et al., 2024; Shi et al., 2025). Thus, the knowledge gap lies in the absence of a synthesis that specifically connects professional competence, workload, and work motivation as determinants of teacher performance in the digital transformation of vocational schools.

Based on this gap, the present study was conducted to build a foundation for a preliminary study while also clarifying the rationale for selecting the topic of teacher performance in the digital transformation of vocational schools. This step was considered necessary because previous research has largely been dispersed across the contexts of preservice teachers, teacher educators, and technology-assisted teaching, so that the direct relationship among instructional quality, digital transformation challenges, the modeling role of teacher educators, and psychological needs in strengthening digital competence has not yet been mapped integratively for the vocational school context (Runge et al., 2023; Wagner et al., 2026). In addition, preservice teachers' digital competence development has been shown to be strongly influenced by the modeling carried out by teacher educators, while teachers' use of ChatGPT has begun to be reported as related to the strengthening of digital competence through the fulfillment of competence and relatedness needs (Momdjian et al., 2025; Zhou et al., 2024). On this basis, the study was directed to map patterns of findings, answer questions regarding which determinants are the most consistent, explain how the relationships among determinants are formed, and identify the contributions that can be made to the formulation of future research directions. Therefore, the main contribution of this study lies in providing a tighter synthesis framework to justify the title, focus, and direction of subsequent research more precisely.

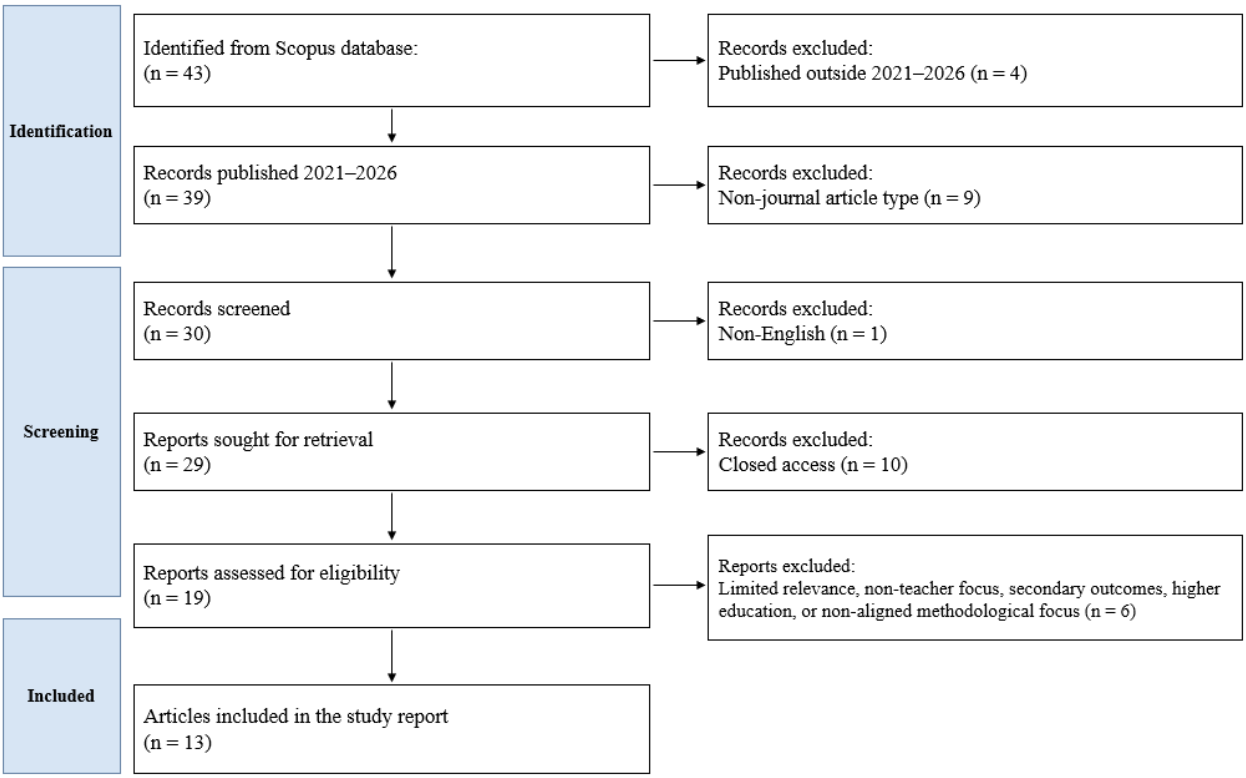
METHOD

This study employed a systematic literature review guided by PRISMA, with Scopus used as the data source. The search was conducted using the following keywords: (("teacher performance" OR "teacher effectiveness" OR "teacher job performance") AND ("teacher competenc*" OR "professional competenc*") AND (workload OR "teacher workload" OR "job demand*") AND (motivat* OR "work motivation") AND ("vocational education" OR "vocational school*" OR TVET)). The initial search yielded 43 documents. Stepwise screening was then conducted by limiting the publication years to 2021–2026, leaving 39 documents, filtering for journal articles, leaving 30 documents, filtering for English-language publications, leaving 29 documents, and applying the All Open Access filter, leaving 19 documents. These 19 articles were then examined based on authorship, title, and the alignment of their abstracts with the focus of the review.

The final selection of the 19 articles was conducted using the following inclusion criteria: the articles discussed teachers or school educators rather than general workers, had substantive relevance to teacher performance, professional

competence, work motivation, workload or working conditions, instructional innovation, learning digitalization, or professional development, used empirical quantitative, qualitative, mixed, or multilevel designs based on field data, and were relevant to the context of digital transformation and teacher performance enhancement, particularly those that could be extended to the vocational school domain. The exclusion criteria covered articles primarily focused on non-teacher workers, student learning outcomes as the dominant output, higher education lecturers, organizational citizenship behavior not directly related to the main determinants, or classroom observation intentions that did not position teacher performance or competence at the center of analysis. Based on these criteria, six articles were excluded because of substantive misalignment, leaving 13 articles as the included studies. At the verification stage, no duplicate articles and no retracted articles were identified.

The PRISMA flow can be summarized textually as follows. At the identification stage, 43 articles were retrieved from Scopus. After the year filter was applied, the number of articles decreased to 39. After the journal article filter was applied, the number decreased to 30. After the English-language filter was applied, the number decreased to 29. After the All Open Access filter was applied, the number decreased to 19. At the final screening stage, based on abstract review, thematic relevance, subject type, and methodological fit, 13 articles were included in the closed-set review. Thus, the synthesis of results and discussion in this study was entirely built on these 13 included articles.



RESULTS

A total of 13 articles met the inclusion criteria and were used as the basis for the synthesis. These articles were dominated by quantitative survey designs based on SEM or PLS, followed by multilevel studies, mixed methods, and

grounded theory. Substantively, the compiled findings clustered around four main axes, namely teacher professional competence, work motivation, working conditions or workload, and organizational support and leadership. A summary of the review results is presented in Table 1.

Table 1. Review Results of the Articles

No	Authors	Main Findings
1	Virgana & Lapasau (2024)	Locus of control, leadership style, and environmental factors increase work motivation. Subsequently, motivation, together with locus of control and the environment, contributes significantly to improved teacher performance.
2	He & Jen (2025)	Diverse teaching methods improve the competence of vocational teachers, while motivation and engagement are proven to mediate the relationship and strengthen the effectiveness of instructional strategies.
3	Zhou et al. (2025)	Self-efficacy operates not only directly, but mainly through job satisfaction, thereby increasing the work engagement of physical education teachers in disadvantaged areas.
4	Avci et al. (2025)	Initial and continuous ICT training, collegial collaboration, and school digital infrastructure were identified as important predictors of teachers' digipedagogical competence across various school contexts.
5	Hardianto et al. (2025)	Reward and commitment significantly affect transformational leadership. This leadership then increases teacher job satisfaction and supports motivation and professional performance.
6	Ulfah et al. (2024)	Motivation, professional development, managerial support, working conditions, and family support collectively shape teacher performance. Proportional workload facilitates technical development and work comfort.
7	Windasari et al. (2025)	Transformational leadership is not dominant directly, but operates through PLC, self-efficacy, and motivation to improve innovative teaching behavior and teachers' pedagogical competence.
8	Meng & Chang (2024)	Principals' instructional leadership improves teachers' occupational well-being, while instructional efficacy and awareness of professional development positively mediate the relationship.
9	Nazareno & Montañez (2025)	Teachers demonstrate high performance in planning, management, and instruction, but limited digital skills, high workload, poor connectivity, and minimal resources remain constraints.

No	Authors	Main Findings
10	Cataudella et al. (2024)	Self-efficacy, self-esteem, cognitive flexibility, burnout, and years of service are proven to affect the level of digitalization perceived by teachers during the acceleration of school technology use.
11	Kholifah et al. (2024)	Motivation and professional development become the main mediators explaining the effects of family sociology, managerial support, and working conditions on vocational school teacher performance.
12	Kirschning et al. (2025)	Teaching enthusiasm increases cognitive activation, student support, and work engagement, while reducing burnout. Teaching reflection also contributes to occupational well-being.
13	Nong et al. (2025)	Preschool teachers' occupational well-being is shaped by empowering leadership through pathways of work pressure, burnout, organizational support, positive environment, personal motivation, and engagement.

DISCUSSION

Within the landscape of digital transformation in schools, teacher professional competence is not shaped by a single factor, but by a combination of training, infrastructure, instructional strategies, and psychological readiness. In the vocational context, the use of diverse teaching methods has been shown to strengthen teacher competence when motivation and engagement are also activated (He & Jen, 2025). This finding is consistent with multilevel evidence showing that preservice and in-service ICT training, collegial collaboration, and digital infrastructure are important predictors of the digipedagogical competence of secondary school teachers across different school contexts (Avci et al., 2025). At the same time, the school digitalization process is also influenced by self-efficacy, self-esteem, cognitive flexibility, and burnout, so technological change cannot be understood merely as device adoption (Cataudella et al., 2024). In adaptive learning situations, limited digital skills and high workload have also continued to be reported as factors suppressing the quality of teachers' practices (Nazareno & Montañez, 2025). Therefore, the strengthening of professional competence in the digital era needs to be positioned as a systemic process that unites technical capacity, organizational support, and personal readiness.

Work motivation emerged as the most consistent mechanism in explaining changes in teacher performance. Among senior high school teachers, performance was found to improve when motivation was strengthened by locus of control, leadership style, and environmental factors (Virgana & Lapasau, 2024). In contexts closer to vocational schools, motivation and professional development acted as mediators that transmitted the effects of working conditions, managerial support, and family sociology on teacher performance (Ulfah et al., 2024; Kholifah et al., 2024). A similar mediation pattern was also visible when transformational leadership did not operate directly, but rather through PLC, self-efficacy, and motivation in encouraging innovative teaching

behavior (Windasari et al., 2025). Even among beginning teachers, affective-motivational competence such as teaching enthusiasm and reflection remained associated with instructional quality and work engagement (Kirschning et al., 2025). Therefore, work motivation is better understood as the core lever connecting structural support with observable pedagogical performance.

Although motivation plays an important role, the compiled findings show that workload and job demands remain problematic dimensions that cannot be ignored. Among secondary school teachers in Indonesia, proportional workload was reported to facilitate teachers in carrying out technical development and maintaining optimal performance (Ulfah et al., 2024). In adaptive education, high workload, weak connectivity, and limited resources were reported as real barriers, even though teachers still demonstrated resilience (Nazareno & Montañez, 2025). In the school digitalization process, burnout was also proven to affect the level of digitalization perceived by teachers (Cataudella et al., 2024). The JD-R perspective among preschool teachers shows that occupational well-being is shaped through pathways involving work pressure, burnout, organizational support, and personal motivation (Nong et al., 2025). Among physical education teachers in disadvantaged regions, engagement increased when self-efficacy was translated into job satisfaction (Zhou et al., 2025). Synthesized together, teacher performance is also determined by the ability of schools to manage work pressure proportionally.

Leadership and organizational support also appear to determine the direction of change in teacher performance, yet their influence tends to be non-linear. Reward systems and organizational commitment, for example, do not stop at job satisfaction, but are mediated by transformational leadership that subsequently strengthens teachers' professional conditions (Hardianto et al., 2025). In other studies, managerial support consistently increased motivation and professional development, two factors that eventually improved the performance of school teachers and vocational teachers (Ulfah et al., 2024; Kholifah et al., 2024). The role of the principal also appears important in the well-being dimension, because instructional leadership is positively associated with occupational well-being through instructional efficacy and awareness of professional development (Meng & Chang, 2024). When transformational leadership is combined with PLC, self-efficacy, and motivation, innovative teaching behavior is also more strongly encouraged (Windasari et al., 2025). In other words, effective leadership works mainly when it is translated into learning support, a sense of work security, and growth opportunities that are genuinely experienced by teachers.

When read from the perspective of vocational schools and digital transformation, this collection of articles shows that professional competence cannot be separated from organizational learning. Among vocational teachers, competence is strengthened by varied instructional strategies together with high engagement and motivation (He & Jen, 2025), while vocational teacher performance is driven by motivation and professional development supported by adequate working conditions (Kholifah et al., 2024). At the broader system level, digipedagogical competence is also supported by ICT training, collegial

collaboration, and digital infrastructure (Avci et al., 2025). However, experiences during adaptive education and the acceleration of digitalization indicate that without the control of burnout, workload, and sustained support, competence strengthening will remain fragile (Nazareno & Montañez, 2025; Cataudella et al., 2024). Findings among beginning teachers reinforce that affective-motivational dimensions also need to be maintained so that pedagogical change can be sustained (Kirschning et al., 2025). Within this framework, the present study also closes a conceptual gap by showing that the topic of teacher performance in the digital transformation of vocational schools is important to investigate because it provides an initial empirical basis for preliminary studies and a valid foundation for determining a research title or theme. Therefore, the digital transformation of vocational schools requires simultaneous orchestration among competence, motivation, working conditions, and the governance of professional development.

CONCLUSION

Based on the synthesis of the 13 included articles, teacher performance in the context of the digital transformation of vocational schools is primarily mapped by four main determinants, namely professional competence, work motivation, working conditions or workload, and organizational support and leadership. Professional competence is strengthened when ICT training, varied instructional strategies, collegial collaboration, and digital infrastructure are adequately available. Work motivation plays a central mediating role in linking working conditions, leadership, and professional development with teacher performance. In contrast, high workload, burnout, limited resources, and digital barriers tend to weaken both performance quality and teachers' occupational well-being. Therefore, digital transformation in vocational schools should not be directed only toward the provision of technology, but needs to be built through competence strengthening, proportional workload management, continuous professional development, and supportive school leadership.

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