

Quality of Teachers' Learning Partnerships Through Principal Coaching-Based Digital Academic Supervision in Secondary Education

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ABSTRACT

Digital academic supervision has become increasingly necessary because school transformation requires teacher development that is not merely administrative, but also collaborative, reflective, and grounded in evidence of learning. However, the relationship among digital academic supervision, principal coaching, and the quality of teachers' learning partnerships in secondary education has not been comprehensively mapped. This study aims to synthesize empirical evidence on the mechanisms, prerequisites, and contributions of principal coaching-based digital academic supervision in strengthening teachers' learning partnerships. A systematic literature review method was applied by referring to the PRISMA guidelines. The search was conducted in the Scopus database using relevant keyword combinations, followed by screening based on publication year, document type, language, open access status, abstract relevance, empirical design, and DOI validity. The findings indicate that digital academic supervision contributes to teacher professionalism when supported by instructional leadership, school digital culture, personal learning networks, evidence-based classroom observation, and reflective dialogue resembling coaching practices. The findings also confirm that principals need the capacity to interpret classroom evidence, provide constructive feedback, and organize follow-up professional development. This review contributes by offering a conceptual basis for developing digital academic supervision that is cyclical, participatory, and oriented toward teachers' learning partnerships.

INTRODUCTION

School digital transformation has expanded the meaning of academic supervision from administrative control to learning governance based on data, collaboration, and professional capacity strengthening. In primary and secondary education, technology is not only used as a supporting tool, but is also positioned as a lever for systemic change that requires leadership readiness, digital strategies, and sustainable teacher development design (McCarthy et al., 2023). The role of principals has also changed because digital leadership is understood through the ability to manage technology, communication, and instructional decisions within the school ecosystem (Karakose et al., 2021). Recent studies also show that technology shapes the daily practices of school leaders and changes patterns of relationships among leaders, teachers, and stakeholders (Krein, 2025) and (Lozano-Díaz et al., 2024). Therefore, digital academic supervision needs to be understood as a learning leadership process that connects technology, professional relationships, and the quality of teachers' instructional practices.

The current research landscape shows three interrelated major streams, namely principals' instructional leadership, teachers' professional learning communities, and collaboration-based professional development. Instructional leadership has been proven to be an important predictor of teachers' professional development because the principal's role is attached to curriculum coordination, the provision of learning opportunities, and the strengthening of instructional practices (He et al., 2024). On the other hand, principals' leadership practices can encourage teacher collaboration and organizational change when participatory spaces and support for instructional improvement are consistently provided (Meyer et al., 2023). Professional learning communities are also associated with informal teacher leadership, job satisfaction, and an orientation toward instructional improvement (Lee & Ip, 2023) and (Christensen & Jerrim, 2025). Meanwhile, effective professional learning tends to be strengthened through continuous training, coaching, and collaboration (Ventista & Brown, 2023). This landscape shows that the quality of supervision does not stand alone, but is shaped by connected leadership, collaboration, and professional learning.

Although the knowledge base on digital leadership and teacher professional development has expanded, an important gap remains in the integration of digital academic supervision, principal coaching, and teachers' learning partnerships. Digital instructional leadership has been linked to teachers' intrinsic motivation and students' learning perceptions, yet coaching-based supervision mechanisms have not always been explained as structured cycles of professional development (Berkovich & Hassan, 2024). Findings from the Italian context show that digital instructional leadership is related to teaching practices during emergency situations, but this context does not fully explain routine supervision after the crisis (Moulin & Soncin, 2026). The strengthening of leaders' capacity through virtual communities and teachers' digital competence has also been examined, but it remains separated from teacher-principal partnership models (Pashmforoosh et al., 2023) and (Skantz-Åberg et al., 2022).

This gap confirms the need for a focused synthesis that maps how digital supervision can serve as the basis for coaching and learning partnerships.

This study is directed at affirming the conceptual and empirical basis for selecting the theme of teachers' learning partnership quality through principal coaching-based digital academic supervision in secondary education. The focus on secondary education is relevant because principals' goals, leadership styles, and digital readiness may influence the direction of school digital transformation differently according to organizational context (Ruloff & Petko, 2025). In addition, school leaders' digital competence still needs to be formulated more operationally so that its impact on administrative and pedagogical leadership can be interpreted more clearly (Tømte, 2024). In Indonesia, principals' use of social media for instructional leadership has shown that digital platforms can be used for communication, supervision, and learning support (Prasojo & Yuliana, 2021). This study aims to synthesize evidence on the relationship among digital supervision, principal coaching, and teachers' learning partnerships. The research question is directed at how empirical evidence explains the mechanisms, prerequisites, and contributions of principal coaching-based digital academic supervision to the quality of teachers' learning partnerships.

LITERATURE REVIEW

Digital Academic Supervision

Digital academic supervision refers to the utilization of digital technologies to facilitate supervision processes, including classroom observation, documentation, feedback provision, and professional development follow-up. Unlike conventional supervision that often emphasizes administrative compliance, digital supervision enables evidence-based monitoring and continuous professional learning through online platforms and collaborative digital environments. Research has shown that digital academic supervision contributes positively to teacher professionalism by strengthening professional communication, reflective practices, and access to learning resources (Nisa et al., 2024; Rasdiana et al., 2024). Effective digital supervision requires not only technological infrastructure but also a supportive digital culture and leadership commitment.

Principal Coaching and Instructional Leadership

Coaching-oriented leadership emphasizes the principal's role as a facilitator of teacher growth rather than merely an evaluator of performance. Through coaching practices, principals engage teachers in reflective dialogue, collaborative problem-solving, and goal-oriented professional development. Instructional leadership literature consistently identifies principals as key actors in improving teaching quality through classroom observation, feedback, curriculum coordination, and professional learning support (He et al., 2024). Studies further indicate that coaching-based supervision fosters trust, teacher motivation, and instructional improvement when implemented through constructive and evidence-based interactions (Gümüş et al., 2025; Ferrell & Garner, 2023).

Teachers' Learning Partnerships

Teachers' learning partnerships refer to collaborative professional relationships that support continuous learning, knowledge sharing, and instructional improvement. These partnerships are often developed through professional learning communities, personal learning networks, mentoring, and collaborative supervision practices. Previous studies demonstrate that collaborative learning environments strengthen teacher leadership, job satisfaction, and commitment to instructional innovation (Lee & Ip, 2023; Christensen & Jerrim, 2025). In digitally connected school environments, learning partnerships can extend beyond formal organizational boundaries and facilitate sustained professional growth.

The Relationship between Digital Supervision, Coaching, and Learning Partnerships

Recent educational research suggests that digital supervision, principal coaching, and teachers' learning partnerships are interconnected components of effective school improvement. Digital platforms provide mechanisms for collecting classroom evidence and supporting communication, while coaching practices transform supervision into a developmental process. Simultaneously, learning partnerships create collaborative structures that sustain professional learning and instructional change. However, existing studies often examine these components separately, leaving limited understanding of how principal coaching-based digital supervision systematically contributes to strengthening teachers' learning partnerships, particularly in secondary education settings (Berkovich & Hassan, 2024; Pashmforoosh et al., 2023). Therefore, a synthesis of empirical evidence is needed to clarify the mechanisms and conditions through which these elements interact to improve teacher professionalism and educational quality.

METHOD

This review used a systematic literature review design with a PRISMA approach to identify, screen, and synthesize articles relevant to the quality of teachers' learning partnerships through principal coaching-based digital academic supervision in secondary education. Initial identification was conducted in the Scopus database using the Boolean keywords principal AND teacher AND coaching AND supervision AND collaboration AND digital AND school. The initial search produced 156 articles. After the publication year limit of 2021–2026 was applied, the number of articles decreased to 124. Subsequently, the journal article document type filter produced 34 articles, the English language filter produced 33 articles, and the All Open Access filter produced 23 articles.

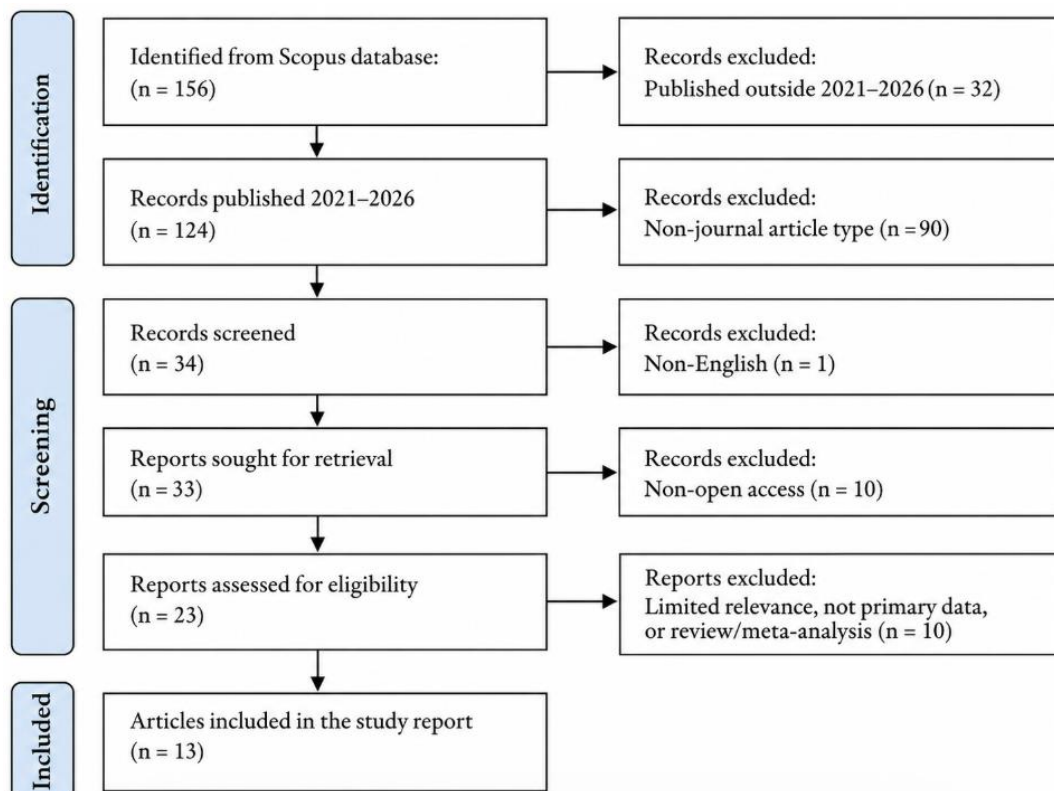
The eligibility stage was conducted on 23 articles through the reading of titles, abstracts, DOI information, subject context, research design, and thematic suitability. The inclusion criteria covered English-language journal articles published between 2021 and 2026, articles with DOI, articles using primary data or empirical interventions, and articles containing the substance of principal leadership, academic supervision, e-supervision, teacher professional development, classroom observation, collaboration, coaching, or digitalization of learning practices. The exclusion criteria covered articles that did not focus on schools or teachers, purely conceptual articles, conference reports, systematic

reviews, meta-analyses, articles in higher education contexts that were not directly related to schoolteacher supervision, and articles that did not show a substantial relationship with academic supervision or teacher professional development. No DOI duplication was found at the eligibility stage. After the eligibility assessment, 10 articles were excluded, and 13 articles were selected as the included articles.

At the identification stage, 156 articles were found from Scopus. After the 2021–2026 year filter was applied, 124 articles remained, while 32 articles were excluded. At the document type screening stage, 34 journal articles remained, while 90 articles were excluded because they were not journal articles. After the English language filter was applied, 33 articles remained and 1 article was excluded. After the All Open Access filter was applied, 23 articles remained. At the eligibility stage, 10 articles were excluded because they did not meet the relevance criteria, did not use primary data, were literature reviews or meta-analyses, or were outside the focus of digital academic supervision and teacher professional development. A total of 13 articles met the final criteria and were analyzed in the synthesis.

PRISMA Flowchart

The following section presents the article selection flow based on the PRISMA guidelines, from the identification stage in the Scopus database to the final inclusion of articles that met the eligibility criteria for further analysis in this study. This flow outlines the number of records at each stage and the reasons for exclusion applied systematically, as shown in Figure 1.



RESULTS

The screening results show that from 23 open access articles that met the initial Scopus filters, 13 articles were considered the most relevant for analysis. The analyzed articles mostly used quantitative, qualitative, mixed-methods, research and development, survey, and professional development intervention approaches. The main focus of the articles included digital academic supervision, principals' e-supervision, instructional leadership, technology leadership, simulation-based classroom observation, teacher professional development, and principals' capacity to support learning.

Table 1. Results of Article Review

No	Name	Conclusion
1	Kusumaningrum et al. (2025)	Instructional leadership has direct and indirect effects on teachers' teaching performance through school culture, particularly when change leadership is strong.
2	Maruf et al. (2023)	Supervisors improve quality through teacher development, supervision of learning documents, collaboration with madrasah principals, and training in the use of digital approaches.
3	Barokah et al. (2025)	A community-based supervision model improves pedagogical competence, lesson planning, teaching strategies, reflection, and participatory professional learning culture.
4	Nisa et al. (2024)	Digital academic supervision improves teacher professionalism directly and indirectly through personal learning networks that strengthen professional collaboration.
5	Gümüş et al. (2025)	Web-based simulation helps school leaders learn classroom observation in a practical, interactive, and sustainable way, especially for new leaders.
6	Ferrell and Garner (2023)	Administrators value teacher-student relationships, but their capacity to detect evidence-based science pedagogy differs according to background and leadership experience.
7	Rachmadi et al. (2024)	Principal leadership and work climate improve teacher job satisfaction, with teacher performance serving as an important mediator.
8	Rasdiana et al. (2024)	Principals' e-supervision, technology leadership, and school digital culture contribute to teachers' professional digital competence.
9	Amzat et al. (2022)	Principals' instructional and distributed leadership directly influence teachers' professional development and mutually strengthen school leadership practices.

No	Name	Conclusion
10	Dwikurnaningsih et al. (2026)	The SUPERTRAP model integrates academic supervision, Trello, project-based learning, and Gallery Walk as a participatory approach that is ready for implementation.
11	Alshaikhi and Khasawneh (2025)	Professional development programs improve teacher competence, but the implementation of practices is influenced by initial competence, educational background, and structural barriers.
12	Ntavlourou et al. (2026)	Digital skills are related to teacher leadership orientation, but gaps appear between leadership self-concept and professional digital readiness.
13	Beswick et al. (2026)	Principals show positive dispositions toward STEM, but leadership content knowledge remains limited and requires specific capacity strengthening.

DISCUSSION

The main findings show that academic supervision is no longer adequate when positioned merely as an administrative procedure, but needs to be directed as a professional partnership mechanism that is documented, reflective, and technology-based. Digital academic supervision has been shown to be related to teacher professionalism through the strengthening of personal learning networks, while principals' e-supervision supports professional digital competence when supported by technology leadership and school digital culture (Nisa et al., 2024) and (Rasdiana et al., 2024). The SUPERTRAP model strengthens this finding because Trello, project-based learning, and Gallery Walk are positioned as participatory supervision instruments, not merely managerial applications (Dwikurnaningsih et al., 2026). On the other hand, community-based supervision shows that the success of academic supervision is determined by shared reflection forums and follow-up teacher development (Barokah et al., 2025). Thus, the quality of teachers' learning partnerships becomes stronger when technology is integrated with collective reflection, structured follow-up, and supportive principal leadership.

Principal leadership in the included articles is not only interpreted as policy direction, but also as the driver of professional relationships that influence school culture and teacher performance. Instructional leadership has been shown to influence teaching performance through school culture, especially when strengthened by change leadership that opens spaces for collaboration between teachers and principals (Kusumaningrum et al., 2025). Other evidence shows that instructional and distributed leadership encourage teacher professional development because responsibility for learning improvement is not centralized in one actor (Amzat et al., 2022). In the madrasah context, teacher development, learning document review, and cooperation between supervisors and madrasah principals become elements that strengthen educational quality (Maruf et al., 2023). Leadership and supervision are also related to teacher job satisfaction through teacher performance as a mediator (Rachmadi et al., 2024). This pattern

confirms that principal coaching becomes effective when implemented as an equal, directed, and learning-improvement-oriented professional relationship.

The coaching dimension in academic supervision appears strongest when principals have adequate classroom observation capacity and instructional content knowledge. Web-based classroom observation simulation shows that school leaders need practical exercises, quality materials, and interactive experiences in order to provide meaningful instructional feedback (Gümüş et al., 2025). This is consistent with the finding that secondary school administrators have different capacities to detect evidence-based science pedagogy, particularly because disciplinary backgrounds and leadership experiences are not uniform (Ferrell & Garner, 2023). In the STEM context, principals show positive dispositions toward learning, but leadership content knowledge still needs to be strengthened so that instructional support does not stop at general encouragement (Beswick et al., 2026). Professional development interventions also show that teacher competence improvement needs to be adjusted to initial abilities and structural barriers (Alshaikhi & Khasawneh, 2025). Coaching-based supervision requires principals who understand learning content, are able to interpret classroom evidence, and are capable of adjusting support to teachers' needs.

Digital transformation in supervision does not automatically produce learning partnerships when professional digital readiness has not been systematically developed. Teachers' digital skills are related to leadership orientation and innovation readiness, but gaps still appear between leadership self-concept and truly professional digital competence (Ntavlourou et al., 2026). This finding explains why principals' e-supervision becomes more impactful when mediated by school digital culture, rather than merely when technology is introduced as a new tool (Rasdiana et al., 2024). Similarly, personal learning networks strengthen the impact of digital supervision because teachers obtain collaborative spaces to share resources, reflect on practices, and build professional identity (Nisa et al., 2024). Distributed leadership also provides an important foundation because teacher professional development becomes more sustainable when responsibility for learning is shared collectively (Amzat et al., 2022). Therefore, the digitalization of supervision needs to be directed toward a collaborative ecosystem that nurtures a learning culture, not merely toward the transfer of supervision administration to online platforms.

The synthesis of 13 articles shows that a coaching-based digital academic supervision model must be arranged as a cycle that integrates joint planning, evidence-based observation, reflective dialogue, follow-up, and the development of learning networks. Community-based supervision shows the importance of collaborative planning, reflective observation, reflection forums, and further development (Barokah et al., 2025). SUPERTRAP adds that digital platforms can be used to organize supervision syntax, documentation, and participatory activities (Dwikurnaningsih et al., 2026). Change leadership and simulation-based classroom observation training clarify that principals' capacity needs to be developed through applicable learning experiences, not only through conceptual training (Kusumaningrum et al., 2025) and (Gümüş et al., 2025). The gap

identified across the findings is the lack of integration among digital academic supervision, principal coaching, and teachers' learning partnerships into a complete conceptual framework, particularly in secondary education.

Therefore, this theme is important to study because it can serve as the basis for a preliminary study and as a scientific foundation for selecting the research title and direction. The most promising supervision framework is a hybrid model that combines technology, coaching, teacher collaboration, and evidence-based instructional leadership.

CONCLUSION

This review concludes that the quality of teachers' learning partnerships through principal coaching-based digital academic supervision is built by three main elements, namely collaborative instructional leadership, meaningful use of supervision technology, and a sustainable culture of professional reflection. Digital academic supervision is most effective when it is not narrowed into a reporting system, but is used to strengthen classroom observation, learning documentation, reflective dialogue, teacher learning networks, and follow-up professional development.

The synthesis findings also show that principals hold a central role as learning coaches. This role requires the ability to interpret classroom evidence, understand learning content, provide constructive feedback, mobilize school digital culture, and build professional trust with teachers. The digitalization of supervision will lose its impact if it is not accompanied by digital readiness, structural support, and leadership that distributes responsibility for improving learning quality.

The practical implication of this review is the need to develop a digital academic supervision model that is cyclical, participatory, and evidence-based. This model needs to include joint planning, classroom observation, reflective coaching, the use of digital platforms, strengthening of personal learning networks, and follow-up evaluation. In secondary education, this approach has the potential to strengthen teacher professionalism, learning quality, and the quality of partnerships between teachers and principals.

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