



Digital Leadership Paradox in Primary Education: Bridging the Instructional Gap through Collaborative Teacher Networks

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ARTICLE INFO	ABSTRACT
Article history: Submitted: May, 19 2026 Final Revised: June, 13 2026 Accepted: June, 19 2026 Published: July, 21 2026	Purpose: The development of digital technology in primary education presents a paradox in instructional leadership. Although schools are increasingly providing learning technologies, the transformation of instructional practices has not yet fully occurred. This study aims to analyze how teacher learning communities construct collective digital instructional leadership through reflection, collaboration, and the distribution of agency among teachers. Methods: This study employed a qualitative approach with a case study design focusing on the Kombel Ganesha teacher learning community in Yogyakarta. The participants consisted of one head of the learning community, two community administrators, and one school supervisor, who were selected purposively. Data were collected through in-depth interviews and document analysis, and were analyzed using Braun and Clarke's thematic analysis with the assistance of ATLAS.ti. Findings: The findings revealed five major themes: agency and instructional leadership, data-based planning and assessment, technology integration and innovation, collaboration within teacher learning communities, and quality assurance and teacher role modeling. The findings indicate that teacher learning communities function as collaborative spaces for professional reflection, shared problem-solving, and instructional improvement. Collective digital instructional leadership develops through collaboration, technology integration, and institutional support, enabling teachers to address the gap between digital learning demands and pedagogical readiness. Research Implications: Teacher learning communities can serve as strategic platforms for strengthening collective digital instructional leadership and supporting sustainable pedagogical transformation in primary education. Originality: This study proposes collective digital instructional leadership as a collaborative approach to bridging the gap between digital learning demands and pedagogical readiness through teacher learning communities.
Keywords: Collective Digital Instructional Leadership; Digital Instructional Leadership; Pedagogical Transformation; Professional Learning Community; Technology-Pedagogical Gap.	
	
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INTRODUCTION

The development of digital technology in primary schools presents a paradox in contemporary educational practice. On the one hand, various digital facilities such as Chromebooks, school internet networks, learning design platforms, and artificial intelligence-based applications are becoming increasingly accessible to teachers. (Haleem et al., 2022; Hidayati et al., 2023; Isaeva et al., 2025; Nazaretsky et al., 2022). Digitalization has even become a symbol of educational modernization, believed to enhance the quality of learning (Hemajothi & Jain, 2022; Krstić et al., 2022; Saputro et al., 2025). However, the reality in the field shows that the abundance of digital infrastructure does not always correspond to improvements in instructional quality in the classroom (Derder et al., 2023; Imama et al., 2025; Rawal, 2024). Teachers are often trapped in an orientation that focuses merely on the use of digital tools, while the essence of instructional leadership becomes increasingly obscured. As a result, technology is more frequently utilized to support the administrative and presentational aspects of teaching rather than to meaningfully transform students' learning experiences (Abedi, 2024; Røe et al., 2022). This phenomenon reflects a “capability trap,” a condition in which schools

appear technologically advanced but remain unable to substantively transform pedagogical practices (Abedi et al., 2024; Fawns, 2022; Pettersson, 2021). Moreover, the use of technology without accompanying changes in pedagogical approaches also has the potential to reinforce one-way learning and provide limited opportunities for students' active participation. In many cases, technology functions merely as a visual aid without being accompanied by instructional strategies capable of fostering students' creativity, problem-solving abilities, and critical thinking skills. This situation indicates that the digital transformation of education requires changes in learning culture, not merely the provision of technological devices in schools (Muhtadin et al., 2026).

This condition becomes increasingly complex when teachers are confronted with the heterogeneity of students' learning needs in the digital era. Teachers are not only required to operate technology effectively, but also to lead learning processes that are adaptive to the diverse characteristics of students, including students with special needs, students with low critical reasoning abilities, and students with varying levels of digital literacy (Marienko et al., 2020; Novrizal & Manaf, 2024). In practice, many teachers still experience difficulties in integrating technology with inclusive and transformative pedagogical strategies (Althubyani, 2024). Research by Doukakis et al. (2021) shows that teachers' mastery of content knowledge and technological knowledge was relatively high (4.38 and 4.16), whereas pedagogical content knowledge and technological content knowledge remained lower (3.51 and 3.68) (Bentri et al., 2025; Lizamuddin et al., 2025). This situation indicates a gap between the mastery of digital tools and the capacity for pedagogical leadership, which should constitute the core of instructional leadership in primary schools. The gap suggests that the success of digital transformation is determined not only by teachers' technical abilities, but also by their capacity to create learning experiences that are relevant, inclusive, and meaningful for students (Hasanah et al., 2023).

Amid these challenges, individualistic patterns of instructional leadership increasingly reveal their limitations. Teachers can no longer continue working in isolation when facing curriculum changes, rapid technological advancement, and the dynamic learning needs of students (Christensen & Jerrim, 2025; Ohayon & Albulescu, 2022). If this condition continues, the implementation of the Merdeka Curriculum may risk being reduced to merely fulfilling instructional administrative requirements, such as preparing learning outcomes, learning objectives, and teaching modules, without genuinely transforming students' learning experiences (Lakkala et al., 2021; Manalu et al., 2023). As a result, digital learning practices tend to stop at the use of media and technological devices without reaching deeper changes in instructional strategies that are more reflective, adaptive, and student-centered. Consequently, instructional leadership loses the reflective and collaborative dimensions that should serve as the primary foundation of educational change (Kyriopoulos, 2025; Van Braak et al., 2021). Collaboration among teachers becomes essential because the complexity of digital learning cannot be addressed solely through the individual experiences of each teacher (Pradana et al., 2025). Collaborative approaches also enable the exchange of best practices that can strengthen instructional leadership capacity in primary schools.

The urgency of transforming instructional leadership becomes increasingly evident as disparities in digital competence among teachers within the same region continue to widen. Technology-based instructional innovation tends to develop only among certain groups of teachers who possess greater access to knowledge, professional networks, and learning motivation (Hassan & Berkovich, 2023). Meanwhile, other teachers are left behind and experience difficulties in keeping up with these changes. This condition indicates that the digital transformation of education cannot be achieved solely through the provision of technology or individual formal training programs (Edwin et al., 2025; Mariana & Nurjanah, 2023). Collaborative spaces are needed to enable teachers to learn collectively, share best practices, and develop shared solutions to instructional challenges (Ohayon & Albulescu, 2022; Rizqi & Syafika, 2024). Teacher learning communities such as *Kombel Ganesha* function not only as platforms for competency development, but also as spaces for the participatory and sustainable distribution of digital instructional leadership agency among teachers. Through learning communities, teachers have opportunities to cultivate a culture of professional reflection that encourages continuous evaluation of their instructional practices.

Research on digital instructional leadership has generally focused on teachers' digital competencies (Althubyani, 2024; Bentri et al., 2022; Skantz-Åberg et al., 2022), the role of school principals in digital transformation (Berkovich & Hassan, 2025; Hidayat & Patras, 2024; Karakose et al., 2021), as well as teacher learning communities, which are generally positioned as forums for the development of pedagogical competencies (Sepulveda-Escobar, 2024; Wang et al., 2025). Research that views teacher learning communities as spaces for developing collective digital instructional leadership capacity remains limited. Teacher learning communities should not merely function as places for sharing teaching materials or instructional strategies, but also as spaces for collective reflection where teachers discuss instructional challenges, evaluate unsuccessful teaching practices, and collaboratively develop instructional solutions.

This research gap highlights the need for a more in-depth examination of how teacher learning communities contribute to the development of collective digital instructional leadership

The mechanism of collective reflection within the learning community serves not only as a space for sharing best practices, but also as a safe environment for teachers to evaluate the weaknesses of their own instructional practices. Through interactions among teachers, they begin to reconsider the instructional strategies they have long employed, including shifts in disciplinary approaches from punishment-oriented methods toward learning approaches that are more motivating for students. Reflection within the community also extends beyond classroom evaluation to include assessments of the effectiveness of the community's own programs. Such reflective and dialogical mechanisms are rarely found in top-down and individually oriented teacher training programs. This gap constitutes the primary focus of this study. Based on these considerations, this study investigates how teacher learning communities develop collective digital instructional leadership through reflection, collaboration, and the distribution of agency to address the gap between digital learning demands and pedagogical readiness.

METHOD

Research Design

This study employed a qualitative case study design to explore in depth the paradox of digital leadership in primary education, particularly in efforts to bridge instructional gaps through collaborative teacher networks. A case study design was selected because the research focuses on understanding how teacher learning communities can function as collaborative spaces that support the transformation of digital-based instructional leadership (Mishra & Dey, 2022; Younas & Inayat, 2025). Through this approach, the researchers were able to uncover the dynamics of interaction, collaborative practices, and teachers' experiences in facing the challenges of digital leadership in primary schools. This study also referred to the Standards for Reporting Qualitative Research (SRQR) to enhance the transparency and credibility of qualitative research reporting (Watson & Jackson, 2025).

Research Setting and Participants

Participants were selected using purposive sampling based on their active involvement in the development of digital learning within district-level teacher learning communities in Yogyakarta (Memon et al., 2024). The research participants consisted of one primary school teacher serving as the head of the learning community, two primary school teachers serving as learning community administrators, and one school supervisor who were actively involved in the Kelompok Belajar Ganesha (Ganesha Learning Community) in Yogyakarta. All participants were directly involved in the planning, implementation, mentoring, and evaluation of learning community activities related to digital instructional leadership. The informants were selected because they possessed direct experience, active involvement, and informational authority related to the development of digital instructional leadership within the learning community context (Wong et al., 2021). The research was conducted in Yogyakarta, particularly within district-level teacher learning communities that engage in collaborative activities, training, reflection, and continuous professional development for teachers.

Data Collection Technique and Instruments

Data were collected through structured in-depth interviews using an interview guide developed based on the research focus on reflection, collaboration, and digital instructional leadership. The interview guide was reviewed by experts to ensure content validity and alignment with the research objectives. Research data were collected from February 1 to April 5, 2026. Each interview lasted approximately 30–50 minutes and focused on three main aspects: digital learning planning, instructional implementation and collaboration within the learning community, and teachers' instructional reflection in teaching practices. In addition to interviews, the researchers conducted document analysis to strengthen the research data. The documents analyzed included the official decree establishing the Ganesha Teacher Learning Community, meeting minutes, meeting reports, teacher learning community program documents, teaching modules, student worksheets (LKPD), and classroom observation instruments used by supervisors. These documents were used to verify interview findings and provide contextual evidence regarding collaborative practices, instructional reflection, and the implementation of digital instructional leadership within the learning community. The use of multiple data sources served as a form of source triangulation to enhance the depth, credibility, and validity of the research findings (Schlunegger et al., 2024).

Ethical Considerations

Participation in this study was voluntary. Prior to data collection, all participants were informed about the objectives of the study, their rights as participants, the voluntary nature of their participation, and the confidentiality of the information they provided. Informed consent was obtained from all participants before the interviews were conducted. Participants were also informed of their right to withdraw from the study at any stage without any consequences. These procedures are consistent with contemporary ethical principles that emphasize voluntary participation, informed consent, and respect for participants' autonomy in qualitative research (Xu et al., 2020; Zhang et al., 2024). To ensure confidentiality, participants' identities were anonymized in interview transcripts and research reports, and all collected data were used solely for research purposes. The protection of anonymity and confidentiality is considered an essential component of ethical qualitative research, particularly when collecting rich and detailed participant narratives (Zhang et al., 2024).

Data Analysis Technique

The data analysis technique in this study employed thematic analysis using the approach developed by Braun & Clarke (2021). The process of data processing and analysis was conducted with the assistance of ATLAS.ti to facilitate systematic coding, theme categorization, and visualization of relationships among the data. The analysis was carried out through the following stages:

1. Familiarization with the data, the researchers repeatedly read and reviewed the interview transcripts and supporting documents to gain an in-depth understanding of the overall data and to become familiar with participants' experiences.
2. Generating initial codes, the researchers assigned codes to important statements related to the focus of the study, such as "sharing best practices," "diagnostic assessment," "learning community training," "instructional reflection," and "teacher collaboration."
3. Generating themes, codes that were interconnected were subsequently grouped into broader categories and organized into preliminary themes related to digital instructional leadership and teacher learning communities.
4. Reviewing themes, the researchers reexamined the alignment between the themes and the original data to ensure that the resulting interpretations remained consistent with and representative of the participants' experiences.
5. Defining and naming themes, the researchers refined the scope and meaning of each theme and assigned clear thematic labels that accurately reflected the patterns identified in the data.
6. Producing the report, the final themes were organized into a coherent narrative and supported by representative quotations and documentary evidence to present a comprehensive understanding of the development of digital instructional leadership within the teacher learning community.

Trustworthiness

The trustworthiness of the data in this study was maintained through the use of member checking techniques. The researchers returned the interview transcripts and data interpretations to the informants to ensure that the quotations, meanings, and conclusions accurately reflected the experiences and intentions conveyed by the participants (Kullman & Chudyk, 2025). In addition, an audit trail was maintained throughout the research process to document data collection procedures, coding decisions, theme development, and analytical interpretations. The researchers also conducted peer debriefing with academic supervisors to review the coding process and discuss alternative interpretations of the data (Ahmed, 2024). This technique was employed to minimize researcher bias while enhancing the credibility and trustworthiness of the research findings (Dahal, 2025).

Research Limitations

This study was conducted within a single teacher learning community in Yogyakarta. Therefore, the findings are specific to the context of the community studied and are not intended to be broadly generalized. Although the case study approach provided an in-depth understanding of the development of digital instructional leadership within the community, different teacher learning communities may have different characteristics, experiences, and implementation practices. Therefore, the findings should be interpreted within the context of this study.

RESULTS

The results of this study were analyzed using a Thematic Analysis approach through the stages of familiarization, coding, generating themes, and reviewing themes. The analysis process produced several major themes that were interconnected in the development of collective digital instructional leadership through the teacher learning community (Kombel Ganesha). Based on the results of data analysis using ATLAS.ti software, relationships among the themes were identified, indicating that the development of digital instructional leadership was influenced not only by teachers' individual capacities, but also by mechanisms of collective reflection, professional collaboration, technology integration, and institutional support from schools. Figure 1 illustrates the relationships among the five major themes generated through thematic analysis using ATLAS.ti. The visualization demonstrates how agency and instructional leadership, data-based planning and assessment, innovation and technology integration, collaboration within learning communities, and quality assurance and role modeling interact in the development of collective digital instructional leadership.

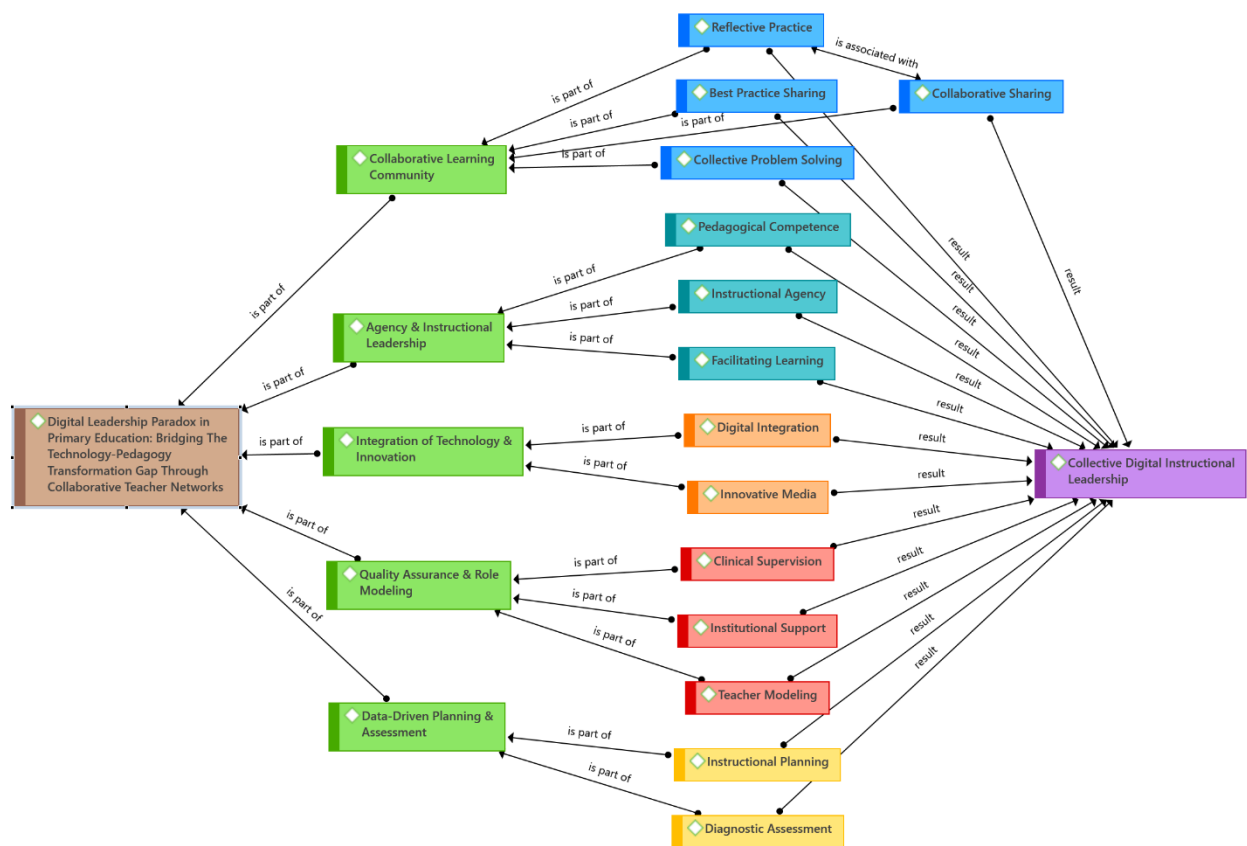


Figure 1. Relationships Among Themes of Collective Digital Instructional Leadership Generated Through ATLAS.ti Analysis

Based on the visualization, this study demonstrates that teacher learning communities function as mechanisms for the distribution of agency in developing Collective Digital Instructional Leadership. The major themes identified include agency and instructional leadership, data-based planning and assessment, technology integration and innovation, collaboration within learning communities, as well as quality assurance and role modeling. These five themes are interconnected in shaping the capacity for digital instructional leadership that develops collectively through collaborative teacher networks.

Agency and Instructional Leadership

Within this theme, several forms of teachers' instructional agency were identified, including instructional agency, pedagogical competence, and facilitating learning. The findings indicate that teacher learning communities play a role in developing instructional leadership capacity through the strengthening of teachers' instructional agency and pedagogical competence

"...a teacher is required to understand pedagogical competencies, as well as how to implement them in the classroom." (P2)

In the context of digital learning, teachers no longer merely perform the function of delivering content, but also act as learning facilitators who are capable of guiding, adapting, and developing instructional processes according to students' needs

"...the focus is on facilitating students themselves in carrying out the learning process so that the objectives can be achieved." (P3)

A similar statement was also expressed by the school supervisor, who emphasized that teachers function as facilitators of student learning both inside and outside the classroom

"...teachers are able to facilitate learning both inside and outside the classroom." (P4)

Instructional leadership was also reflected in teachers' ability to mobilize the learning environment in order to remain responsive to developments in digital education

"...they can become individuals who are able to motivate their environment to continue learning so as not to fall behind the developments in contemporary education." (P1).

The findings indicate that teachers perceived their roles as extending beyond content delivery toward facilitating learning processes, adapting instruction, and responding to changes in digital education.

Data-Based Planning and Assessment

Data-based planning and assessment encompass two subthemes, namely instructional planning and diagnostic assessment. Differences in students' learning readiness, academic abilities, and special needs encourage teachers to conduct instructional planning and assessment in a more adaptive manner. Teachers employ diagnostic assessment as a basis for identifying students' learning needs before determining appropriate instructional strategies

"...it is called diagnostic analysis. So, teachers can first analyze students' learning needs." (P3)

A similar statement was also conveyed by another teacher, who explained that initial analysis was conducted to understand students' characteristics.

"So, at the very beginning, we need to have assessments of students from both cognitive and non-cognitive aspects. In this way, we can understand students' characteristics and their learning readiness." (P2)

In addition, instructional planning was carried out by considering learning outcomes and students' characteristics identified through the results of the initial assessment.

"Instructional leadership begins with planning. When teachers plan instruction, ...it is implemented in the development of teaching modules." (P3)

Participants reported the importance of diagnostic assessment and adaptive instructional planning in responding to differences in students' learning readiness, characteristics, and educational needs.

Innovation and Technology Integration

The findings indicate that digital integration and innovative media have become important components of instructional practices in primary schools. Teachers utilize various digital media, such as Canva and instructional videos, to support learning processes that are more engaging and participatory.

“...I applied Canva comics with the students. The students created comics like mine or modified them according to their own creativity.” (P2)

Another teacher also reported the use of instructional videos in classroom learning

“...But for media, I usually use audio-visual videos.” (P3)

Technology was utilized not only for delivering instructional content, but also for creating learning experiences that were more engaging, contextual, and interactive. In addition, teachers also integrated and developed learning management systems (LMS) within instructional practices.

“I developed an LMS that I use with teachers in relation to PBL.” (P2)

Participants reported using various digital tools, including Canva, instructional videos, and learning management systems, to support classroom instruction and student engagement.

Collaboration within Learning Communities

This theme consists of several major subthemes, namely reflective practice, collaborative sharing, best practice sharing, and collective problem solving. The findings indicate that the teacher learning community (*Kombel Ganesha*) serves as a collaborative space and a forum for sharing best practices that support the development of digital instructional leadership

“...because within the community, we also engage in sharing. We share about classroom learning, for example, how to manage the classroom so that students become motivated to learn.” (P2)

Teachers also conducted best practice sharing through training sessions and workshops.

“...within the community, there are activities such as the ones I mentioned earlier, including workshops, seminars, and so forth.” (P3)

This was reinforced by another teacher’s statement regarding the existence of several teacher competency development activities within the learning community.

“Within the teacher community, ...there are direct activities that involve collective learning, ranging from organizing webinars, workshops, and training sessions.” (P1)

In addition, collective problem solving and reflective practice enabled teachers to provide mutual feedback and collaboratively seek solutions to instructional challenges that emerged within schools.

“...there is reflective evaluation. Later, we reflect together with colleagues in the school community. We ask for feedback as material for evaluation—what is lacking and which aspects are good can later be evaluated.” (P1)

Participants described learning communities as spaces for collaborative sharing, reflective practice, best-practice exchange, and collective problem solving.

Quality Assurance and Role Modeling

The development of digital instructional leadership in this context was influenced by three factors: clinical supervision, institutional support, and teacher modeling. In the context of teacher modeling, teachers' learning processes were viewed as part of instructional leadership that could influence students' motivation and learning culture.

"...what is equally important... is learning through role modeling. Teachers need to be willing to learn first so that encouraging students to learn becomes easier." (P3)

School principals and supervisors played roles in conducting instructional mentoring and evaluation through supervision in order to strengthen teachers' learning culture.

"...there is a school principal who supervises teachers. Later, it can be evaluated... to improve the effectiveness of learning." (P2)

Another teacher also emphasized the importance of supervision by school principals as a reminder for teachers.

"The supervision conducted by the school principal is effective in ensuring that teachers remain consistently mindful." (P1)

Institutional support was manifested through the provision of funding, supporting facilities, and opportunities for teachers' professional development.

"...as for support, it is clearly reflected in the budget, because we need instructional media." (P2)

Support for the provision of supporting facilities was also provided to both teachers and students.

"...facilitating the needs of students in the classroom, as well as teachers' needs in the classroom, including media, learning tools, and books." (P4)

In addition, teachers were given opportunities to continue learning.

"...given opportunities to learn. ...for example, when there are training sessions and workshops, I am allowed to participate." (P3)

Participants reported that supervision, institutional support, and teacher role modeling contributed to the implementation of digital instructional leadership practices within the learning community.

The themes presented in this study were derived from a small purposive sample consisting of three teachers who served as learning community leaders and administrators, and one school supervisor. Therefore, the findings reflect participants' experiences within the specific context of the Ganesha Learning Community and are intended to provide an in-depth understanding of the phenomenon rather than statistical generalization to broader populations.

DISCUSSION

The findings indicate that the development of digital instructional leadership in primary schools begins with strengthening teachers' agency and instructional capacity. Teachers no longer function merely as content deliverers, but have evolved into learning facilitators who are capable of guiding learning processes according to students' needs. This transformation reflects a shift in teachers' roles toward adaptive instructional leaders who respond to developments in digital education and align with the concept of student-centered facilitating learning (Afriani et al., 2024). In addition to technological mastery, digital instructional leadership also requires pedagogical abilities that are responsive to students' needs. The findings reveal that these abilities develop through continuous professional learning, enabling teachers to continuously learn, adapt, and enhance their competencies. This finding supports the studies of Bentri et al. (2025) and Lizamuddin et al. (2025) which emphasize that the transformation of digital learning requires adaptive pedagogical capacities rather than merely technical abilities. Therefore, teachers' instructional agency becomes a crucial foundation for developing effective digital instructional leadership in primary schools.

In the aspect of data-based planning and assessment, the findings indicate that teachers have begun implementing diagnostic assessments to understand students' characteristics, learning readiness, and needs before determining instructional strategies. These assessments were used as the basis for developing teaching modules and determining instructional approaches that were more aligned with students' conditions, thereby reflecting a shift toward more adaptive and data-driven learning. In the context of digital instructional leadership, the use of learning data becomes an important component of instructional decision-making that is responsive to students' needs (Alsaleh, 2022). However, this study also found that teachers still face challenges in implementing differentiated and inclusive learning amid the diversity of students' characteristics. These findings indicate that the digital transformation of education is not automatically followed by the transformation of teachers' pedagogical capacities. This is consistent with the perspective of Marienko et al. (2020) and Novrizal & Manaf (2024) which emphasizes that digital learning requires adaptive capacities to accommodate the diverse learning needs of students. Therefore, digital instructional leadership demands not only the utilization of technology, but also teachers' abilities to design learning that is inclusive, flexible, and responsive to students' needs.

The findings also indicate that technology integration and innovation have become important components of instructional practices in primary schools. Consistent with previous research, digital technology has become an integral part of the learning process because it can enhance student engagement, expand access to learning resources, and support more interactive and student-centered learning environments (Schmitz et al., 2023). Teachers utilized various digital media, such as Canva, instructional videos, and learning management systems (LMS), to create learning experiences that were more engaging and interactive. The use of digital media was not limited to content delivery, but also encouraged students' engagement and creativity in the learning process (Chusna et al., 2024; Sadulla, 2024). These findings indicate that technology has begun to be utilized to support learning that is more participatory and contextual. However, this study also identified a paradox in digital instructional leadership. Although various learning technologies have been implemented, the presence of technology has not yet fully transformed the quality of teachers' instructional practices. The use of technology has not been consistently accompanied by profound changes in instructional strategies that are centered on students' needs. This condition is consistent with the perspectives of Abedi et al. (2024), Fawns (2022), and Pettersson (2021), who argue that the digitalization of education often remains at the technical and administrative level without substantively transforming pedagogical practices. Therefore, the digital transformation of education requires a balanced integration of technology, pedagogy, and instructional leadership.

On the other hand, this study demonstrates that the teacher learning community (Kombel Ganesha) functions as a space for collaborative sharing, reflective practice, and collective problem solving in supporting the development of digital instructional leadership. Teachers shared best practices, discussed instructional challenges, and developed instructional solutions through workshops, webinars, and collective reflection. These findings indicate that teacher capacity development no longer occurs individually, but rather through collaborative networks among teachers. This is consistent with the perspective of Ohayon & Albulescu (2022), who explain that professional learning communities function as spaces for collaborative learning to improve instructional quality. However, this study reveals that learning communities function not only as mechanisms for professional competency development, but also as mechanisms for the distribution of agency in building collective digital instructional leadership. Through collective reflection and professional collaboration, teachers are able to evaluate and develop instructional practices collaboratively, allowing the transformation of digital learning to emerge not through top-down processes, but from real experiences and practical needs in the field. These findings are supported by Van Braak et al. (2021) which emphasizes that collaborative reflection can strengthen the continuous development of teachers' professional knowledge. Based on the findings of this study, collective digital instructional leadership can be understood as a form of instructional leadership that emerges collectively through teacher collaboration, professional reflection, technology integration, and shared responsibility for improving learning quality within digital learning environments (Calderón, 2023; Sasere & Makhasane, 2023). This concept builds upon the principles of distributed leadership, which emphasize the distribution of leadership practices across organizational members. However, collective digital instructional leadership specifically focuses on how teachers collaboratively enact instructional leadership to support pedagogical transformation and digital learning through teacher learning communities (Firdaus et al., 2022; Nikmah et al., 2025).

Furthermore, the study indicates that the sustainability of digital instructional leadership is influenced by quality assurance and institutional support from schools. Supervision by school principals and supervisors plays a role in strengthening teachers' learning culture through continuous instructional evaluation and mentoring (Castillo, 2025; Rasdiana et al., 2024). Supervision is not merely understood as a mechanism of control, but also as a form of strengthening teachers' professionalism in developing more effective digital instructional practices. In addition, teacher modeling demonstrates that teachers' role modeling in learning becomes an important component in fostering a

learning culture within schools. This is consistent with the theory proposed by Haddad (2025) teachers who continuously learn and develop their digital competencies are more likely to foster students' learning motivation. In addition to supervision and role modeling, institutional support is also manifested through the provision of facilities, instructional media, funding, and opportunities for teachers' professional development through training programs and workshops. These findings indicate that the transformation of digital instructional leadership requires systemic support that enables teachers to continuously learn and collaborate in a sustainable manner.

Despite the positive findings regarding the role of teacher learning communities in developing collective digital instructional leadership, the findings should be interpreted within the context of the participant characteristics. Most participants in this study were teachers who also held leadership roles within the learning community, including the community leader and administrators. Their active involvement in organizing and facilitating community activities provided extensive experience related to collaborative learning, professional reflection, and instructional improvement. These findings are consistent with previous studies demonstrating that professional learning communities contribute to teacher leadership development, professional collaboration, and instructional innovation (Sepulveda-Escobar, 2024). However, previous research also suggests that experiences within professional learning communities can vary according to participants' levels of engagement, access to professional networks, and involvement in decision-making processes (Berkovich & Hassan, 2023). Therefore, the findings of this study primarily represent the experiences of teachers who were actively involved in managing and developing the learning community. The perspectives of teachers who participated as regular members were not explored in depth in this study. Including these perspectives would enrich the understanding of the challenges associated with implementing digital instructional leadership in school settings. Future research should involve participants with varying levels of engagement within teacher learning communities to obtain a more comprehensive understanding of the development of collective digital instructional leadership.

CONCLUSION

This study demonstrates that the development of digital instructional leadership in primary schools is determined not only by teachers' ability to use technology, but also by pedagogical capacity, professional reflection, and collaboration among teachers within learning communities. The findings reveal a paradox of digital leadership, in which technological transformation has not been fully accompanied by the transformation of instructional practices that are responsive to students' needs. In this context, teacher learning communities function as spaces for collective reflection, professional collaboration, and collaborative problem solving that support the development of digital instructional leadership. Based on the findings, collective digital instructional leadership can be defined as a collaborative process through which teachers collectively develop and enact instructional leadership practices in digital learning environments through professional reflection, technology integration, data-informed decision making, and shared responsibility for improving learning quality. This concept extends existing perspectives on instructional leadership by emphasizing teacher-led, collaborative, and digitally mediated leadership practices that emerge through professional learning communities. Furthermore, schools and educational administrators should strengthen teacher learning communities by providing structured opportunities for collaborative reflection, technology integration, and data-based instructional improvement to support sustainable digital transformation in primary education. As this study was conducted within a single teacher learning community, the findings should be interpreted within this specific context. Future studies are encouraged to involve participants with varying levels of engagement in teacher learning communities and to examine the applicability of collective digital instructional leadership across different educational settings.

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AUTHOR CONTRIBUTION STATEMENT

EA contributed to the development of the research concept, data collection and analysis, interpretation of the research findings, and manuscript writing. EH contributed to the research design, supervision, strengthening of the theoretical framework, and manuscript revision. ABS contributed to the development of the methodology, validation of the research findings, as well as manuscript review and editing. All authors have read, reviewed, and approved the final version of the manuscript prior to publication.

AI DISCLOSURE STATEMENT

Artificial intelligence (AI) was used only as a supporting tool to enhance the linguistic presentation of this manuscript, including improving grammar, sentence structure, and overall readability. The preparation of the research, including the development of the study, methodological decisions, data collection, data analysis, interpretation of the results, and the formulation of the discussion and conclusions, was carried out entirely by the authors. Every statement, interpretation, and scientific contribution presented in this article reflects the authors' own scholarly work. The authors have reviewed the final manuscript and accept full responsibility for its accuracy, originality, and academic integrity.

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