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Evaluating Elementary School Principals' Digital Leadership in Managing Students' Generative AI Use

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Abstract

This study evaluated principals' digital leadership in managing students' generative Artificial Intelligence (GenAI) use in elementary schools using the Context, Input, Process, and Product (CIPP) evaluation model. A qualitative evaluation study was conducted in an Indonesian public elementary school involving one principal, two vice principals, five classroom teachers, three parent representatives, and two students. Data were collected through semi-structured interviews, observations, and document analysis and analyzed using the interactive model of Miles, Huberman, and Saldaña. The results indicated an urgent need for school-level GenAI governance. Existing digital infrastructure, teacher readiness, and parental support provided a foundation for implementation, while principals enacted digital leadership through policy communication, teacher empowerment, monitoring practices, and stakeholder collaboration. These efforts contributed to strengthening students' awareness of responsible GenAI use and enhancing digital literacy. The study was limited to a single-school context and qualitative evidence. Schools should strengthen AI-related professional development, parental engagement, and age-appropriate governance frameworks. This study extends the application of the CIPP model to GenAI governance and highlights principals' digital leadership as a key mechanism for fostering responsible AI use in elementary education.

Keywords: digital leadership; generative Artificial Intelligence; AI governance; elementary school; CIPP evaluation.

Introduction

Education is undergoing a profound transformation driven by rapid technological advancement and digital innovation. Among these innovations, generative Artificial Intelligence (GenAI) has emerged as one of the most disruptive technologies reshaping educational practices worldwide (Law, 2024). AI-powered applications such as intelligent tutoring systems, automated feedback tools, content generators, and personalized learning platforms are increasingly integrated into teaching and learning activities (Almuhanna, 2025). In particular, GenAI technologies have transformed how students seek information, generate ideas, complete assignments, and engage in knowledge construction. Consequently, educational institutions are challenged not only to adopt technological innovations but also to establish effective governance mechanisms that ensure their responsible and ethical use.

The rapid diffusion of GenAI technologies among students has become a global phenomenon. According to the Organisation for Economic Co-operation and Development (OECD), more than one-third of individuals across OECD countries used generative AI tools in 2025, while approximately 75% of students aged 16 years and above reported using generative AI for educational and personal purposes (OECD, 2026). The increasing prevalence of GenAI use among learners demonstrates that these technologies are becoming an integral component of contemporary educational experiences. Recent studies further indicate that students increasingly utilize GenAI not only for information retrieval but also for brainstorming, drafting written work, and solving academic tasks, thereby blurring the boundaries between learning support and academic dependency (Saqjuddin et al., 2025). As GenAI technologies continue to penetrate school environments, educational institutions must develop effective policies and management strategies to maximize educational benefits while minimizing potential risks.

Although GenAI offers considerable opportunities for enhancing learning effectiveness, creativity, personalized instruction, and access to information, it also presents significant challenges. Concerns have emerged regarding academic dishonesty, overreliance on AI-generated content, declining critical-thinking skills, misinformation, privacy issues, and data security risks. Mighfar et al. (2026) emphasizes that many educational systems remain inadequately prepared to address the ethical and pedagogical implications of generative AI. Consequently, UNESCO recommends the development of regulatory frameworks, age-appropriate guidelines, teacher capacity-building programs, and human-centered approaches to AI governance in education. Emerging evidence also suggests that educational leaders are increasingly expected to formulate institutional policies and establish safeguards that balance innovation with accountability in the use of GenAI technologies (Chen & Delaney, 2025). Such concerns highlight the necessity for educational leaders to establish clear policies that balance innovation with educational integrity and student development.

In the Indonesian context, the integration of digital technologies aligns with ongoing educational reforms aimed at strengthening twenty-first-century competencies, including critical thinking, creativity, collaboration, communication, and digital literacy (Khoiriyah et al., 2026). The implementation of the Merdeka Curriculum encourages schools to utilize digital technologies to support student-centered learning and independent knowledge construction. The increasing accessibility of GenAI applications through smartphones, tablets, and internet-based platforms has expanded opportunities for elementary school students to encounter and utilize these technologies in both formal and informal learning environments (Wang et al., 2026). However, the rapid diffusion of GenAI has not always been accompanied by comprehensive school-level policies, resulting in uncertainties regarding acceptable use, supervision mechanisms, and ethical standards. Educational institutions should establish context-sensitive governance frameworks to ensure that technological innovation is aligned with learners' developmental needs and educational values (Ulpiana, 2026). This situation underscores the strategic importance of school leadership in governing GenAI implementation within educational settings.

In responding to digital transformation, digital leadership has emerged as a critical competency for school principals. Digital leadership refers to leaders' capacities to articulate a shared vision for technology integration, establish policies and ethical standards, foster stakeholders' digital competencies, support innovation, and create organizational conditions that enable responsible technology use (Gonzalo, 2026; Zulmaulida et al., 2026). Recent studies indicate that educational administrators perceive digital leadership as extending beyond technological management toward guiding ethical decision-making and navigating the complexities associated with artificial intelligence in schools (Kurkan & Çetin, 2024). In the era of GenAI, principals are expected not only to promote technological adoption but also to regulate students' use of emerging technologies, facilitate teachers' professional learning,

engage parents and communities, and ensure that innovation supports educational goals rather than undermines them. Research has further demonstrated that principals' digital leadership positively contributes to the development of digital literacy initiatives and technology-supported services within elementary schools (Supriadi, 2025). Effective digital leadership is therefore essential in promoting responsible GenAI use while mitigating risks associated with inappropriate or excessive dependence on these technologies.

The elementary school context deserves particular attention because younger learners are still developing foundational cognitive, social, ethical, and self-regulation competencies. Unlike secondary or higher education students, elementary school students often possess limited abilities to critically evaluate AI-generated information and distinguish between reliable and unreliable content. The importance of age-appropriate AI implementation and emphasizes the need for stronger supervision and safeguards for younger learners (Maheen & Muneer, 2025). Without adequate guidance, younger learners may become vulnerable to misinformation, reduced independent problem-solving, and excessive reliance on automated outputs, potentially affecting the development of essential learning dispositions. Therefore, leadership interventions at the elementary school level are crucial to ensure that GenAI serves as a supportive educational tool rather than a substitute for essential learning processes.

Despite the increasing scholarly interest in GenAI within educational contexts, existing studies have predominantly focused on students' perceptions of GenAI, teachers' readiness to adopt AI technologies, technology acceptance, and the pedagogical applications of AI tools. Recent studies have also explored the effects of GenAI on students' learning outcomes, motivation, and academic performance, while simultaneously warning against potential risks such as overdependence and metacognitive laziness (Fan et al., 2025; Liu et al., 2025). However, limited attention has been devoted to examining how school principals enact digital leadership in governing students' GenAI use, particularly within elementary school settings. Moreover, existing research has rarely investigated how school leaders formulate policies, monitor implementation, engage stakeholders, and evaluate the outcomes of GenAI governance initiatives. This omission reveals an important empirical gap in the emerging literature on AI governance and educational leadership.

In addition to the empirical gap, a contextual and methodological gap can also be identified. Existing studies rarely provide in-depth evaluations of how digital leadership is enacted within the everyday realities of elementary school settings, despite younger learners requiring stronger supervision and age-appropriate safeguards in their use of GenAI. Furthermore, prior investigations have predominantly relied on perception-based approaches, offering limited insight into how leadership practices are implemented and evaluated in authentic school contexts (Ayumi & Nasution, 2025). Consequently, contextually grounded evaluations conducted within authentic elementary school environments remain necessary to understand how school leaders navigate opportunities and challenges associated with students' GenAI use.

To address these limitations, this study evaluates the digital leadership of an elementary school principal in managing students' GenAI use through the Context, Input, Process, and Product (CIPP) evaluation model developed by Stufflebeam. The CIPP model provides a comprehensive framework for assessing leadership effectiveness by examining contextual needs and challenges, organizational resources and preparedness, implementation processes, and resulting outcomes. Unlike previous studies that primarily focus on perceptions or technology acceptance, this study offers a multidimensional evaluation of how digital leadership is enacted in governing students' GenAI use within an authentic school context. The study contributes to the literature in three ways. First, it extends the emerging discourse on AI governance by conceptualizing the management of students' GenAI use as a manifestation of principals' digital leadership. Second, it provides an in-depth, contextually grounded evaluation of digital leadership practices within an elementary school setting,

offering insights into how schools respond to the opportunities and challenges associated with students' GenAI use. Third, it demonstrates the applicability of the CIPP model as a comprehensive framework for evaluating leadership effectiveness in educational technology governance. Practically, the findings are expected to inform school leaders, policymakers, and other educational stakeholders in developing strategies that promote ethical, responsible, and educationally meaningful use of GenAI in elementary education.

Method

Research Design

This study employed a qualitative evaluation design guided by the Context, Input, Process, and Product (CIPP) evaluation model to investigate the effectiveness of elementary school principals' digital leadership in managing students' generative Artificial Intelligence (GenAI) use. A qualitative evaluation approach was selected because it enables researchers to gain an in-depth understanding of leadership practices, stakeholder perspectives, and contextual factors influencing GenAI governance within school settings. Qualitative inquiry facilitates the exploration of complex social interactions, organizational dynamics, and leadership decision-making processes that cannot be adequately captured through quantitative measures alone (Creswell & Poth, 2017; Merriam & Tisdell, 2016). Given the study's focus on evaluating leadership practices within a naturally bounded educational setting, this approach was considered appropriate for generating contextually grounded insights into how principals govern students' GenAI use.

The CIPP model developed by Stufflebeam and Coryn (2014) was employed as the primary evaluation framework because of its capacity to support comprehensive educational evaluations and continuous improvement. In this study, the model was operationalized to evaluate principals' digital leadership practices in governing students' GenAI use. The context dimension focused on identifying needs, challenges, and environmental conditions associated with students' GenAI use. The input dimension examined institutional resources, policies, digital infrastructure, and stakeholder readiness supporting GenAI governance. The process dimension evaluated leadership practices related to communication, supervision, stakeholder engagement, and monitoring of GenAI implementation. Finally, the product dimension assessed the perceived outcomes of leadership interventions, including responsible GenAI use, strengthened digital literacy, and enhanced ethical awareness among members of the school community.

Research Setting and Participants

The research was conducted at a public elementary school in Lampung Province, Indonesia, referred to in this study as *Elementary School A* to protect the confidentiality of the institution and its participants. The school was purposively selected because it had integrated digital technologies into teaching and learning activities and had begun encountering emerging issues related to students' use of GenAI applications. The increasing accessibility of AI-powered tools among students and teachers provided a relevant context for evaluating how principals exercised digital leadership in managing technology use within elementary education settings.

Participants were selected using purposive sampling based on their direct involvement in school leadership, instructional practices, and experiences related to students' GenAI use. The study involved 13 informants comprising one principal, two vice principals, five classroom teachers, three parent representatives, and two students. The inclusion of multiple stakeholder groups enabled the researchers to capture diverse perspectives regarding the implementation and effectiveness of principals' digital leadership practices. Such variation in participants also facilitated source triangulation and enriched the contextual understanding of the phenomenon under investigation.

Data Collection

Data were collected over a three-month period through semi-structured interviews, non-participant observations, and document analysis. The use of multiple data collection techniques enabled the researchers to obtain rich descriptions of leadership practices and strengthen the credibility of the findings through methodological triangulation. Semi-structured interviews were conducted to explore participants' experiences, perceptions, and evaluations of principals' digital leadership in managing students' GenAI use. Interview protocols were developed based on the four dimensions of the CIPP model. Each interview lasted approximately 45–60 minutes and was conducted face-to-face at the school. With participants' consent, interviews were audio-recorded and transcribed verbatim for analysis. Non-participant observations were undertaken during classroom activities, technology-supported learning sessions, school meetings, and other school programs relevant to students' use of digital technologies. These observations aimed to examine leadership practices, stakeholder interactions, and the implementation of school initiatives related to GenAI governance. Document analysis involved reviewing school regulations, technology-use policies, digital literacy programs, meeting minutes, strategic planning documents, and other records relevant to the management of students' GenAI use. Documentary evidence served to corroborate information obtained from interviews and observations.

Data Analysis

Data analysis followed the interactive model proposed by Miles et al. (2014), comprising data condensation, data display, and conclusion drawing and verification. During the data condensation stage, interview transcripts, observation notes, and documentary evidence were organized and coded. Open coding was initially employed to identify meaningful units of information, which were subsequently categorized according to the four dimensions of the CIPP evaluation model: context, input, process, and product. This analytical strategy enabled the researchers to examine how principals' digital leadership practices were manifested across different aspects of GenAI governance.

The data were subsequently displayed through thematic matrices and narrative descriptions to facilitate pattern identification and interpretation. The final stage involved drawing conclusions and continuously verifying emerging findings through comparisons across participant groups and data sources. This iterative analytical process supported the development of a comprehensive understanding of the effectiveness of principals' digital leadership in managing students' GenAI use. To enhance the credibility of the findings, source triangulation was conducted by comparing information obtained from the principal, teachers, parents, and students, while methodological triangulation was achieved through the integration of interviews, observations, and document analysis. Member checking was undertaken by sharing preliminary interpretations with selected participants to confirm the accuracy of the researchers' interpretations. In addition, peer debriefing with experienced qualitative researchers was conducted to strengthen analytical consistency and minimize potential researcher bias.

Results and Discussion

The findings are presented according to the four dimensions of the Context, Input, Process, and Product (CIPP) evaluation model to provide a comprehensive evaluation of principals' digital leadership in managing students' generative Artificial Intelligence (GenAI) use. The CIPP model enables researchers to assess educational practices by examining contextual needs, organizational readiness, implementation processes, and the outcomes of interventions, thereby supporting both accountability and continuous improvement

(Stufflebeam & Coryn, 2014). A summary of the major findings across the four dimensions is presented in Table 1.

Table 1. *Summary of Findings Based on the CIPP Framework*

CIPP Dimension	Key Findings
Context	The growing accessibility of GenAI created an urgent need for structured governance, ethical guidance, and age-appropriate supervision.
Input	Existing digital infrastructure, teacher readiness, and parental support provided a foundation for GenAI governance, although AI-specific capacity building remained limited.
Process	Principals enacted digital leadership through policy development, teacher empowerment, monitoring practices, and collaboration with parents.
Product	Leadership practices contributed to greater awareness of responsible GenAI use and strengthened digital literacy, despite continuing challenges.

Context Evaluation: The Need for Generative AI Governance in Elementary Schools

The findings revealed an emerging need for structured governance of students' generative Artificial Intelligence (GenAI) use within the elementary school context. Participants reported that students increasingly utilized AI-powered applications to search for information, generate ideas, answer homework questions, and support learning activities. Although these technologies were perceived as beneficial for facilitating access to information and assisting learning, concerns emerged regarding students' overreliance on AI-generated responses, limited critical evaluation skills, and the absence of clear guidelines governing appropriate AI use. These conditions highlighted the urgency for school leaders to provide direction and safeguards to ensure that GenAI supports meaningful learning rather than replacing students' independent thinking. The principal emphasized that the widespread accessibility of AI applications had become a new challenge for schools in guiding students' learning behaviors:

> "Many students are already familiar with AI applications through smartphones and the internet. However, without guidance, they tend to use AI merely to obtain instant answers rather than to support meaningful learning." (P)

Teachers expressed similar concerns, particularly regarding students' tendency to rely on AI-generated outputs without fully understanding the content. One teacher explained:

> "We have introduced students to responsible internet use, but discussions specifically related to AI ethics and how students should use AI appropriately have not yet been systematically implemented." (T3)

Parents also acknowledged the growing influence of AI technologies on their children's learning experiences. While recognizing the potential benefits of GenAI, they admitted experiencing difficulties in supervising its use at home due to limited understanding of AI applications and their implications. As one parent stated:

> "AI can help children learn more easily, but we as parents do not always understand how to monitor its use properly. We need guidance from the school as well." (PR2)

Student participants described GenAI as a practical tool that enabled them to obtain information more quickly and complete assignments more efficiently. However, they also

admitted that they did not always verify the accuracy of AI-generated information before using it. One student commented:

> "Sometimes I use AI to find answers because it is faster, but I usually do not check whether the information is correct unless the teacher asks us to explain it." (S1)

From the perspective of the CIPP model, these findings indicate that the contextual environment was characterized by an urgent need for leadership intervention to regulate students' GenAI use. The widespread availability of AI applications, coupled with students' limited capacity to critically evaluate AI-generated content and the absence of formal guidelines specifically addressing GenAI use, positioned digital leadership as an emerging responsibility of elementary school principals. This finding supports Crompton et al. (2026) recommendation that educational institutions establish age-appropriate policies and guidance frameworks to promote the ethical and responsible use of GenAI. It also reinforces the view that younger learners require stronger supervision and explicit guidance because they are still developing competencies related to critical thinking, self-regulation, and ethical decision-making. Therefore, the context evaluation suggests that effective GenAI governance should begin with principals' recognition of contextual needs and their capacity to respond proactively to emerging technological challenges through digital leadership practices.

The findings suggest that the emergence of GenAI in elementary education has created a new leadership challenge requiring proactive governance and age-appropriate safeguards. Unlike older learners, elementary school students are still developing critical thinking and self-regulation competencies, making them more vulnerable to uncritical dependence on AI-generated content. This finding supports Li et al. (2026) argument that schools should establish clear guidance mechanisms to ensure that GenAI promotes meaningful learning rather than replacing essential cognitive processes. It also extends previous discussions on AI governance by highlighting the pivotal role of principals' digital leadership in responding to contextual needs within elementary school settings.

Input Evaluation: Resource Readiness and Stakeholder Support for GenAI Governance

Input evaluation examined the availability of institutional resources and the readiness of stakeholders to support the governance of students' generative Artificial Intelligence (GenAI) use. The findings indicated that the school possessed adequate foundational resources to facilitate the implementation of GenAI governance initiatives. However, several limitations remained, particularly regarding AI-specific capacity building and the development of more structured support systems. A summary of the input components identified in this study is presented in Table 2.

Table 2. *Input Components Supporting GenAI Governance*

Input Component	Findings	Implications
Digital infrastructure	Internet access, computers, projectors, and digital learning platforms were available to support instructional activities	Facilitated technology-enhanced learning and supervision of students' technology use
Teacher readiness	Teachers had participated in digital literacy activities and educational technology training, although AI-specific training remained limited	Increased confidence in guiding students, but highlighted the need for continuous professional development

Input Component	Findings	Implications
School policies	General regulations regarding technology use existed, while specific guidelines related to GenAI were still evolving	Demonstrated institutional commitment but underscored the need for clearer governance frameworks
Parent support	Parents actively engaged in communication forums and school meetings related to students' technology use	Strengthened supervision and promoted shared responsibility between school and home

The availability of digital infrastructure emerged as one of the key enabling factors supporting GenAI governance. Participants reported that internet access, computers, projectors, and digital learning platforms had been routinely utilized to support teaching and learning activities. Although these facilities were generally considered adequate, several teachers acknowledged occasional technical constraints that affected instructional implementation.

One teacher explained:

"The available facilities are generally adequate, but internet connectivity sometimes becomes unstable during peak usage periods. This occasionally affects our ability to demonstrate AI-based learning activities." (T2)

In addition to infrastructure, teacher readiness was identified as a crucial input for effective GenAI governance. Participants noted that teachers had participated in digital literacy workshops and educational technology training, which enhanced their confidence in supervising students' technology use. Nevertheless, opportunities specifically addressing GenAI ethics, instructional integration, and risk mitigation remained limited.

A vice principal stated:

"Teachers are familiar with digital learning tools, but training related to AI ethics and responsible use is still relatively new. We need more structured capacity-building programs." (VP1)

These findings suggest that while teachers possessed foundational digital competencies, they required ongoing professional development to respond effectively to the rapidly evolving nature of GenAI technologies. Previous studies have similarly emphasized that successful AI implementation in education depends not only on technological availability but also on educators' preparedness and leadership capacity to guide responsible use (Alexandrowicz, 2024). Parental support also emerged as an important component of institutional readiness. Parents generally expressed positive attitudes toward the educational potential of GenAI while simultaneously acknowledging concerns regarding excessive dependence on technology and limited supervision at home. Communication forums organized by the school were perceived as valuable opportunities for strengthening parents' understanding of both the opportunities and risks associated with students' GenAI use.

As one parent noted:

"AI can be very helpful for learning, but children still need supervision. The information provided by the school helps us understand how to guide our children more effectively at home." (PR1)

From the perspective of the CIPP model, the input evaluation indicates that effective GenAI governance requires the alignment of technological resources, human capacity, institutional commitment, and stakeholder support. Although the school had established a

relatively supportive foundation through existing infrastructure, teacher readiness, and parental involvement, the findings highlight the need for more systematic initiatives related to AI literacy and professional development. Consistent with Daher (2025), the successful integration of AI in educational settings depends upon the interaction between technological resources and the preparedness of individuals responsible for implementing and supervising its use. Therefore, strengthening stakeholder capacity should be considered a strategic priority in enhancing principals' digital leadership for GenAI governance in elementary schools.

The findings indicate that the successful governance of GenAI depends not only on the availability of technological infrastructure but also on the preparedness of human resources and stakeholder commitment. Although teachers demonstrated adequate digital competence, the limited availability of AI-specific professional development may hinder schools' capacity to respond to rapidly evolving technological changes. Effective AI integration requires a combination of institutional readiness, educator capacity, and collaborative engagement among stakeholders (Yokus, 2025). Therefore, strengthening AI literacy among teachers and parents should become a strategic priority for school leaders.

Process Evaluation: Principals' Digital Leadership Practices in Managing Students' GenAI Use

The process evaluation examined how principals enacted digital leadership practices to manage students' generative Artificial Intelligence (GenAI) use within the school environment. The findings revealed that principals played an active role in translating institutional concerns regarding GenAI into concrete actions through four interrelated practices: policy development, teacher empowerment, monitoring and supervision, and stakeholder collaboration. These practices reflected the principal's role not merely as an administrator, but as a leader responsible for fostering a culture of responsible technology use. One of the principal strategies involved the development and communication of school expectations regarding appropriate GenAI use. Although formal written policies specifically addressing GenAI had not yet been fully established, participants reported that school leaders consistently emphasized that AI should function as a learning support tool rather than a substitute for students' independent thinking.

The principal explained:

> "Students should understand that AI is a tool to assist learning, not a shortcut to complete assignments without thinking. We continuously remind teachers and students that responsibility and honesty remain the most important principles." (P)

Teachers confirmed that these directions influenced instructional practices in the classroom. Learning activities and assignments were gradually redesigned to encourage analysis, reflection, and explanation, thereby reducing students' dependence on AI-generated answers.

One teacher stated:

> "Students are allowed to use AI for learning purposes, but they are required to explain and justify the information they obtain. This helps them develop critical thinking rather than simply copying AI-generated answers." (T4)

Another important aspect of the process involved teacher empowerment. Participants reported that principals facilitated professional discussions, informal mentoring, and opportunities for collaborative learning related to educational technology. These activities enabled teachers to exchange experiences and identify strategies for guiding students in using GenAI appropriately.

As noted by one vice principal:

> "We regularly discuss emerging issues related to technology use during teacher meetings. Although we are still learning about AI, these discussions help teachers understand how to respond to new challenges." (VP2)

The findings also demonstrated the importance of monitoring and supervision practices. Teachers monitored patterns of students' assignment completion, observed classroom interactions involving technology use, and provided immediate guidance when they identified inappropriate practices. Rather than adopting punitive approaches, participants emphasized educational strategies that encouraged students to reflect on the ethical implications of their actions.

One teacher explained:

> "When we suspect that students rely too much on AI-generated answers, we ask them to explain the process and discuss the information together. This approach is more educational than simply prohibiting its use." (T1)

In addition, stakeholder collaboration emerged as an essential component of the leadership process. Principals maintained communication with parents through meetings, messaging groups, and school activities to ensure consistency between expectations at school and supervision at home. Parents appreciated these efforts because they helped them understand both the opportunities and risks associated with GenAI use among children.

A parent representative commented:

> "The school keeps informing us about how technology should be used responsibly. This communication helps parents provide guidance at home using the same expectations as the school." (PR3)

From the perspective of the CIPP model, the process evaluation indicates that principals' digital leadership was characterized by adaptive and collaborative practices aimed at balancing technological innovation with educational values. Rather than relying solely on restrictive measures, school leaders promoted responsible GenAI use through guidance, capacity building, supervision, and shared responsibility among stakeholders. These findings align with the concept of digital leadership proposed by Sheninger (2019), which emphasizes that effective school leaders must create conditions that support innovation while safeguarding learning quality and ethical standards. Similarly, the International Society for Technology in Education (ISTE) highlights that educational leaders are expected to cultivate digital citizenship, empower educators, and engage stakeholders in creating safe and meaningful learning environments (Trust, 2018).

The findings further suggest that managing students' GenAI use in elementary schools requires leadership approaches that are proactive, educative, and relational. Principals' efforts to communicate expectations, strengthen teacher capacity, monitor students' practices, and collaborate with parents collectively contributed to the development of a responsible technology culture within the school community. Therefore, the process evaluation demonstrates that digital leadership functions as the central mechanism through which GenAI governance is enacted in elementary education settings.

The process evaluation highlights that principals enacted digital leadership through adaptive and collaborative practices rather than through restrictive control mechanisms alone. By developing shared expectations, empowering teachers, monitoring students' practices, and engaging parents, principals fostered a culture of responsible technology use. These findings align with Akhmad (2025) conceptualization of digital leadership, which emphasizes innovation, collaboration, and the promotion of ethical technology use to support meaningful learning experiences.

Product Evaluation: Outcomes of Principals' Digital Leadership in Managing Students' GenAI Use

The product evaluation examined the outcomes associated with principals' digital leadership practices in managing students' generative Artificial Intelligence (GenAI) use.

Overall, participants perceived that the initiatives implemented by school leaders had contributed positively to promoting more responsible technology use and strengthening digital literacy within the school community. Nevertheless, several challenges remained and indicated the need for continuous improvement. Teachers reported observable changes in students' attitudes toward the use of GenAI. Students appeared to demonstrate greater awareness of academic honesty and became more cautious in accepting AI-generated information without verification. Rather than relying solely on AI outputs, students were increasingly encouraged to explain, discuss, and justify the information they obtained from digital tools.

One teacher noted:

"Students have become more careful when using AI. They now understand that AI-generated answers should be checked and discussed rather than copied directly." (T5)

Students themselves acknowledged that they had become more aware of the need to use GenAI critically. Although they still perceived AI as a useful learning aid, they recognized that not all responses generated by AI could be accepted without further consideration.

As expressed by one student:

"I still use AI to help me learn, but now I know that I have to check whether the answers make sense and match what the teacher has taught us." (S2)

Participants also described positive outcomes among teachers. Increased discussions regarding GenAI and opportunities for collaborative learning contributed to teachers' confidence in supervising students and addressing emerging issues related to AI use in educational settings.

A teacher explained:

"Previously, many of us were uncertain about how to respond when students used AI. Now, we are more confident in guiding them and integrating discussions about responsible technology use into our lessons." (T2)

Parents similarly perceived changes in students' learning behaviours and expressed appreciation for the school's efforts to involve families in promoting responsible technology practices. They reported becoming more attentive to their children's use of digital tools and more willing to discuss both the benefits and limitations of GenAI at home.

One parent stated:

"The information provided by the school has helped us understand that AI can support learning, but children still need guidance so that they use it wisely." (PR2)

Despite these positive outcomes, participants identified several challenges requiring further attention. Teachers highlighted the need for more specialized training related to emerging AI applications, while school leaders pointed to the absence of comprehensive policy guidance specifically addressing GenAI use among elementary school students. Participants also acknowledged that the rapid development of AI technologies would continue to require schools to adapt their strategies and strengthen collaboration among stakeholders.

The principal commented:

"Technology develops very quickly. Schools need continuous learning and support so that we can guide students appropriately and keep our policies relevant to new developments." (P)

From the perspective of the CIPP model, the product evaluation suggests that principals' digital leadership contributed to the development of a more responsible culture of GenAI use within the school community. The observed outcomes extended beyond students'

increased awareness of ethical technology use to include strengthened teacher capacity and enhanced parental engagement. However, these outcomes should be understood as part of an ongoing process rather than as final achievements, given the evolving nature of GenAI technologies and the continuing need for institutional adaptation.

These findings support Sari et al. (2026) argument that educational responses to GenAI should prioritize human agency, ethical awareness, and age-appropriate guidance rather than focusing solely on technological adoption. The findings also resonate with Ramadhan and Herdiyana (2025), who emphasized that the successful integration of AI in education should be evaluated not only in terms of technological implementation but also through its contribution to learners' responsible participation, critical engagement, and broader educational development. Therefore, the product evaluation demonstrates that effective digital leadership can play a pivotal role in ensuring that GenAI functions as a meaningful educational support tool while minimizing potential risks associated with its misuse among elementary school students.

The outcomes observed in this study suggest that principals' digital leadership contributed to strengthening responsible GenAI use and digital literacy among members of the school community. Nevertheless, the persistence of challenges related to evolving technologies and limited policy guidance indicates that GenAI governance should be viewed as a continuous improvement process rather than a completed initiative. In line with UNESCO (2023), educational responses to GenAI should prioritize human agency, ethical awareness, and sustained stakeholder engagement to maximize benefits while minimizing potential risks.

The synthesis of findings across the four CIPP dimensions demonstrates that effective GenAI governance in elementary schools is shaped by the alignment between contextual needs, organizational readiness, leadership practices, and educational outcomes. The context evaluation revealed an urgent need for guidance due to increasing student exposure to GenAI. Input evaluation indicated that existing resources and stakeholder support provided a foundation for action, although capacity-building efforts remained necessary. Process evaluation showed that principals enacted digital leadership through collaborative and educative approaches, while product evaluation highlighted improvements in responsible technology use and digital literacy. Collectively, these findings suggest that principals' digital leadership functions as the central mechanism connecting the four CIPP dimensions and enabling schools to respond proactively to emerging technological challenges.

Implications

This study contributes to the emerging discourse on educational leadership and generative Artificial Intelligence (GenAI) governance by demonstrating that principals' digital leadership serves as a central mechanism linking contextual needs, organizational readiness, implementation processes, and educational outcomes in managing students' GenAI use in elementary schools. The findings extend the application of the CIPP evaluation model to the field of AI governance in education and suggest that effective GenAI management requires more than technological provision alone; it also depends on clear institutional policies, continuous teacher capacity building, active parental involvement, and systematic monitoring practices. Therefore, school leaders are encouraged to establish age-appropriate guidelines that promote ethical and responsible AI use, while policymakers should provide broader regulatory support and professional development opportunities to assist schools in responding proactively to the rapidly evolving landscape of AI in education.

Limitations

Several limitations should be considered when interpreting the findings of this study. First, this research was conducted in a single elementary school context, which may limit the transferability of the findings to other educational settings with different organizational

cultures, technological infrastructures, and leadership practices. Second, the study employed a qualitative evaluation approach that emphasized participants' experiences, perceptions, and interpretations of principals' digital leadership in managing students' generative Artificial Intelligence (GenAI) use. While this approach provided rich and contextually grounded insights, it did not quantitatively assess the effectiveness of leadership interventions or examine their direct relationship with students' learning outcomes. Third, given the rapidly evolving nature of GenAI technologies, leadership strategies and governance practices identified in this study should be viewed as context-dependent and subject to continuous adaptation. Future research is therefore encouraged to involve multiple school contexts, employ mixed-method or longitudinal designs, and explore the long-term impact of principals' digital leadership on students' responsible GenAI use, digital literacy, and educational outcomes.

Conclusion

This study evaluated principals' digital leadership in managing students' generative Artificial Intelligence (GenAI) use in an elementary school through the Context, Input, Process, and Product (CIPP) evaluation model. The findings revealed that the increasing use of GenAI among elementary school students has created an urgent need for age-appropriate governance and strategic leadership interventions. Context evaluation highlighted the necessity of clear guidance to address emerging ethical and pedagogical concerns related to students' GenAI use. Input evaluation showed that digital infrastructure, teacher readiness, and parental support provided a foundation for GenAI governance, although AI-specific capacity building remained limited. Process evaluation demonstrated that principals enacted digital leadership through policy communication, teacher empowerment, monitoring practices, and collaboration with parents, while product evaluation indicated positive outcomes in strengthening students' awareness of responsible GenAI use, enhancing digital literacy, and fostering stakeholder engagement. Overall, this study concludes that principals' digital leadership serves as a key mechanism linking contextual needs, institutional readiness, leadership practices, and educational outcomes in the governance of students' GenAI use. The findings further suggest that effective GenAI governance extends beyond technological adoption and requires collaborative, ethical, and adaptive leadership to ensure that emerging technologies support meaningful learning and the holistic development of elementary school students.

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