



An Evaluation of Teachers' Digital Competence to Improve Pedagogical Competence in Boarding School

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Abstract

This study aims to evaluate teachers' digital competence to improve their pedagogical competence at Jabal Rahmah Mulia High School in Medan, as well as to identify supporting factors, inhibiting factors, and the implications of its implementation using the Context, Input, Process, Product (CIPP) evaluation model. The study employed a descriptive qualitative approach using the CIPP evaluation model. Data were collected through observations, in-depth interviews, and document analysis involving four purposively selected informants: one vice principal in charge of curriculum and three teachers. Selection criteria included direct involvement in teacher performance evaluations, experience in applying digital technology in instruction, and an understanding of the learning process within a boarding school setting. Data analysis was conducted through data reduction, data presentation, and drawing conclusions, while data validity was tested using source and technique triangulation. The results revealed that the evaluation of teachers' digital competence has been carried out through instructional supervision, evaluation meetings, and professional discussions. The evaluation is supported by school resources and policies, although it still faces several challenges in its implementation. Research findings indicate that the evaluation of digital competence contributes to improvements in teachers' pedagogical competencies, the quality of learning, and the development of digital learning in schools. This study produced a model for assessing teachers' digital competence in boarding schools that positions teachers as the primary agents in the digitization of learning. This model can serve as a guideline for schools in developing sustainable teacher evaluation and professional development systems to enhance pedagogical competencies and support the transformation of digital learning.

Abstrak

Penelitian ini bertujuan mengevaluasi kecakapan digital guru untuk meningkatkan kompetensi pedagogik di SMA Jabal Rahmah Mulia Medan serta mengidentifikasi faktor pendukung, faktor penghambat, dan implikasi implementasinya melalui model evaluasi Context, Input, Process, Product (CIPP). Penelitian menggunakan pendekatan kualitatif deskriptif dengan penerapan evaluasi CIPP. Data diperoleh melalui observasi, wawancara mendalam, dan studi dokumentasi terhadap empat informan yang dipilih secara purposif, yaitu satu wakil kepala sekolah bidang kurikulum dan tiga guru, dengan kriteria keterlibatan langsung dalam evaluasi kinerja guru, pengalaman menerapkan teknologi digital dalam pembelajaran, serta pemahaman terhadap proses pembelajaran di lingkungan sekolah berasrama.

Kata kunci:

*kecakapan digital;
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Analisis data dilakukan melalui reduksi data, penyajian data, dan penarikan kesimpulan, sedangkan keabsahan data diuji menggunakan triangulasi sumber dan teknik. Hasil penelitian mengungkapkan bahwa evaluasi kecakapan digital guru telah dilaksanakan melalui supervisi pembelajaran, rapat evaluasi, dan diskusi profesional. Evaluasi didukung oleh sumber daya dan kebijakan sekolah, meskipun masih menghadapi beberapa kendala dalam implementasinya. Temuan penelitian mengindikasikan bahwa evaluasi kecakapan digital berkontribusi terhadap peningkatan kompetensi pedagogik guru, kualitas pembelajaran, dan pengembangan pembelajaran digital di sekolah. Penelitian ini menghasilkan model evaluasi kecakapan digital guru pada sekolah asrama yang menempatkan guru sebagai aktor utama dalam digitalisasi pembelajaran. Model tersebut dapat menjadi acuan bagi sekolah dalam mengembangkan sistem evaluasi dan pembinaan guru yang berkelanjutan untuk meningkatkan kompetensi pedagogik dan mendukung transformasi pembelajaran digital.

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INTRODUCTION

Digital competence is an individual's ability to understand, utilize, evaluate, and create information through digital technology in an effective, critical, and responsible manner. In the context of education, digital competence is an essential competency for teachers to meet the demands of 21st-century learning, which is characterized by the rapid development of information and communication technology. Teachers no longer serve merely as conveyors of information but also as learning facilitators who can effectively integrate digital technology into the teaching and learning process to enhance the quality of learning and student engagement (Wati & Nurhasannah, 2024). Advances in digital technology have brought about significant changes to educational practices at various levels. The use of technology in education enables teachers to develop more interactive learning materials, expand access to learning resources, and create more engaging and meaningful learning experiences for students. Teachers' digital competence encompasses not only technical skills in using technological devices but also pedagogical competencies in integrating technology to support the learning process, evaluation, collaboration, and ongoing professional development (Redeckser & Punie, 2017).

Therefore, digital competence has become one of the key indicators for assessing teachers' professionalism and performance in the digital age. Pedagogical competence, as one of the core competencies of teachers, is closely linked to digital competence. Pedagogical competence encompasses the ability to understand students' characteristics, design learning activities, facilitate the learning process, evaluate learning outcomes, and optimally develop students' potential (Lestari et al., 2023). The appropriate use of digital technology can help teachers improve the quality of their lesson planning, develop innovative teaching materials, and create learning experiences that are more responsive to students' needs. However, the improvement of teachers' digital competence does not always proceed optimally. Obstacles in the implementation of digital technology remain a challenge in improving the quality of learning. Putri and Haifaturrahmah (2025) state that teachers' digital competencies are influenced by

various factors, including the training they have received, their experience in using learning technology, and the support provided by schools.

These three aspects are not yet equally available in every educational institution, leading to disparities in digital competency levels among teachers. These findings indicate that strengthening digital competency does not depend solely on individual ability but also requires systemic support from educational institutions (Putri & Haifaturrahmah, 2025). On the other hand, Nashrullah et al. (2025) point out that while many teachers have been able to use digital technology in their teaching activities, they have not yet been fully able to integrate it into meaningful instructional design (Nashrullah et al., 2025). These challenges become even more complex in a boarding school setting. Boarding schools differ from regular schools because the educational process is more intensive and integrated into students' daily lives. Technological advancements require teachers to master various digital platforms and media in the learning process. Boarding schools impose restrictions on students' use of electronic devices as part of character building and discipline. This situation makes teachers the key actors in the process of digitizing learning, so teachers' digital competence plays a crucial role in determining the effectiveness of learning.

Jabal Rahmah Mulia High School in Medan is a boarding school that strives to integrate digital technology into learning by providing various facilities such as projectors, smart boards, smart televisions, and computer labs, as well as by utilizing digital platforms such as Canva, Bamboozle, Educaplay, Wordwall, and Cambridge Desktop. The school also conducts various training and mentoring programs to improve teachers' ability to utilize digital technology. However, the effectiveness of implementing teachers' digital competencies needs to be systematically evaluated to determine the extent to which these skills contribute to improving educators' pedagogical competencies. A number of previous studies have examined the relationship between digital competencies and teacher performance. Falloon argues that teachers' digital competencies encompass not only technical skills in using technology but also involve interrelated pedagogical, ethical, and professional aspects. These competencies need to be developed continuously through teaching experience, reflection on teaching practices, and the ability to adapt to ever-changing developments in digital technology. In line with this, teachers are expected to be able to utilize technology effectively, safely, and responsibly to support a more meaningful learning process (Falloon, 2020). Meanwhile, Rasdiana et al. found that the successful implementation of digital learning is influenced not only by teachers' digital competencies but also by institutional support and the availability of technological infrastructure that supports the learning process (Rasdiana et al., 2024). A large scale study of nearly ten thousand teachers further shows that digital competence shapes not only teachers' intention to adopt technology but also their contextual judgment of its pedagogical usefulness, an effect that is likely to differ under the distinctive norms of a boarding school environment (Zhang et al., 2025). However, most of these studies were conducted in public schools and have not specifically examined the evaluation of teachers' digital competence in the context of boarding schools, which have different characteristics and policies regarding technology use.

Based on the above discussion, there is a research gap because most previous studies have focused only on the relationship between or the influence of digital competence on teacher performance in public schools. Research that comprehensively evaluates the implementation of teachers' digital competence using the CIPP model particularly in the context of boarding schools that have policies restricting students' use of technology remains limited. This gap underscores the need for research to obtain a comprehensive picture of the implementation, supporting and inhibiting factors, and the contribution of digital competence to the improvement of teachers' pedagogical competencies. Furthermore, the results of this study are expected to contribute to the development of a more relevant evaluation system for teachers' digital competence, aimed at improving their pedagogical competence, particularly in boarding school settings. In addition, the findings are expected to serve as a basis for schools in formulating teacher professional development policies focused on the continuous improvement of digital competence and pedagogical competence. Based on this description, the study aims to evaluate teachers' digital competence in enhancing the pedagogical competence of educators at Jabal Rahmah Mulia High School in Medan and to identify the factors that support and hinder its implementation through the application of the CIPP evaluation model.

RESEARCH METHOD

This study employed a qualitative approach using a descriptive research design through the application of the Context, Input, Process, Product (CIPP) evaluation model. This approach was chosen to obtain an in-depth understanding of the evaluation of teachers' digital competence in supporting the improvement of educators' pedagogical competence. The study was conducted at Jabal Rahmah Mulia High School, a boarding school located in Medan, North Sumatra. The population of this study consisted of the Vice Principal for Curriculum and all teachers actively teaching at Jabal Rahmah Mulia High School, Medan, in 2026, when the study was conducted. From this population, four informants were selected, consisting of the Vice Principal for Curriculum and teachers. This sample size was considered sufficient to achieve data saturation. Informants were selected using a purposive sampling technique, in which participants were deliberately chosen based on criteria relevant to the research objectives, namely: (1) direct involvement in teacher performance evaluation and professional development, (2) experience in implementing digital technology in the teaching and learning process, and (3) adequate understanding of the learning process in a boarding school environment. This technique was selected because it enabled the researcher to obtain information-rich informants who could provide an in-depth and contextual understanding of the phenomenon under investigation.

The research instruments consisted of observation guidelines, interview guidelines, and documentation guidelines developed based on the four components of the CIPP evaluation model: Context, Input, Process, and Product. Each instrument was developed based on indicators derived from the theoretical framework of teachers' digital competence and pedagogical competence, as summarized in Table 1, to ensure the relevance of the content and the clarity of the instruments before they were used in the field. Data were collected using three complementary techniques. First, non-participant observation was conducted to directly

observe teachers' use of digital technology and various digital platforms, such as Canva, Bamboozle, Educaplay, Wordwall, and Cambridge Desktop, during classroom instruction. Second, in-depth semi-structured interviews were conducted with the Vice Principal for Curriculum and the selected teachers to explore their perceptions, experiences, and challenges in implementing digital competence. Third, document analysis was carried out using relevant school documents, including training reports, lesson plans, and inventories of educational facilities and infrastructure, to complement and verify the information obtained through observations and interviews. These three techniques were applied to each component of the CIPP model to obtain comprehensive information regarding the implementation of the evaluation.

To ensure the trustworthiness of the data, this study employed source triangulation and methodological triangulation. Source triangulation was conducted by comparing information obtained from different informants, namely the Vice Principal for Curriculum and the teachers, while methodological triangulation was carried out by comparing data obtained through observations, interviews, and documentation. In addition, an audit trail was maintained throughout the data collection and analysis process to enhance the dependability and confirmability of the research findings. The data were analyzed descriptively using the interactive analysis model developed by Miles and Huberman, which consists of three stages. Data reduction involved selecting, simplifying, and organizing the raw data obtained from observations, interviews, and documentation based on the four components of the CIPP model. Data display involved presenting the reduced data in narrative and tabular forms to identify patterns and relationships among the findings. Finally, conclusion drawing and verification were conducted by interpreting the findings and verifying them based on the evaluation criteria presented in Table 1, resulting in a comprehensive understanding of the implementation of the evaluation of teachers' digital competence and its implications for improving educators' pedagogical competence at Jabal Rahmah Mulia High School, Medan. Furthermore, the evaluation criteria used in this study were developed based on the indicators of each component of the CIPP evaluation model, as presented below.

Table 1. CIPP Evaluation Criteria

No	CIPP Component	Evaluation Criteria	Description
1	Context	Alignment of the need for learning digitization with boarding school policies	Assessing the context and urgency of strengthening teachers' digital competence as key actors in the use of technology in the classroom.
2	Input	Teacher competency readiness, facilities and infrastructure, and professional development programs	Assessing the availability of human resources, digital infrastructure, and training and mentoring to support program implementation.
3	Process	Implementation of the mechanism for evaluating teachers' digital proficiency	Implementation of the mechanism for evaluating teachers' digital proficiency

4	Product	The Impact of Digital competence on Teachers' Pedagogical Competence	Assessing the contribution of digital competence to the planning, implementation, and management of more interactive and adaptive learning.
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RESULTS

Teachers' digital competence is one of the key aspects that needs to be evaluated to support effective learning in the digital age. Findings from Jabal Rahmah Mulia High School show that, because the school restricts students' use of electronic devices, teachers are positioned as the primary agents of digital technology use in the classroom. This policy has prompted the school to provide facilities such as smart boards, projectors, and computer labs, enabling students to gain technologically relevant learning experiences without violating the boarding school's regulations. This study evaluates teachers' digital competence using Stufflebeam's (1966) CIPP model, comprising four components: Context (the needs and conditions underlying the program), Input (available resources and strategies), Process (program implementation and monitoring), and Product (the resulting outcomes and impacts). The model was selected because it captures both the final results and the factors that shape a program's success (Stufflebeam, 2000). Accordingly, the findings below are organized by these four components, followed by a summary table and a synthesis of the overall results.

The context evaluation indicates that strengthening teachers' digital competence is a strategic necessity rather than merely a response to technological trends. Because students' access to digital devices outside class hours is restricted, teachers are positioned as the main agents of technology integration, making digitization an integral part of the school's educational service rather than an optional add-on. This provides the empirical basis for the subsequent evaluation stages.

On the input side, implementation readiness is supported by teacher competence, adequate facilities and infrastructure, and structured professional development. Most teachers can already use digital technology appropriately for their subject matter, a capability reinforced by hands-on platform experience and supported by smart boards, projectors, computer labs, and digital learning applications. Competency building is further strengthened through regular training and mentoring involving external experts in instructional material development and technology integration, indicating that the school has adequate resources to sustain digital competence implementation.

Process evaluation shows that monitoring of digital competence is embedded in the school's academic quality assurance system through classroom supervision, evaluation meetings, and professional discussion forums. Supervision by the principal and vice-principal for curriculum examines teachers' use of digital media, platform-content alignment, and their ability to create interactive learning. Observation findings are then discussed in evaluation meetings to identify obstacles and formulate improvements, while discussion forums provide a

space for sharing best practices. Together, these three mechanisms indicate that the evaluation process is systematic, continuous, and improvement-focused.

The product evaluation shows that digital competence implementation contributes positively to teachers' pedagogical competence, reflected in their engagement with academic supervision, participation in training, and independent professional development using platforms such as Canva, Quizizz, and Wordwall. Beyond technical proficiency, these tools support teachers in designing varied learning experiences, selecting relevant resources, and adapting strategies to students' characteristics. Teachers also developed a habit of post-lesson reflection, examining student participation, responses, and outcomes to refine future teaching strategies, which strengthens more contextually appropriate pedagogical decisions in the boarding school setting. Notably, digital technology alone does not automatically improve students' conceptual understanding: game-based platforms were found to increase motivation and engagement, but their effectiveness still depends on the pedagogical strategy applied. Digital technology therefore functions as a supporting tool that must be combined with approaches such as discussion, lecture, and problem-based learning – the teacher's ability to integrate technology with appropriate strategies ultimately determines learning outcomes.

Table 2. *Summary of Evaluation Results*

No	Aspect	Indicator	Notes
1	Context	The Need to Develop Teachers' Digital competence in Boarding Schools	Digital competence is essential for supporting 21st-century learning, with teachers playing a key role in the use of technology.
2	Input	Teacher competencies, facilities and infrastructure, and professional development programs	Supported by teacher competence, digital learning resources, and regular training and mentoring.
3	Process	Conducting an evaluation of teachers' digital proficiency	Evaluations are conducted through supervision, evaluation meetings, and professional discussions to assess the use of technology.
4	Product	The Impact of Digital competence on Teachers' Pedagogical Competence	Digital competence enhances teachers' ability to design, implement, and manage interactive and adaptive learning experiences.

Overall, implementation of digital competence at Jabal Rahmah Mulia High School has contributed to strengthening teachers' pedagogical competence, particularly in lesson planning, classroom management, resource selection, and the development of learning strategies adapted to a boarding school setting. The four CIPP components form a consistent chain: the context establishes the need for digital competence, the input provides the resources and training to meet it, the process evaluates its implementation, and the product demonstrates its tangible impact on teaching quality. These findings are discussed further in the following section in relation to relevant theory and prior research.

Discussion

An Evaluation of Teachers' Digital Competence in Improving Educators' Pedagogical Competence Performance

Digital competence is an essential skill that educators must possess to navigate the transformation of 21st-century education. In the context of education, digital competence is not only understood as the ability to use technological devices, but also the ability to effectively integrate technology into the learning process. The Digital Competence Framework for Educators (DigCompEdu) defines teachers' digital competence as the ability to use digital technology for communication, collaboration, learning management, learning evaluation, and continuous professional development, so that teachers can effectively utilize technology to improve the quality of learning and student engagement (Ghomi & Redecker, 2019) .

The evaluation of teachers' digital competence is a systematic and ongoing process aimed at measuring, assessing, and providing feedback on educators' ability to integrate technology into teaching practices (Subandi et al., 2025). The components of Stufflebeam's (1966) CIPP evaluation model serve as an analytical framework for interpreting the findings in the results section in greater depth. Each component is linked to theories of teachers' digital competence and relevant prior research findings, thereby revealing the extent to which the findings at Jabal Rahmah Mulia High School align with previous studies and highlighting the distinctive characteristics of boarding schools that limit students' access to electronic devices. Regarding the "context" aspect, the findings at Jabal Rahmah Mulia High School indicate that the implementation of teachers' digital competence is carried out adaptively to address the limitations inherent in boarding schools, namely the ban on students' use of mobile devices. The vice principal for curriculum emphasized that the school continues to promote the digitization of learning through alternative approaches, as expressed by an informant:

SI: We do emphasize to subject teachers that they should continue to design their lessons to incorporate digital elements, whether in the form of PowerPoint presentations displayed via an Infocus projector or interactive games that also require digital elements.

These findings demonstrate both alignment with and adaptation to the DigCompEdu framework proposed by Ghomi and Redecker (2019). This framework is fundamentally based on the assumption of a relatively open digital ecosystem, in which students have direct access to digital devices. The context at Jabal Rahmah Mulia High School presents a different situation: the boarding school's policy restricting students' ownership of mobile devices means that the role of technology in learning falls primarily on teachers. In this context, teachers serve as the primary mediators in integrating technology into the learning process. Therefore, strengthening teachers' digital competencies is not only aimed at meeting the demands of 21st-century learning as is commonly found in schools with more open access to devices but also serves as an effort to address the limitations in technology access experienced by students. These contextual characteristics distinguish the findings of this study from various studies on teachers'

digital competence in general and demonstrate that the context is a crucial foundation for shaping the direction of evaluation in subsequent components.

This finding can be interpreted as evidence that the meaning of digital competence itself shifts once the open technological ecosystem assumed by DigCompEdu is absent. Rather than technology functioning as a resource shared directly between teacher and student, the boarding school context transforms the teacher into the sole conduit of digital experience; what DigCompEdu frames as a competence for enriching students' existing access instead becomes, in this setting, a competence for substituting for that access altogether. This distinction matters theoretically because it suggests that digital competence frameworks built for mainstream, technology-open schools cannot simply be transplanted into access-restricted environments without reinterpretation: the same indicator, such as the use of digital tools to increase engagement, carries a different functional weight when it is the only channel through which students encounter technology at all. Practically, this implies that any instrument used to evaluate teachers' digital competence at Jabal Rahmah Mulia High School should give proportionally greater weight to indicators of mediating and compensating for restricted access, since indicators of technical tool proficiency alone would understate what teachers are actually required to do in this context.

In terms of inputs, this statement reflects the institution's effort to maintain the digital dimension of learning even when students are not directly holding devices. Teachers are encouraged to use platforms such as Quizizz, Bamboozle, and Wordwall which are operated by teachers and displayed via a projector so that interactivity is maintained without requiring students to use their personal devices. The use of these platforms which are fully operated by teachers underscores that the primary factor in evaluating digital competence at this school is not merely teachers' technical competence, but also a combination of available resources (smartboards, projectors, computer labs) and teachers' creativity in repurposing shared devices as interactive tools to replace students' individual devices. This situation aligns with Falloon's (2020) view that teachers' digital competence develops gradually through experience and the meaningful use of technology in professional contexts, while simultaneously broadening that scope because the relevant input is not merely individual competence but also teachers' capacity to turn infrastructure limitations into pedagogical opportunities (Falloon, 2020).

The evaluation of teachers' competencies is conducted through instructional supervision carried out directly in the classroom while the teaching and learning process is underway. The vice principal, as the person in charge of the curriculum, acts as the primary supervisor, assisted by the principal, with observation indicators including the use of digital teaching media, the relevance of the media to the material, and the level of interactivity in the classroom.

SI: During classroom supervision, there are several aspects that form part of the teacher evaluation; one of them is certainly related to the use of teaching media, as well as the digitization of learning specifically, whether the teacher is using teaching media effectively within the supervision program.

In addition to classroom supervision, evaluations are also conducted through meetings held at least once a week. These meetings serve as a collective space to evaluate learning progress, share best practices among teachers, and provide guidance on the use of digital media. This mechanism aligns with the findings of Lantz-Andersson et al., who emphasize that developing teachers' digital competence cannot be achieved through formal training alone. Developing these competencies requires collaborative spaces that allow teachers to discuss, share experiences, and reflect on their use of technology in the classroom. (Lantz-Andersson et al., 2022). Through continuous reflection and collaboration, teachers can develop a deeper understanding of how to utilize technology so that their digital competence can be applied more effectively in line with learning needs. From the teachers' perspective, the evaluation of digital competence is also evident in the way educators independently adapt their teaching strategies to students' needs. One teacher stated:

ZM: We have to observe the students' condition when we enter the classroom; sometimes there needs to be time when they're not just receiving information but also contributing, so occasionally we have them speak and write.

This statement indicates that teachers do not simply use digital technology as a substitute for conventional media, but rather actively consider classroom dynamics to determine when and how such technology should be integrated. This reflects the pedagogical dimension of digital competence that goes beyond technical operational skills, as outlined in the DigCompEdu framework. Teachers' digital competence contributes to the diversification of learning strategies. Teachers acknowledge significant changes in their teaching approaches after actively integrating digital technology:

MJP: Before, when I started high school, I was still only using PowerPoint. Since then, I've started to expand my skills not only using PowerPoint but also Canva and I've learned how to play several games, including Scrabble.

This development aligns with Falloon's findings, which state that teachers' digital competence is a skill that develops gradually and continuously. This process involves not only mastering technical skills but also the ability to integrate technology into teaching practices through experience, reflection, and the meaningful use of technology in a professional context (Falloon, 2020). The teacher also stated that digital technology alone is not enough; it must be integrated with lecture-based methods, problem-solving, and contextual approaches to ensure that learning is meaningful, rather than merely superficially engaging. The evaluation of teachers' digital competencies is conducted on an ongoing basis through classroom supervision, weekly meetings, and direct discussions among teachers. These three mechanisms reflect the school's efforts to develop a comprehensive evaluation system to support the improvement of teacher competencies and the quality of learning. These findings confirm that the evaluation of teachers' digital competence at Jabal Rahmah Mulia High School makes a tangible contribution to enhancing pedagogical competencies, particularly in diversifying learning media, managing interactive classrooms, and adapting teaching strategies to students' characteristics.

These findings offer a partial contrast to Skantz-Åberg et al., (2022) original conceptualization, which frames digital competence primarily as an individually accumulated capacity built through a teacher's own repeated use of technology (Skantz-Åberg et al., 2022). At Jabal Rahmah Mulia High School, this individual trajectory is compressed and reshaped by institutional constraints: because personal devices are unavailable to students, teachers' competence growth becomes inseparable from their ability to repurpose shared infrastructure, such as projectors and computer labs, into substitutes for individual access. A plausible explanation for this pattern is that scarcity itself functions as a pedagogical driver, pushing teachers toward more deliberate and creative use of limited tools than they might otherwise adopt in a resource-abundant setting where reliance on students' own devices could substitute for teacher effort. Theoretically, this extends Falloon's model by suggesting that the input dimension of teachers' digital competence cannot be understood solely as an individual attribute; it must also account for the interaction between infrastructure constraints and teachers' professional creativity. Practically, this implies that professional development programs in similar boarding school contexts should explicitly train teachers to design device-free but digitally mediated activities, rather than assuming that competence built on personal devices will transfer automatically to shared-resource, whole-class settings.

Table 3. *Mechanism for Evaluating Teachers' Digital Competence at Jabal Rahmah Mulia High School in Medan*

Evaluation Mechanism	Aspects Evaluated	Frequency
Classroom Supervision	The use of digital media, the appropriateness of digital media for the instructional content, and the level of learning interactivity	Periodically (scheduled)
Weekly Collegial Meetings	Progress in instructional practices, sharing of digital best practices, and guidance on newly adopted digital platforms	At least once a week
Teachers' Self-Directed Adaptation	The relevance of instructional strategies to classroom conditions, as well as the timeliness and contextual appropriateness of technology use	Every class session

A series of supervisory mechanisms, weekly meetings, and adaptations demonstrate that the evaluation process at Jabal Rahmah Mulia High School is ongoing. The application of CIPP in the context of evaluating teachers' digital competence at this boarding school remains contextual and is not yet fully formalized, although substantively, the ongoing process of collective reflection has been able to foster the development of digital teaching practices. In terms of the product aspect, the evaluation of teachers' digital competence at Jabal Rahmah Mulia High School in Medan is not merely a technical evaluation of their ability to use devices but is directly linked to teachers' pedagogical practices in the classroom. Classroom supervision, weekly meetings, and teachers' independent adaptation demonstrate that the school assesses digital competence based on how teachers select media, manage learning interactions, and adapt teaching strategies to the students' circumstances within the boarding school environment. In this context, the use of tools such as Canva, Quizizz, Bamboozle, and Wordwall is not merely an indicator of proficiency in using the applications, but represents teachers' efforts to transform technology into pedagogical tools that support content delivery, formative evaluation, and student engagement. This finding aligns with the study by Tzafilkou et al., which emphasizes that teachers' digital competencies must be understood as an integration of

both pedagogical and professional elements; thus, evaluation should not merely focus on the frequency of technology use but also on how that technology is employed to design meaningful learning experiences (Tzafilkou et al., 2023). The evaluation of teachers' digital competencies at Jabal Rahmah Mulia High School in Medan has shifted toward an evaluation that positions digital competencies as part of the quality of learning, rather than merely as teachers' operational ability to use digital media.

Essentially, the improvement of teachers' pedagogical competencies occurs through two interrelated pathways: formal evaluation through supervision, and reflective evaluation through collegial meetings and teachers' self-directed professional development. This approach is important because teachers' digital competencies fundamentally develop not only through training or mastery of applications, but also through the process of reflection, institutional support, and professional practices in adapting technology to learning needs. A study by Chiu et al. (2024) emphasizes that the development of teachers' digital competencies is more robust when the school environment supports motivation, autonomy, and continuous professional development (Chiu et al., 2024). Specifically at Jabal Rahmah Mulia High School in Medan, the boarding school context which restricts the use of electronic devices has led to an evaluation of teachers' digital proficiency that focuses on their adaptive capacity: teachers are assessed not by how many platforms they use, but by their ability to select appropriate technology, maintain classroom interactivity, and effectively combine digital media with conventional teaching approaches. In this regard, the evaluation of digital competence at this school can be understood as an evaluation of teachers' contextual digital pedagogical competencies.

Overall, the evaluation results indicate that the application of the CIPP model aligns with the concept proposed by Stufflebeam (1983), namely that evaluation does not focus solely on final outcomes but also includes an analysis of needs, resource availability, implementation processes, and the resulting impacts. Based on this, each component of the evaluation is interrelated in providing a comprehensive picture of the program's implementation. Nevertheless, the application of the CIPP model in evaluating teachers' digital competence at boarding schools has distinct characteristics compared to evaluations in formal education programs, which generally use standardized indicators and evaluation instruments. At Jabal Rahmah Mulia High School, evaluation places greater emphasis on understanding practices in the field through supervision, reflection, and various forms of ongoing evaluation. Therefore, the strength of the CIPP model in this study does not lie in quantitative measurement but rather in its ability to explain the relationship between needs, resource readiness, program implementation, and their impact on strengthening teachers' pedagogical competencies in the context of a boarding school.

This divergence from standardized formal evaluation carries an important theoretical implication: it suggests that the explanatory power of the CIPP model in under-resourced or access-restricted settings lies less in producing comparable quantitative scores and more in making visible the adaptive reasoning that connects needs, available resources, implementation choices, and outcomes. Studies conducted in schools with open access to technology and standardized instrument based evaluations tend to treat the four CIPP components as separate

stages of measurement(Juri et al., 2021), the findings here show them functioning instead as an interpretive narrative, in which each component explains why the next unfolds as it does. Practically, this implies that education offices overseeing similar boarding schools should be cautious about importing standardized digital-competence rubrics wholesale, and should instead adapt CIPP-based evaluation instruments to foreground contextual adaptability as an explicit criterion, alongside more conventional indicators of technical proficiency.

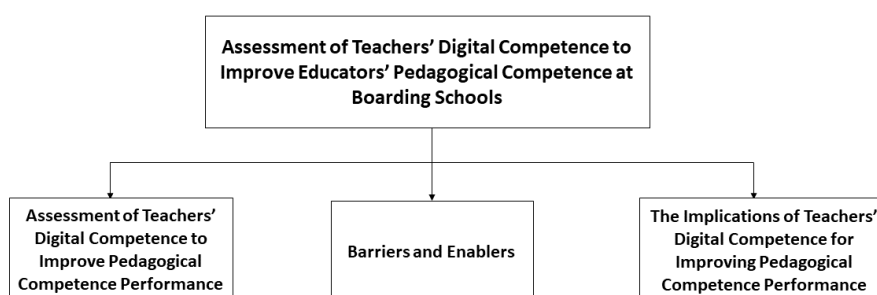


Figure 1. Concept Map of the Evaluation of Teachers' Digital Competence to Improve Educators' Pedagogical Competence Performance

The concept map illustrates that the evaluation of teachers' digital competence in enhancing the pedagogical competence of educators at boarding schools does not focus solely on the evaluation process itself, but also encompasses the influencing factors and resulting impacts. The evaluation of teachers' digital competence is conducted through various mechanisms, such as instructional supervision, evaluation meetings, and professional discussions, to assess teachers' ability to utilize technology in the learning process. The implementation of this evaluation is influenced by various supporting factors, such as teacher competence, the availability of technological facilities and infrastructure, and training programs provided by the school, while also facing a number of inhibiting factors, such as students' digital distractions and the lack of standardized evaluation instruments. Through this evaluation process, supported by these various factors, the resulting implications include an improvement in teachers' pedagogical competencies particularly in instructional planning, the development of teaching materials, classroom management, and the implementation of learning strategies that are more interactive and adaptable to students' needs within a boarding school setting.

Factors Supporting and Hindering the Evaluation of Teachers' Digital Competence

Supporting Factors

The success of evaluating teachers' digital competencies is also determined by a number of multidimensional supporting factors, including human resources, infrastructure, organizational culture, and leadership (Reis-Andersson, 2024). At Jabal Rahmah Mulia High School, the following five key supporting factors have been identified. First, the demographic

profile of the relatively young teaching staff serves as an adaptive foundation for the development of digital competencies. More than 90% of the teaching staff are under 40 years old, and the majority are recent graduates, so they remain open to learning new technologies.

SI: Given the teachers' age, they are still productive, still willing to learn more, and still eager to learn extensively, so the process of digitizing learning also proceeds well and smoothly.

This finding aligns with Fernández-Batanero et al. (2022), who found that younger teachers tend to have higher levels of knowledge and confidence in integrating technology into learning (Fernández-Batanero et al., 2022). Second, the availability of adequate technological infrastructure projectors in every classroom, interactive Smart TVs, and computer labs bridges the gap between students' limited access to devices and the need for interactive digital learning.

RF: One of the biggest supports is the availability of an InFocus projector in every classroom. We're also provided with Smart TVs. So we can write directly on the screen and answer questions together as a group.

Furthermore, a culture of structured meetings and collegial discussions through weekly meetings encourages the sharing of knowledge and best practices among teachers. Fourth, academic freedom allows teachers to choose digital platforms and strategies based on the characteristics of their subjects, without being required to use a specific platform. Fifth, the training program at the beginning of the school year brings in external experts to assist with the development of digital teaching modules and lesson plans.

Taken together, these five factors help explain why digital adaptation has proceeded relatively smoothly at Jabal Rahmah Mulia High School despite the restriction on students' devices. The findings extend the multidimensional framework of teachers' digital competence proposed by demonstrating how its competence dimensions interact in a resource-constrained boarding school context (Fan et al., 2025). The young teacher demographic supplies the underlying willingness to adopt new practices, but that willingness only translates into classroom impact because it is met by adequate infrastructure, a collegial culture that converts individual learning into shared practice, and structural autonomy that lets teachers match platforms to their own subjects rather than a single mandated tool. Theoretically, this pattern suggests that supporting factors for digital competence should be understood not as an additive checklist but as a set of conditions that reinforce one another, since infrastructure without a collegial culture, or autonomy without training, would each on its own leave gaps that the remaining factors are left to compensate for. Practically, this implies that school leaders seeking to replicate this outcome elsewhere should prioritize strengthening the interaction between these factors, for example by using weekly meetings specifically as the venue where infrastructure use and individual platform choices are shared and normalized across teachers, rather than treating training, infrastructure provision, and collegial meetings as separate and unconnected programs.

Table 4. *Factors Supporting the Evaluation of Teachers' Digital Competence at Jabal Rahmah Mulia High School*

No.	Supporting Factor	Empirical Evidence	Impact on the Evaluation
1	Young Teacher Demographic Profile	More than 90% of teachers are under 40 years old, with the majority being recent graduates.	Provides an adaptive foundation for integrating digital competence into instructional practices.
2	Adequate Technological Infrastructure	Each classroom is equipped with a projector, interactive smart TV, and access to a computer laboratory.	Compensates for the prohibition of students' smartphone use, allowing digital learning to continue through centralized projection.
3	Weekly Collegial Meeting Culture	Weekly meetings (at least once a week) are conducted under the active guidance of the principal and vice principal.	Promotes collective reflection and the dissemination of digital teaching practices among teachers.
4	Academic Autonomy in Platform Selection	Teachers are free to choose digital platforms that align with the characteristics of their subjects without being required to use a single standardized platform.	Encourages instructional innovation that is responsive to the needs of each classroom.
5	Beginning-of-the-Year Professional Development Program	External facilitators provide guidance in developing digitally oriented lesson modules and lesson plans at the beginning of each academic year.	Periodically updates teachers' competencies starting from the instructional planning stage.

These five factors indicate that the success of the evaluation depends not only on individual teachers' abilities but also on a school ecosystem that supports comprehensive digital transformation. The development of teachers' digital competencies is the result of the interaction between personal factors, institutional support, and a conducive professional environment; therefore, the evaluation will be more effective if supported by integrated school policies, adequate resources, and a culture of continuous professional learning (Yulihartati & Veri, 2025)

Barriers

The challenges in evaluating teachers' digital competencies reflect that the success of learning digitization is determined not only by the availability of resources and teacher competencies, but also by various contextual factors related to students, evaluation mechanisms, and the boarding school environment. Teachers identified the following issues:

ZM: The students have trouble concentrating. Because they often watch TikTok, social media, and short videos on YouTube, they lose focus after just one minute of studying.

Integrating technology without proper pedagogical design risks merely increasing student engagement at a superficial level, without fostering deep conceptual understanding; technology needs to be integrated with learning strategies that encourage students' cognitive activities and reflection (Sailer et al., 2024). Another obstacle is students' behavior, which is difficult to control when they are given independent access to digital devices:

ZM: I once took my students to the computer lab, but all they did was open Roblox. That was an obstacle for me an external one, and a bit difficult because there were so many of them – so I had to watch them from behind; basically, as soon as the students saw the slightest opening, they immediately opened YouTube.

This risk of superficial engagement can be explained by the distinction between behavioral and cognitive engagement. Although digital media can effectively attract students' attention and encourage participation, attention alone does not necessarily result in the deep cognitive processing required for meaningful learning. Recent studies emphasize that cognitive engagement is characterized by active knowledge construction, self-regulation, and higher-order thinking rather than merely observable participation (Shi et al., 2026). In the present boarding school context, interview and observation findings indicate that students' limited opportunities to access digital technology outside classroom activities are often directed toward entertainment rather than academic purposes. This finding suggests that restricted access alone is insufficient to promote meaningful digital learning without appropriate pedagogical guidance. Therefore, the evaluation of teachers' digital competence should assess not only teachers' ability to attract students' attention through digital media but also their capacity to foster higher-order thinking, reflection, and sustained cognitive engagement. Accordingly, supervision and evaluation instruments should include indicators of reflective questioning, critical discussion, and knowledge construction following digital learning activities, rather than merely documenting the use of digital media. Overall, these supporting and hindering factors underscore that the success of teacher digital competency evaluations depends on a balance between human resource readiness, infrastructure availability, the design of comprehensive evaluation instruments, and adaptive classroom management.

Table 5. *Factors Hindering the Evaluation of Teachers' Digital Competence at Jabal Rahmah Mulia High School*

No.	Inhibiting Factor	Source	Impact	Recommendation
1	Students' Digital Distractions	Student Behavior	Encourages frequent shifts in attention rather than sustained concentration.	Vary instructional media regularly and divide learning materials into shorter instructional sessions.
2	Reliance on Visual Content Without Deep Understanding	Pedagogical Factors	Promotes behavioral engagement while limiting cognitive engagement.	Integrate gamification with reflective questioning and formative evaluation.
3	Student Behavior During Independent Digital Access	Classroom Management	Requires monitoring and supervisory capacities that differ from those needed in conventional classroom settings.	Implement access restrictions, strengthen coordination with laboratory staff, and establish clear digital classroom protocols.

These obstacles indicate that the success of technology implementation cannot be measured solely by the level of digital platform usage or the high level of student enthusiasm. Digital distractions and reliance on visual elements can create superficial engagement without deep conceptual understanding, while independent access to digital devices requires more complex classroom management skills than conventional learning. This study also found that

the lack of standardized evaluation instruments poses a methodological challenge that can affect the objectivity of teacher digital competency evaluations. Thus, optimizing the evaluation of digital competency requires strengthening pedagogical design, managing digital learning, and developing a more comprehensive evaluation system. These findings are consistent with the research by Stefany and Helmi (2024), which shows that the effectiveness of digital learning is determined more by the quality of pedagogical design and educators' digital competencies than by the mere use of technology; therefore, the development of a comprehensive evaluation system is a crucial aspect of improving the quality of digital learning (Stefany & Helmi, 2024).

Implications of Teacher Digital Competency Evaluation for Improving Educators' Pedagogical Competence

The evaluation of digital competency has significant implications for improving the quality of technology-based instructional design. Through targeted evaluation, teachers are encouraged not merely to use digital devices as tools for delivering content, but to integrate them into more systematic instructional designs that are oriented toward students' needs (Surahman et al., 2025). In line with the DigCompEdu framework, which defines teachers' digital competence as the ability to pedagogically design, manage, and develop technology-based learning experiences. Furthermore, the evaluation of digital competence fosters teachers' professional reflection. Ongoing evaluation provides teachers with the opportunity to review the effectiveness of digital strategies, adjust their teaching approaches, and develop more adaptive teaching practices, so that technology is understood as a contextual tool rather than the learning objective itself (Estede et al., 2025). This dynamic is clearly evident at Jabal Rahmah Mulia High School. The Vice Principal for Curriculum emphasized:

SI: We also continue to emphasize the process of digitizing learning so that teachers aren't technologically illiterate and so that students don't get bored while learning in class.

This statement indicates that teachers' digital competencies are viewed as part of school policy, not merely an individual responsibility. This implication is also evident in students' independent learning, as expressed by a teacher:

RF: The competency students can develop is realizing that there are countless learning resources out there that they can access, so when they have free time, they can learn independently they don't have to be with a teacher.

This finding confirms that digitally competent teachers are shifting from being the sole source of learning to becoming facilitators who empower students to learn beyond the confines of the classroom. To ensure this impact is sustainable, evaluation results need to be followed up with using supervision results as the basis for developing teacher competency plans, rather than merely as administrative documents and giving teachers the opportunity to reflect on evaluation results through discussions with their immediate supervisors, so that evaluation does not end with the assignment of grades but becomes the foundation for continuous improvement in teaching practices.

This shift can be interpreted through the changing pedagogical role of teachers in a technology-restricted learning environment. Rather than competing with students' independent use of digital devices, teachers at Jabal Rahmah Mulia High School play an important role in introducing students to appropriate digital learning resources within the school's technology restrictions. In this context, teachers not only facilitate learning activities but also guide students in accessing digital resources that support independent learning. This finding suggests that the teacher-as-facilitator role should be understood in relation to the learning context. In technology-restricted environments, teachers assume an additional responsibility of directing students toward relevant and educationally meaningful digital resources. Therefore, evaluating teachers' digital competence should include indicators assessing how effectively teachers introduce, guide, and integrate digital learning resources to promote students' independent learning, rather than focusing solely on their ability to use digital technology during classroom instruction.

Table 6. *Mapping the Implications of the Evaluation of Teachers' Digital Competence on Pedagogical Competence at Jabal Rahmah Mulia High School*

No.	Implication	Concrete Form
1	Improved quality of instructional planning	Utilization of the Cambridge Desktop platform as a learning medium incorporating interactive videos, audio, and text.
2	Enhanced teachers' professional reflection	Reflection on learning outcomes as a basis for improving instruction in subsequent lessons.
3	Integration of technology with instructional strategies	The use of digital technology combined with lecture-based, problem-solving, and contextual learning approaches.
4	Improved students' digital competence	Teachers serve as role models in the use of technology while fostering students' independent learning.
5	Strengthened teachers' professional development	The use of classroom supervision as a basis for evaluating and developing teachers' competencies.
6	Strengthened organizational learning	Documentation of digital teaching practices as a resource for knowledge sharing and continuous school development.

At the teacher level, evaluation enhances the quality of instructional design, professional reflection, and more contextual integration of technology. At the student level, strengthening teachers' digital competencies contributes to students' digital competence and independent learning. At the institutional level, evaluation reinforces professional accountability and lays the foundation for the development of a digital-based learning organization. Nevertheless, optimizing the impact of evaluation still requires strengthening efforts in diversifying learning resources, utilizing learning data in the reflection process, and managing documentation of digital practices more systematically (Matulesy et al., 2025). The evaluation cycle in this school which involves supervision, evaluation meetings, professional discussions, and training has been followed up with teacher coaching and competency development; however, the development of more specific digital competency evaluation instruments is still needed so that evaluations can be conducted more systematically and comprehensively.



Figure 2. Model for Evaluating Teachers' Digital Competence in Boarding School

This study offers a model for evaluating teachers' digital competence in boarding schools, which affirms that the digitization of learning can remain effective even when students' use of devices is restricted, through the teacher's role as the primary mediator of learning technology. In this model, teachers' digital competence is understood not only as the technical ability to operate digital devices and applications, but also as the pedagogical ability to select, adapt, and integrate technology according to learning needs. The model is implemented through ongoing evaluation in the form of instructional supervision, evaluation meetings, and professional discussions, which serve not only as instruments for assessing teacher performance but also as avenues for professional reflection that foster the development of technology-based teaching practices. These findings confirm that the success of the digitization of learning is determined by teachers' ability to utilize technology pedagogically to improve the quality of learning, rather than by the mere intensity of technology use. Moving forward, efforts to strengthen this model should focus on the ongoing development and evaluation of teachers' digital competencies, supported by the availability of digital infrastructure, institutional support from schools, and a culture of professional reflection. Thus, the evaluation of teachers' digital competencies not only contributes to improving their pedagogical competencies but also serves as a key strategy in supporting adaptive, contextual, and sustainable digital learning transformation in boarding school environments.

CONCLUSION

This study set out to evaluate teachers' digital competence in enhancing the pedagogical competence of educators at Jabal Rahmah Mulia High School in Medan and to identify the factors that support and hinder its implementation through the CIPP evaluation model. The findings show that, within the constraints of a boarding school setting that restricts students' use of personal devices, teachers function as the primary mediators of digital learning, and the ongoing evaluation carried out through classroom supervision, weekly collegial meetings, and

teachers' self-directed adaptation makes a tangible contribution to strengthening instructional planning, professional reflection, and students' independent learning. The evaluation is supported chiefly by a young and adaptable teaching staff, adequate technological infrastructure, a collegial meeting culture, academic autonomy in platform selection, and structured professional development, while it is constrained by students' digital distractions, an over-reliance on visual engagement without deep conceptual understanding, and the absence of a standardized instrument for assessing digital competence. These findings suggest that evaluating teachers' digital competence in boarding schools should weigh contextual adaptability alongside technical skill, with infrastructure, collegial culture, and training treated as mutually reinforcing rather than separate initiatives. As a single-site qualitative study relying on interviews and observation rather than a standardized instrument, its findings are not generalizable to boarding schools with different cultures or resources. Future research should test this model across multiple schools, develop a validated digital-competence instrument for access-restricted settings, and track longitudinally how teachers' adaptive practices evolve.

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