

Human Resource Management Strategies to Enhance Teacher Competence in the Digital Era

Manuscript Information

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Abstrak

Penelitian ini bertujuan untuk menganalisis strategi manajemen sumber daya manusia dalam meningkatkan kompetensi guru di era digital, mengidentifikasi hambatan yang dihadapi lembaga pendidikan, serta mendeskripsikan upaya strategis yang dapat dilakukan untuk mendukung pengembangan kompetensi guru secara berkelanjutan. Penelitian ini menggunakan metode studi literatur dengan mengkaji berbagai artikel jurnal ilmiah yang relevan dalam lima tahun terakhir. Hasil kajian menunjukkan bahwa peningkatan kompetensi guru di era digital memerlukan strategi manajemen SDM yang sistematis, meliputi identifikasi kebutuhan kompetensi, pelatihan digital berkelanjutan, pendampingan, supervisi, evaluasi kinerja, pengembangan karier, dan pembentukan budaya belajar kolaboratif. Hambatan utama yang ditemukan meliputi rendahnya literasi digital sebagian guru, keterbatasan infrastruktur teknologi, kurangnya pelatihan berkelanjutan, serta belum optimalnya dukungan kebijakan sekolah. Penelitian ini menegaskan bahwa peningkatan kompetensi guru tidak cukup hanya berfokus pada kemampuan teknis menggunakan teknologi, tetapi juga perlu mengintegrasikan teknologi, pedagogi, dan materi ajar melalui pendekatan TPACK. Dengan demikian, manajemen SDM menjadi pendekatan strategis untuk membentuk guru yang adaptif, profesional, dan inovatif dalam menghadapi tuntutan pembelajaran digital.

Kata Kunci:

Kompetensi Digital, Kompetensi Guru, Manajemen SDM, Studi Literatur, TPACK.

Abstract

This study aims to analyze human resource management strategies in improving teacher competence in the digital era, identify the challenges faced by educational institutions, and describe strategic efforts to support continuous teacher competence development. This research employed a literature review method by examining relevant scientific journal articles published within the last five years. The findings indicate that improving teacher competence in the digital era requires systematic human resource management strategies, including competency needs identification, continuous digital training, mentoring, supervision, performance evaluation, career development, and the establishment of a collaborative learning culture. The main challenges include teachers' limited digital literacy, inadequate technological infrastructure, lack of continuous training, and insufficient school policy support. This study emphasizes that improving teacher competence should not merely focus on technical skills in using technology, but also on integrating technology, pedagogy, and subject content through the TPACK approach. Therefore, human resource management serves as a strategic approach to developing teachers who are adaptive, professional, and innovative in responding to the demands of digital learning.

Key Word:

Digital Competence, Human Resource Management, Literature Review, Teacher Competence, TPACK.

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INTRODUCTION

The digital transformation of education has changed the management of learning, learning resources, teacher student communication, and school administration. This condition requires teachers to master subject matter while also integrating technology pedagogically, creatively, ethically, and adaptively. However, the readiness of teacher competencies is not yet evenly distributed. Several studies show that some teachers still experience difficulties in using technology, applying digital media in learning, and adjusting teaching methods to the characteristics of students in the digital era (Wiwik & Murniyati, 2022).

The main issue is the gap between the competency demands for teachers in the digital era and the ability of educational institutions to develop human resources. Teachers are expected to master digital pedagogy, digital literacy, critical thinking, creativity, collaboration, and the use of learning platforms. However, implementation still faces obstacles such as limited infrastructure, unequal access to technology, low digital literacy, and suboptimal institutional support for continuous teacher competency development (Wiwik &

Murniyati, 2022). This condition can hinder the quality of learning because technology is not sufficient merely to be available; it must be properly managed and utilized by teachers.

These problems indicate that improving teacher competence cannot be viewed solely as the responsibility of individual teachers. Systematic human resource management (HRM) strategies are needed, starting from identifying competency needs, planning training, mentoring, performance evaluation, to career development. Melania & Yulianah (2024) emphasize that talent management in education plays an important role in developing teacher competencies through talent identification, training, mentoring, use of technology, and performance evaluation. Thus, HRM becomes a strategic instrument to ensure that teachers receive directed and continuous support in facing digital changes.

On the other hand, digital transformation also requires educational institutions to adjust HR policies to digital competency needs. Rohayati (2024) explains that the integration of HR management and digital competence is important to improve institutional efficiency, support digital learning, and build an innovative environment through digital training programs, digital competency frameworks in HR policies, and recruitment of technologically literate personnel. Similarly, Suryanto et al. (2025) emphasizes that integrating educators' digital competencies with HR management practices is necessary in hybrid learning, particularly through strengthening pedagogical, reflective, and ethical competencies, as well as aligning institutional policies.

Although various studies have discussed teachers' digital competencies and strategies to improve them, an issue that still needs further study is how HRM strategies can be specifically directed to enhance teacher competence in the digital era. Many schools still face challenges in designing sustainable training programs, conducting competency evaluations based on real needs, providing technological support, and building a digital learning culture among teachers. In fact, studies show that strategies such as continuous training, integration of technology in the curriculum, collaborative learning, and policy support are essential to address technological adaptation challenges in learning (Muthmainnah et al., 2025).

Based on these problems, research entitled "Human Resource Management Strategies to Improve Teacher Competence in the Digital Era" is important to conduct in order to conceptually examine various HRM strategies relevant to addressing teacher competency challenges. Using a literature study method, this research is directed at reviewing previous studies on teacher competency development, digital transformation in education, and HRM practices in education. The main focus of this study is to identify problems, challenges, and strategies that can be used by educational institutions to improve teacher competence so they can effectively adapt to digital learning needs.

The research problem formulation includes HRM strategies in improving teacher competence in the digital era, constraints faced by educational institutions in developing teacher competence, and teachers' adaptation efforts to technology-based learning. Accordingly, this study aims to analyze HRM strategies for improving teacher competence, identify obstacles faced by educational institutions, and describe strategic steps to support sustainable teacher competency development in line with the demands of digital education.

Theory of Educational Human Resource Management

The theory of educational HRM emphasizes that teacher quality is determined not only by personal capacity but also by the institution's ability to plan, manage, develop, evaluate, and retain educators. In schools, HRM includes teacher needs analysis, training, professional development, coaching, performance appraisal, and motivation. This theory is relevant because teacher competence in the digital era requires systematic and sustainable institutional strategies. Werdiningsih states that schools are responsible for managing human resources so that teachers can implement online learning and effectively utilize digital platforms (Werdiningsih, 2021).

Teacher Competency Theory

Teacher competency theory explains that professional teachers must possess knowledge, skills, attitudes, and abilities that support teaching tasks. These competencies include pedagogical, professional, social, and personal aspects. In the digital era, competency demands are broader, as teachers must be able to design technology-based learning, use digital media, manage virtual classrooms, and adapt teaching methods to the needs of 21st-century learners. Low teaching competence can hinder learning, thus systematic HRM is required to strengthen teacher capacity (Abdullah, 2024).

TPACK Theory (Technological Pedagogical Content Knowledge)

TPACK theory emphasizes that teachers in the digital era need to master content knowledge, pedagogy, and technology in an integrated manner. This integration is important so that technology does not merely

become a supporting tool but can effectively support the achievement of learning objectives. This theory is relevant because improving teacher competence is not sufficient through technical training in using digital tools; it must also focus on the ability to combine technology, teaching strategies, and subject matter appropriately. TPACK becomes an important framework in understanding teachers' competence in integrating technology into learning (Zhang et al., 2026).

The first related study was conducted by Melania & Yulianah (2024), entitled "Talent Management in Education: Developing Teacher Competence in the Digital Era." This study discusses the importance of talent management in improving teacher competence in the digital era. Competency development is carried out through talent identification, training, career development, mentoring, and performance evaluation. The similarity with this study lies in the focus on developing digital teacher competence and the importance of HR management. The difference is that Melania & Yulianah (2024) emphasize talent management, while this study examines HRM strategies more broadly and integratively.

The second related study was conducted by (Muthmainnah et al., 2025), entitled "Strategies for Improving Teacher Competence in the Digital Era for Elementary Schools." This study discusses strengthening elementary school teachers' competence through continuous training, integration of technology into the curriculum, collaborative learning, and school policy support. The similarity lies in examining teacher competence improvement in the digital era and emphasizing training, technological adaptation, and institutional support. The difference is that Muthmainnah's study focuses on elementary school teachers, while this study positions HRM as the main framework covering planning, implementation, evaluation, and continuous competency development.

Based on these studies, previous research has examined teacher competency development in the digital era through talent management and digital skill improvement strategies. However, this study offers novelty by positioning HRM as a more comprehensive primary approach in improving teacher competence. The focus is not only on training or technological skills but also on systematic and sustainable teacher management. Thus, this research is expected to contribute conceptually to educational institutions in preparing teachers to face digital learning.

METHODS

This study applies a literature review method, which is an approach conducted by collecting, examining, comparing, and synthesizing various relevant scientific sources. This method is used because the research focuses on analyzing concepts, findings, and human resource management (HRM) strategies in improving teacher competence in the digital era based on previous studies. A literature review is considered appropriate for understanding the development of research, identifying research gaps, and formulating new study directions. Carrera-Rivera et al. describe a systematic literature review as a structured method for organizing and arranging studies methodically (Carrera-Rivera et al., 2022).

The stages of this research are carried out through several steps: (1) First, determining the focus of the study, namely establishing the main research topic on HRM strategies in improving teacher competence in the digital era. At this stage, the researcher defines the scope of the study, including literature discussing educational HRM, teacher competency development, digital competence of teachers, teacher training, and digital transformation in education. Defining the focus is important to ensure that the literature search process is more directed and aligned with the research problem. (2) Second, literature search, which involves collecting relevant scientific journal articles through databases or online sources such as Google Scholar, Garuda, Sinta, DOAJ, ResearchGate, ScienceDirect, and national and international journal websites. The keywords used include "educational HRM," "teacher competence in the digital era," "strategies for improving teacher competence," "digital competence teacher," "human resource management in education," and "teacher professional development in the digital era." According to the PRISMA 2020 guidelines, researchers need to explain the sources of information, search strategies, and limitations used so that the review process can be transparently traced (Kitchenham & Charters, 2007). (3) Third, literature selection, which involves choosing articles that meet inclusion and exclusion criteria. The inclusion criteria in this study are journal articles published within the last five years, relevant to the topics of HRM, teacher competence, and the digital era, and containing information that supports the research discussion. Meanwhile, the exclusion criteria include articles that are not relevant to the research focus, are not available in full text, lack clear publication identity, or only discuss educational technology without linking it to teacher competence or HR management. This selection stage aligns with PRISMA 2020 principles, which emphasize the need to clearly explain eligibility criteria, selection processes, and data used in the review (Kitchenham & Charters, 2007). (4) Fourth, content analysis of the literature, which involves reading, noting, and grouping article contents based on key themes

such as teacher training strategies, professional development, performance evaluation, school leadership, digital literacy, and challenges in improving teacher competence. At this stage, data from various sources are analyzed using a descriptive-qualitative approach to identify patterns, similarities, differences, and relationships among findings. A literature review does not merely summarize previous studies but also synthesizes findings to produce a more comprehensive understanding of the issue being examined. Carrera-Rivera et al. emphasize that literature reviews should be conducted in a structured manner so that researchers can systematically organize, analyze, and conclude findings (Carrera-Rivera et al., 2022). (5) Fifth, synthesis and conclusion drawing, which involves organizing the results of the analysis into a conceptual explanation of HRM strategies that can be used to improve teacher competence in the digital era. The synthesis is conducted by connecting findings from previous studies and identifying the most relevant strategies, such as continuous training, mentoring, performance evaluation, strengthening digital literacy, developing teacher learning communities, and policy support from schools. This final stage results in conclusions regarding the importance of HRM as a strategic approach in improving teacher competence systematically and sustainably. In general, these stages align with systematic literature review guidelines, which include planning, conducting literature search and selection, analysis, synthesis, and reporting of review results (Kitchenham & Charters, 2007).

The PRISMA 2020 flow diagram illustrates the systematic process used to identify, screen, assess, and select articles for the study entitled “Human Resource Management Strategies to Enhance Teacher Competence in the Digital Era.” The literature search was conducted through several databases and sources, including Google Scholar, Garuda, Sinta, DOAJ, ResearchGate, ScienceDirect, and national and international journal websites, using keywords such as “educational HRM,” “teacher competence in the digital era,” “strategies for improving teacher competence,” “digital competence teacher,” “human resource management in education,” and “teacher professional development in the digital era.” A total of 232 records were initially identified, after which 92 records were removed due to duplication, ineligibility, and other reasons. The remaining 140 records were screened, and 98 records were excluded based on relevance and screening criteria. Subsequently, 42 reports were sought for retrieval, but 6 reports could not be accessed. Of the 36 reports assessed for eligibility, 29 were excluded because they did not specifically focus on HRM strategies, were unrelated to teacher competence in the digital era, lacked empirical or systematic approaches, or contained incomplete data. Finally, 7 studies met all inclusion criteria and were selected for the final review and analysis.

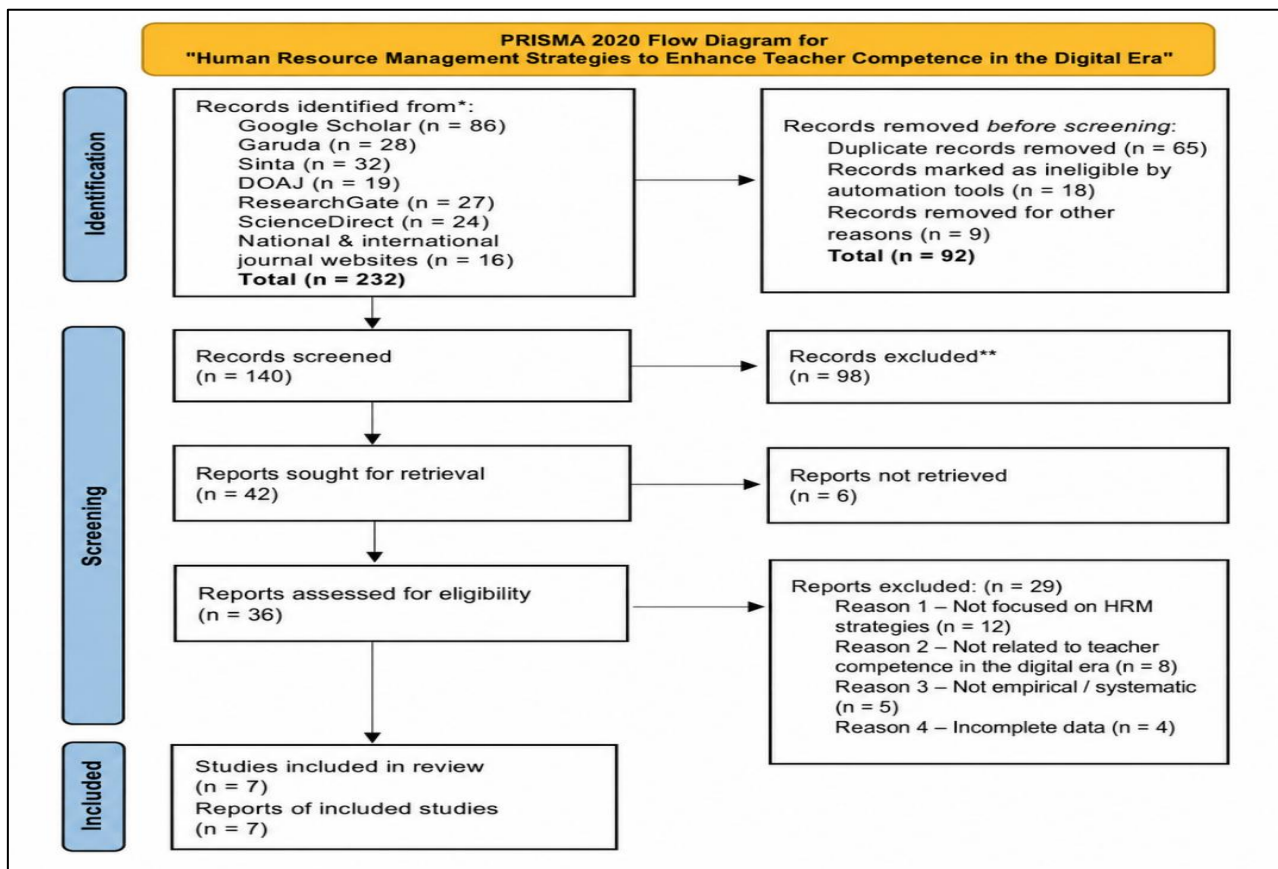


Figure 1. PRISMA Flowchart Diagram

RESULTS AND DISCUSSION

Results

Based on the selection results, the literature used consists of articles number 1 to 7, as they are directly related to educational human resource management, teacher competence, digital competence, teacher training, and strategies for improving teacher professionalism in the digital era. Articles number 8 to 12 are still included as search results but were excluded because their focus is too narrow, too general, or does not directly address human resource management strategies as the main approach to improving teacher competence.

Table 1. Selection results

No.	Topic	Author (Year)	Status
1	Talent management in developing teacher competence in the digital era.	(Melania & Yulianah, 2024)	Used
2	Integration of human resource management and digital competence in higher education management.	(Rohayati, 2024)	Used
3	The impact of digital transformation on teacher competence in the educational process.	(Triyunita et al., 2025)	Used
4	Strategies to improve elementary school teachers' competence in facing digital learning.	(Muthmainnah et al., 2025)	Used
5	Human resource management to enhance teachers' abilities in online learning.	(Werdiningsih, 2021)	Used
6	The needs and challenges of teacher competence in facing 21st-century educational transformation.	(Wiwik & Murniyati, 2022)	Used
7	Development of teacher competence in responding to the demands of the digital education era.	(Rahmadillah et al., 2025)	Used
8	Policies for developing teachers' pedagogical competence in the context of digital learning.	(Mawarni et al., 2025)	Eliminated
9	Development of teacher competence in the digital era based on literature review studies.	(Desiga & Liswati, 2025)	Eliminated
10	Issues of early childhood education (ECE) teachers' competence in utilizing digital technology for learning.	(Crispy et al., 2025)	Eliminated
11	Challenges and strategies for developing educator professionalism in the digital era.	(Saputra & Aji, 2025)	Eliminated
12	Strategies of Islamic elementary school (Madrasah Ibtidaiyah) teachers in building value-based competence and utilizing digital technology.	(Suryani & Sholeh, 2024)	Eliminated

Based on the reviewed literature, human resource management (HRM) strategies play an important role in improving teacher competence in the digital era. Technological development not only requires teachers to master digital tools but also requires educational institutions to manage teacher development systematically. Melania & Yulianah (2024) show that digital transformation demands adaptive teachers, thus requiring talent management through training, career development, and continuous performance evaluation. This aligns with the theory of educational HRM, which states that improving teacher competence is the result of planned institutional management that meets the needs of digital learning.

These findings are reinforced by Werdiningsih (2021) research on HRM in improving teacher competence in online learning. The study shows that teacher competence can be developed through online learning training, the formation of mentoring teams, and continuous supervision. This confirms that educational HRM does not only focus on training but also includes mentoring, supervision, and evaluation of learning. In line with HRM theory, schools play an important role in managing teachers so they can carry out professional duties in the digital era.

Furthermore, Rohayati (2024) shows that the integration of human resource management and digital competence is a strategic approach in educational institutions. Rohayati (2024) emphasizes that digital competence includes the ability to use technology effectively and efficiently, ranging from basic digital literacy to more complex technical skills. In relation to this study, these findings strengthen the view that HRM strategies must be directed toward developing teachers' digital competence through training, institutional policies, technological support, and an innovative work environment. Although aligned with HRM theory, Rohayati (2024) mostly situated in higher education, so its ideas need to be adapted to the school context.

From the perspective of teacher competency theory, the reviewed literature shows an expansion of the meaning of competence in the digital era. Teachers are not only required to master pedagogical, professional, social, and personal competencies but also to integrate technology into learning. Research by Triyunita, Yana, Bachtiar, and Abdurrahmansyah (2025) shows that digital transformation affects all aspects of teacher competence. Teachers need to master educational technology, improve digital literacy, and adapt teaching

methods based on technology. These findings are consistent with competency theory, which emphasizes professional development in line with educational needs (Triyunita et al., 2025).

Findings by Muthmainnah, Falasifah, Yadi, and Halimah (2025) also support teacher competency theory. Their research explains that teachers in the digital era, especially at the elementary level, no longer act solely as information transmitters but also as facilitators and motivators of learning. Strategies for improving teacher competence include continuous training, integration of technology in learning, collaborative learning, and school policy support. These findings show that teacher competence must be developed comprehensively, covering teaching ability, technological mastery, creativity, and the ability to build active learning interactions. Thus, this study aligns with teacher competency theory by emphasizing that teacher quality is determined by the ability to adapt professional competence to changing demands (Muthmainnah et al., 2025).

Research by Wiwik and Murniyati (2022) further clarifies the main issues faced by teachers in the digital era, namely the need to improve competence to meet the challenges of 21st-century education. Their study discusses the needs and challenges of teacher competence in the digital era, including demands for technological skills, creativity, and adaptation to changes in learning. From the perspective of teacher competency theory, these findings show that competence is dynamic rather than static, meaning it must continuously evolve in line with curriculum development, technological advancement, student characteristics, and 21st-century learning needs (Wiwik & Murniyati, 2022).

In relation to TPACK theory, the reviewed literature shows that improving teacher competence cannot rely solely on technical training in using technology. Teachers must understand how to integrate technology with pedagogical strategies and subject content. Research by Triyunita et al. emphasizes that digital transformation requires teachers to master learning technologies and adapt digital-based teaching methods. These findings align with TPACK, as technology should strengthen pedagogical processes rather than merely serve as a supplementary tool. Teachers need to select appropriate technologies, connect them with subject content, and apply them through suitable learning approaches (Triyunita et al., 2025).

Research by Rahmadillah et al. (2025) also aligns with TPACK theory by emphasizing continuous professional development, curriculum integration, and collaborative learning. Their study shows that digital technological development influences the teaching profession and requires new competencies. From a TPACK perspective, teacher adaptation involves not only technical skills in using applications but also the ability to design meaningful learning through the integration of content, pedagogy, and technology. Therefore, teacher competence development should focus on integrative abilities rather than merely operational technological skills.

Discussion

Human Resource Management Strategies for Teacher Competency Development

Although most of the reviewed studies align with the three supporting theories, there are differences in emphasis. Melania & Yulianah (2024) focus more on talent management, while Werdiningsih (2021) emphasizes online learning. Rohayati (2024) discusses HRM and digital competence integration in higher education, whereas Muthmainnah focuses on elementary school teachers. These differences indicate that previous studies tend to address specific aspects separately, such as digital training, online learning, talent management, or teacher competence at certain levels. Therefore, this study integrates these aspects within an HRM strategy framework for improving teacher competence in the digital era.

Thus, the literature shows that HRM strategies for improving teacher competence in the digital era include competency needs planning, continuous digital training, mentoring, supervision, performance evaluation, career development, collaborative learning, and school policy support. These strategies align with educational HRM theory by emphasizing systematic teacher management. They are also consistent with teacher competency theory and TPACK, as they focus on strengthening pedagogical, professional, social, and personal competencies, as well as integrating technology, pedagogy, and subject content.

Challenges in Developing Teacher Competence in the Digital Era

The findings indicate that issues of teacher competence in the digital era are not only related to technical skills in using technology but also to the limited integration of technology, pedagogy, and subject content. Therefore, teacher training should go beyond the use of applications or digital tools and focus on designing meaningful, interactive learning suited to student characteristics. This aligns with TPACK theory, which emphasizes the integration of technology, pedagogy, and content.

In addition, the reviewed studies show that strategies for improving teacher competence are more effective when implemented institutionally rather than incidentally. This means that schools need structured teacher development programs, such as continuous digital training, teacher learning communities, mentoring,

academic supervision, and competency-based performance evaluation. Sporadic efforts tend to be less effective due to the rapid and continuous evolution of educational technology.

Integration of TPACK in Teacher Professional Development

Another interpretation shows that the three supporting theories used in this study complement each other. Educational HRM theory explains the importance of managing teachers as institutional assets; teacher competency theory explains the professional abilities required; and TPACK theory explains the form of digital-pedagogical competence needed in modern learning. Together, these theories reinforce that improving teacher competence in the digital era must be viewed as a comprehensive process, not merely technical training.

Thus, appropriate HRM strategies will produce teachers who are more adaptive, innovative, and professional in facing the digital era. Teachers supported by strong HR development systems will be better prepared to use technology as an integral part of the learning process rather than merely as a tool. Therefore, the novelty of this study lies in emphasizing that improving teacher competence in the digital era must be placed within a comprehensive HRM framework, including planning, implementation, evaluation, and continuous professional development.

Based on the discussion, it can be understood that improving teacher competence in the digital era is highly dependent on the ability of educational institutions to manage human resources in a structured and sustainable manner. Teacher competence does not develop sufficiently through individual initiative alone but requires institutional support, including competency planning, training, mentoring, supervision, evaluation, and career development. Thus, HRM plays a strategic role in helping teachers adapt to technological developments and digital learning demands.

CONCLUSION

Based on the literature review, HRM strategies play an important role in improving teacher competence in the digital era through systematic, directed, and sustainable management. These strategies include identifying competency needs, digital training, mentoring, supervision, performance evaluation, career development, and strengthening collaborative learning culture in schools. Challenges include low digital literacy, limited technological infrastructure, lack of continuous training, and insufficient school policy support. Therefore, improving teacher competence requires the integration of HRM, teacher competency theory, and the TPACK approach.

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