

Redefining Lecturer Competencies in the Human Capital 5.0 Era: A Systematic Literature Review on Integrating Human Empathy and AI Efficiency

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Abstract

The rapid diffusion of generative artificial intelligence (AI) into higher education has intensified a conceptual dichotomy between AI-driven efficiency and human empathy as the pedagogical core of lecturers' work, a tension that becomes strategically urgent within the emerging discourse of Human Capital 5.0, which envisions technology as an amplifier rather than a replacement of human values. This study conducted a systematic literature review (SLR) following the PRISMA 2020 reporting guideline [1] to synthesize evidence on how lecturer competencies should be redefined to integrate AI efficiency and human empathy. Fifteen Scopus-indexed empirical and review articles published between 2022 and 2026 were analyzed thematically, using structured comparison across three dimensions: AI-efficiency manifestations, human-empathy evidence, and competency redefinition. The findings reveal that AI efficiency is primarily reflected in instructional facilitation, formative assessment automation, and administrative support, whereas human empathy is associated with the quality of lecturer-student interactions, trust, and students' psychosocial outcomes. Synthesizing these findings, this review proposes a three-layer lecturer competency framework comprising AI-technical literacy, pedagogical-ethical reasoning, and human-relational competence. The framework's main contribution lies in integrating AI efficiency and human empathy as complementary dimensions of lecturer professionalism, providing a conceptual foundation for responsible AI integration in higher education and informing institutional policies and lecturer professional development.

Keywords: *Human Capital 5.0; lecturer competencies; artificial intelligence; empathy; systematic literature review*

Abstrak

Percepatan penetrasi kecerdasan buatan (AI) generatif ke dalam pendidikan tinggi memperuncing dikotomi konseptual antara efisiensi berbasis AI dan empati manusia sebagai inti pedagogis pekerjaan dosen, sebuah ketegangan yang menjadi strategis dalam wacana Human Capital 5.0 yang memandang teknologi sebagai penguat, bukan pengganti, nilai-nilai kemanusiaan. Penelitian ini melakukan tinjauan literatur sistematis (systematic literature review/SLR) mengikuti pedoman pelaporan PRISMA 2020 untuk mensintesis bukti mengenai bagaimana kompetensi dosen perlu diredefinisi agar mengintegrasikan efisiensi AI dan empati manusia. Lima belas artikel empiris dan tinjauan terindeks Scopus yang terbit pada rentang 2022–2026 dianalisis secara tematik melalui perbandingan terstruktur pada tiga dimensi: manifestasi efisiensi AI, bukti empati manusia, dan redefinisi kompetensi. Hasil penelitian menunjukkan bahwa efisiensi AI terutama tercermin dalam fasilitasi pembelajaran, otomatisasi penilaian formatif, dan dukungan administratif. Sementara itu, empati manusia berkaitan dengan kualitas interaksi dosen dan mahasiswa, kepercayaan, serta hasil psikososial mahasiswa. Berdasarkan sintesis temuan tersebut, penelitian ini mengusulkan kerangka kompetensi dosen tiga lapis yang mencakup literasi teknis AI, penalaran pedagogis-etis, dan kompetensi relasional-humanis. Kontribusi utama penelitian ini terletak pada integrasi efisiensi AI dan empati manusia sebagai dimensi kompetensi profesional dosen yang saling melengkapi. Kerangka ini memberikan landasan konseptual bagi integrasi AI yang bertanggung jawab dalam pendidikan tinggi serta menjadi acuan bagi pengembangan kebijakan institusi dan program pengembangan profesional dosen.

Kata Kunci: *Human Capital 5.0; kompetensi dosen; kecerdasan buatan; empati; tinjauan literatur sistematis*

INTRODUCTION

The transformation toward a post-industrial society driven by artificial intelligence (AI) has given rise to a new discourse known as Human Capital 5.0, an extension of the concepts of Society 5.0 and Industry 5.0 that places humans at the center of every technological transformation rather than merely positioning them as objects adapting to automation [2]. Unlike the Industry 4.0 paradigm, which focuses on technical efficiency and process digitalization, Human Capital 5.0 emphasizes that the added value of human resources lies precisely in capacities that cannot be fully replaced by machines, namely ethical reasoning, creativity, and relational sensitivity [2]. In the context of higher education, this paradigm shift places lecturers in a highly strategic yet vulnerable position: on the one hand, lecturers are required to develop AI literacy to ensure that institutions remain competitive and globally relevant, while on the other hand, they must maintain the quality of pedagogical relationships that serves as the foundation of effective human-centered learning.

Urgency to redefine lecturer competencies has become increasingly evident with the rapid adoption of generative AI in higher education following the emergence of ChatGPT in late 2022. [3], through a systematic review of 138 articles published between 2016 and 2022 following PRISMA principles, found that publications on AI in higher education increased two- to threefold in 2021 and 2022 compared with previous years, with five major patterns of use: assessment/evaluation, prediction, AI assistants, intelligent tutoring systems, and student learning management. This trend has continued exponentially in the era of generative AI. [4] reported that lecturers primarily use generative AI for lesson preparation, feedback provision, and formative assessment, while the assessment of core student outcomes continues to rely on conventional approaches. From the student perspective, [5] found that the use of generative AI among 131 students at a university in Jakarta improved efficiency and accessibility in information searching, academic writing, and learning planning. These findings consistently indicate that efficiency represents the most tangible added value of AI and has been widely accepted in higher education practice.

Nevertheless, strengthening AI-based efficiency does not necessarily lead to improvements in the relational quality of learning and, in some cases, may even show the opposite tendency. [6], through a quantitative study based on an online survey of 627 students from two universities in Croatia and Spain using Partial Least Squares Structural Equation Modeling (PLS-SEM), found that lecturers' use of generative AI did not enhance students' perceptions of lecturer expertise. In the combined sample, it even had a significant negative effect on perceived expertise. Meanwhile, teacher clarity remained a strong predictor of perceived expertise, which subsequently influenced trust, perceived usefulness, and lecturer-student familiarity. These findings highlight a fundamental dichotomy: the technical efficiency enabled by AI is not automatically translated into the quality of pedagogical relationships and may even obscure lecturers' interpersonal competencies when AI is used without clear pedagogical purposes.

This dichotomy is further reinforced by empirical evidence regarding the central role of empathy in teaching effectiveness.[7], through a systematic review of 41 study records, concluded that teacher empathy is associated with the quality of teacher-student interactions, particularly emotional support, which in turn influences students' cognitive and psychosocial development. From the students' own perspective, [8], through a Q-methodology study involving 30 students in AI-mediated learning environments, found that the theme of "Empathy and Emotional Support" was the most frequently occurring theme in students' open-ended reflections, while the "Clarity and Empathy Advocates" factor emerged as one of the dominant student profiles in evaluating lecturers' interpersonal behaviors.[4] further emphasized that the literature they synthesized explicitly raises concerns about the loss of human interaction resulting from the uncontrolled use of generative AI, highlighting that AI cannot replace human elements such as empathy, mentoring, and critical judgment. Thus, the literature reveals a consistent pattern: the greater the emphasis on technical efficiency, the greater the risk of eroding the relational dimension that is itself a key determinant of teaching effectiveness.

Previous literature reviews indicate that efforts to define lecturer competencies in the AI era have developed rapidly, but most studies remain fragmented into two separate strands of research. The first strand focuses on the development of technical AI competency frameworks. [9] developed a GenAI-responsive competency framework with four dimensions, namely GenAI literacy, curriculum and learning design, teaching and learning, and assessment, through a systematic analysis of existing digital and AI competency frameworks. [10] developed and validated the Teacher AI Competency Self-Efficacy Scale (TAICS) through a three-round Delphi method and confirmatory factor analysis involving 434 K-12 teachers. The scale consists of six dimensions, including AI knowledge, AI pedagogy, AI assessment, AI ethics, human-centered education, and professional engagement. Meanwhile, [11] through a systematic review of 323 records that resulted in 87 high-quality studies from the Web of Science, Scopus, ERIC, and IEEE Xplore databases, concluded that

AI literacy extends beyond technical proficiency and should encompass ethical considerations and social impacts.

The second strand concerns research on teacher empathy and relational competencies, which has developed relatively independently from the AI discourse, as demonstrated by the comprehensive review conducted by [7], which did not address AI technology at all. This gap is further highlighted by the findings [12], who, through a scoping review of 34 articles published between 2000 and 2023 using the Aristotelian lenses of episteme (theoretical knowledge), techne (practical skills), and phronesis (professional and ethical judgment), revealed that the literature on AI literacy in teacher education remains dominated by the technically and conceptually oriented dimension of episteme. Meanwhile, the dimensions of techne and, particularly, phronesis, which encompass ethical considerations and practical wisdom closely related to relational competencies such as empathy, remain underexplored and insufficiently addressed in an explicit and comprehensive manner.

Several studies have attempted to bridge these two strands, although they have not specifically formulated them into an integrated framework for redefining lecturer competencies. [13], through a convergent mixed-method systematic review of 40 empirical studies following PRISMA across the Scopus and Web of Science databases, proposed a human-centered AI principle in which educators are positioned as one of the stakeholder groups that must retain human agency and human oversight over AI-generated decisions. However, this study did not specify how this principle could be translated into concrete lecturer competencies. [14], through a bibliometric analysis of 1,737 Scopus documents followed by a mixed framework analysis of 14 selected articles using a human-GenAI collaboration approach, identified human oversight competency as one of the important domains alongside GenAI literacy and pedagogical competencies. However, empathy was not explicitly formulated as a distinct construct. Meanwhile, [15], through a PRISMA-ScR scoping review of 70 studies published between January 2021 and April 2026, emphasized that teachers' readiness to use AI is shaped by self-efficacy, institutional support, and, most importantly, the maintenance of professional responsibility. However, the study did not directly connect these findings with empirical evidence on teacher empathy. This research gap is also evident in the specific domain of academic scientific research. [16], through a systematic review of 85 articles published in 2023 on AI in research and scholarly writing in higher education, concluded that a critical and creative perspective is necessary so that AI is used only as a supporting tool while maintaining academic rigor and quality through human supervision. This finding points to the need for hybrid competencies, but these have not yet been formulated into a comprehensive competency framework.

The identified research gap is particularly important as the increasing adoption of AI in higher education requires lecturers to balance technological efficiency with professional judgment, ethical responsibility, and meaningful human relationships. Although AI can support instructional facilitation, assessment, and administrative tasks, its efficiency does not necessarily ensure the quality of lecturer-student interactions. Without an integrated competency framework, lecturer development may emphasize technological proficiency while giving insufficient attention to the human-relational dimensions of teaching. Therefore, an integrated framework is needed to conceptualize AI efficiency and human empathy as complementary dimensions of lecturer competencies within the Human Capital 5.0 perspective.

Based on the mapping of these gaps, the scientific novelty of this article lies in its effort to systematically synthesize fifteen empirical and review articles indexed in Scopus from 2022 to 2026 to redefine lecturer competencies by explicitly integrating two dimensions that have largely developed separately, namely AI-based technical efficiency and human empathy as the relational core of teaching, into a coherent and evidence-based conceptual framework, while situating them within the broader discourse of Human Capital 5.0. This systematic literature review employs the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 reporting guidelines [1] to ensure transparency and replicability in the identification, screening, and synthesis of the literature.

Based on the discussion above, this study formulates three research questions that serve as the basis for conducting this systematic literature review: (1) How is AI efficiency manifested in lecturers' teaching practices in higher education based on recent empirical literature? (2) How is human empathy conceptualized and empirically demonstrated as a core dimension of teaching effectiveness amid the widespread integration of AI? and (3) How can lecturer competencies be redefined to coherently integrate AI efficiency and human empathy within the Human Capital 5.0 framework? In line with these research questions, the objective of this study is to generate an evidence-based synthesis of the redefinition of lecturer competencies that integrates the dimensions of AI efficiency and human empathy, while also providing implications for higher education institutional policies and lecturer professional development programs in preparing for the Human Capital 5.0 era.

METHOD

This study employs a Systematic Literature Review (SLR) design that follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 reporting guidelines as formulated by [1]. The PRISMA 2020 guidelines were selected because they provide a transparent and replicable reporting framework through four main stages: identification, screening, eligibility assessment, and inclusion of articles in the final synthesis.

Data Sources and Eligibility Criteria

The primary corpus of this study consists of fifteen (15) empirical and review articles indexed in the Scopus database. The articles were selected because they directly address one or more of the three core themes: (a) AI efficiency in higher education teaching practices, (b) lecturer/teacher empathy or relational competencies, and (c) AI-related lecturer competency frameworks. The inclusion criteria were as follows: (1) the articles were empirical studies or systematic/scoping reviews that had undergone peer review and were indexed in Scopus; (2) they were published between 2021 and 2026 to capture developments following the emergence of generative AI; (3) they were written in English; (4) they focused on higher education or teacher/lecturer education contexts; and (5) they provided data or findings relevant to at least one of the three core themes described above. The exclusion criteria included opinion or editorial articles without empirical data or systematic synthesis, conference papers without full peer review, and articles focusing on primary and secondary education without direct relevance to higher education or professional teacher education contexts.

The supporting literature search strategy employed a combination of conceptual keywords, including the terms "artificial intelligence" or "generative AI," combined with "lecturer," "teacher," or "faculty," as well as "competence," "empathy," "human-centered," and "higher education" in the Scopus database. The selection process followed the four stages of PRISMA 2020. In the identification stage, initial records were collected through a systematic search of the Scopus database. In the screening stage, titles and abstracts were screened to remove duplicates and records that were clearly irrelevant. In the eligibility assessment stage, the full texts of records that passed the initial screening were assessed for their alignment with the predetermined inclusion and exclusion criteria. In the final stage, fifteen (15) articles were determined to meet all the criteria and were included in the final synthesis as the primary data corpus of this study (Table 1). The literature selection flow diagram is presented in Figure 1.

Figure 1. PRISMA 2020 Flow Diagram for Literature Selection

PRISMA 2020 Stage	Process Description	Output
Identification	A systematic search was conducted in the Scopus database using a combination of keywords related to AI, lecturer competencies, and empathy in the context of higher education (2021–2026).	Initial records collected
Screening	Titles and abstracts were screened. Duplicates and records that were clearly irrelevant to the research objectives were removed.	Records screened for full-text assessment
Eligibility	The full texts were assessed based on the inclusion and exclusion criteria, including relevance, publication in Scopus-	Records meeting the eligibility criteria

	indexed journals, higher education context, and availability of relevant findings.
Included	Articles that met all eligibility criteria were included in the final n = 15 primary articles systematic literature review synthesis as the primary data (Table 1) corpus.

Data Extraction and Synthesis

Data extraction was conducted by developing a coding matrix that recorded five elements from each included article: (1) author identity and publication year; (2) research method employed; (3) reported aspects of AI efficiency; (4) reported aspects of human empathy; and (5) implications for redefining lecturer competencies in the Human Capital 5.0 era. The complete data extraction matrix is presented in Table 1 in the Results and Discussion section. Data synthesis was conducted using a thematic narrative synthesis approach, considering the diversity of research designs represented in the data corpus, including systematic and scoping reviews, bibliometric analyses, quantitative survey studies using structural equation modeling, exploratory qualitative studies, Q-methodology, and the development and validation of psychometric scales, which did not allow for direct statistical meta-analysis. The thematic synthesis was organized into three broad themes aligned with the research questions, namely the manifestation of AI efficiency, evidence of human empathy, and the integrated redefinition of lecturer competencies.

As a quality assurance measure, all included articles were confirmed to have been published in Scopus-indexed journals and to have undergone peer review, serving as a proxy for methodological quality standards. Given the diversity of study types within the data corpus, a formal methodological quality assessment using a single instrument, such as AMSTAR or CASP, was not applied uniformly ([17]). Instead, the quality of each article was assessed qualitatively based on the clarity of the research methods, adequacy of the sample or analytical corpus, and transparency of the reporting of findings. This constitutes one of the methodological limitations of the study, as discussed in the Recommendations section.

RESULTS AND DISCUSSION

General Characteristics of the Analyzed Studies

The fifteen articles that met the inclusion criteria showed a temporal distribution concentrated in the 2024–2026 period, reflecting the surge of academic attention to AI integration and higher education following the emergence of generative AI, consistent with the pattern reported by[3] . In terms of research design, the majority of the articles employed systematic review approaches following PRISMA ([13]; [18] ; [4]; [3] ; [16]) or scoping reviews ([12], [15]). Other studies employed bibliometric analysis combined with qualitative framework analysis ([14]), large-scale quantitative survey research using structural equation modeling ([6]), Q methodology combining content and sentiment analysis ([8]), an exploratory qualitative study based on reflective essays ([5]), and the development and validation of a psychometric scale using the Delphi method and confirmatory factor analysis ([10]). Although [7] did not explicitly address AI, the study was included because it provides one of the most comprehensive empirical references on the relationship between teacher empathy, the quality of teacher-student interactions, and student outcomes, thereby serving as an important comparison point for findings related to AI. The diversity of research designs enriches the triangulation of findings across methods, although it also explains why the synthesis was conducted through a narrative thematic approach rather than statistical meta-analysis. A summary of the characteristics of all studies is presented in Table 1.

Table 1. Summary of the Characteristics of the Fifteen Analyzed Studies

No.	Author (Year)	Design/Method	Main Focus
1	Fu & Weng (2024)	SLR with a convergent design (PRISMA); 40 empirical studies	Principles of human-centered AI and its impact on educational decision-making

2	Zhuang, Long, Martin, & Castellanos-Reyes (2025)	Systematic review; 55 studies	Affordance and considerations of AI in institutional policies and practices
3	Choi, Ba, Chu, Yang, Chang, Dai, & Lim (2026)	Development of a competency framework through systematic synthesis analysis	Responsive competency framework for generative AI
4	Adlup, Carstensen, & Klusmann (2022)	Systematic review; 41 articles	Empathy, teacher-student interaction, and student outcomes
5	Burneo-Arteaga, Lira, Murzi, Baduela, & Costa (2025)	Bibliometric analysis and network analysis; 1,737 documents in 14 articles	Human-GenAI collaboration competency
6	Jalilzadeh, Çelik, & Duran (2025)	Methodology-Q; 30 participants	Students' perceptions of interpersonal behavior in technology-mediated learning
7	Baggia, Tratnik, & Brezavšček (2024)	SLR with a meta-analytic component (PRISMA); 207 records, 30 studies	Perceptions, attitudes, and practices of lecturers toward generative AI
8	Šerć & Garbin Prančević (2026)	PLS-SEM; 627 respondents	Impact of generative AI use by higher education lecturers on skills and effectiveness
9	Rojas Guillén (2026)	Scoping review (PRISMA-ScR); 70 studies	AI literacy and readiness among educators
10	Crompton & Burke (2023)	SLR (PRISMA); 138 articles	Patterns of AI use in higher education from 2016 to 2022
11	Castillo-Martínez, Flores-Bueno, Gómez-Puente, & Vite-León (2024)	SLR; 85 articles	AI in research and teaching in higher education
12	Rahiem (2026)	Qualitative exploratory study; 131 students	Patterns of generative AI use and its impact on learning
13	Biagini (2025)	SLR; 323 records, 87 studies	Generative AI literacy in technical, social, and educational domains
14	Sperling, Stenberg, McGrath, Akerfeldt, Heintz, & Stlidén (2024)	Scoping review; 34 articles	Literature on AI and teacher education through the lens of the techno-phronesis epistemic approach
15	Chiu, Ahmad, & Coban (2025)	Delphi & CFA; 434 K-12 teachers	Development and validation of the Teachers' AI Competency Scale (TAICS)

The Dimension of AI Efficiency in Teaching Practices

The cross-study synthesis indicates that AI efficiency in teaching practices is most consistently manifested in four areas: learning facilitation, assessment automation, administrative support, and personalization. [18], through a systematic review of 55 studies on AI affordances across the online instructional cycle, including design, facilitation, assessment, and evaluation, found that AI was most extensively utilized at the facilitation stage compared with the design, assessment, and evaluation stages. Its contributions included supporting cognition, providing automated feedback, and assessing learning quality. Similarly, [3] identified five major patterns of AI use in higher education: assessment/evaluation, prediction, AI assistants, Intelligent Tutoring Systems, and student learning management, with 72% of the studies focusing on students, 17% on educators, and 11% on institutional managers.

At the level of lecturers' direct teaching practices, [4] found that, among 30 studies synthesized following PRISMA, lecturers primarily used generative AI for preparing teaching materials, creating content, designing rubrics and prompts, performing administrative tasks, providing feedback, and conducting formative assessment, with the main benefits being increased efficiency and teaching support.[9], through the GenAI responsive competency framework they developed, further emphasized that GenAI provides efficiency benefits in the dimensions of curriculum and learning design, teaching processes, and assessment implementation. However, the framework explicitly requires lecturers to progressively develop their competencies, moving from technical awareness to

guided application and ultimately to critical and creative integration. At the student level, [5] documented that the use of generative AI by students increased efficiency in rapid information searching, summarization, academic writing, grammar improvement, practice exercises, and study planning. Meanwhile, [16] demonstrated that AI makes various scientific research processes more efficient, including academic writing and other academic activities within university settings.

Nevertheless, these findings consistently emphasize that AI efficiency is concentrated and unevenly distributed across the teaching cycle. [18], explicitly noted that AI is used substantially more in the facilitation stage than in the stages of instructional design, substantive assessment, and in-depth evaluation. This pattern indicates that AI has not yet, and may not be able to, replace lecturers' professional judgment in teaching stages that require greater contextual and ethical considerations. A similar pattern is also evident in [3], who concluded that although AI can automate prediction and assessment, human competence remains necessary to interpret the results and make contextualized pedagogical decisions. This finding provides an important basis for the argument that AI efficiency, regardless of the extent of its benefits, cannot stand alone as the sole dimension of lecturer competence in the Human Capital 5.0 era.

The Dimension of Human Empathy as the Core of Teaching

In contrast to the optimistic narrative surrounding AI efficiency, empirical evidence on human empathy emphasizes that the relational dimension of teaching cannot be reduced to functions that can be automated. [7], through a systematic review analyzing 41 research records, concluded that teacher empathy, defined as encompassing cognitive aspects, namely the ability to understand students' perspectives and emotions, and affective aspects, namely sensitive responses to students' emotional needs, is associated with the quality of teacher-student interactions, particularly emotional support. This, in turn, contributes to students' cognitive and psychosocial development. However, the authors also caution that claims regarding the effects of empathy need to be supported by more objective and consistent measurements in future research.

Direct evidence regarding the relevance of empathy in the AI era comes from [8]. Using Q methodology with 30 students in an AI-mediated learning environment, they found that among the four student perception factors identified through principal component analysis, the "Clarity and Empathy Advocates" factor emerged as one of the prominent profiles. The theme of "Empathy and Emotional Support" was also the most frequently occurring theme in students' open-ended reflections, alongside the themes of instructional clarity and precision. Students in the study also explicitly emphasized the importance of authentic interaction, which cannot be replaced by algorithm-based personalization alone. This finding strengthens the argument that technical personalization and relational closeness are two distinct constructs, and the presence of the former does not guarantee the presence of the latter.

Stronger empirical evidence regarding the risk of the erosion of the relational dimension due to AI use comes from [6]. This large-scale quantitative study found that the use of generative AI by lecturers did not significantly contribute to the three dimensions of teaching effectiveness that they measured, namely trustworthiness, helpfulness, and lecturer-student rapport. It even showed a significant negative effect on students' perceived lecturer expertise in the combined sample. In contrast, teacher clarity emerged as a strong predictor of perceived expertise among students. These findings are consistent with the concerns highlighted by [4] who synthesized literature that explicitly identified concerns about the loss of human interaction and emphasized that AI cannot replace human elements such as empathy, guidance, and critical judgment. [18] further emphasized that, in the context of online learning, AI is closely associated with issues of engagement, communication, and interaction. Therefore, the human role remains necessary, and AI should be viewed as an enhancement rather than a substitute for the pedagogical role of lecturers.

Convergence: Bridging the Dichotomy between AI Efficiency and Human Empathy

Although the literature indicates a tension between technical efficiency and relational quality, the cross-study synthesis reveals a convergent point of intersection: lecturer competencies in the AI

era cannot be formulated as a binary choice between "mastering AI" and "maintaining empathy." Rather, they should be understood as an integration of both dimensions through what can be referred to as human-AI collaboration competency. [13] provide an important reference in this regard by emphasizing that responsible and human-centered AI principles require educators, as one of the key stakeholder groups, to retain agency and responsibility for AI-generated decisions rather than fully transferring pedagogical authority to automated systems.

[14] reinforce this argument by identifying human oversight competency as one of the important domains alongside GenAI literacy, prompt engineering, and pedagogical competency within the competency framework they developed from an in-depth analysis of 14 peer-reviewed articles selected from a bibliometric corpus of 1,737 Scopus documents. The authors explicitly emphasize that lecturers in the AI era need to become human-AI collaborators rather than merely AI users, with competencies encompassing technical, pedagogical, critical, ethical, communication, and collaborative dimensions. A similar argument is presented by [16], who conclude that lecturer competencies should include the ability to use AI as a support tool while maintaining critical and creative judgment and human supervision to ensure academic rigor and quality when using AI.

The Aristotelian framework employed by [12], namely episteme, techne, and phronesis, provides a strong philosophical foundation for this intersection. The authors found that the literature on AI literacy in teacher education remains dominated by episteme, referring to technical theoretical and scientific knowledge, while phronesis, referring to professional and ethical judgment, is still rarely captured comprehensively, despite being the dimension most relevant to pedagogical decision-making that considers the human context of students, including empathy. This argument is consistent with the findings of [15], who, through a scoping review of 70 studies, concluded that teacher AI literacy encompasses not only technical understanding but also critical evaluation of AI outputs, professional responsibility, self-efficacy, and adaptability. These competencies are continuous, contextual, and practice-based rather than merely involving one-time mastery of AI tools.

[11] further provides evidence supporting this integration through a systematic review of 87 high-quality studies, concluding that AI literacy extends beyond technical competencies, including understanding, using, applying, evaluating, and creating with AI, and encompasses ethical understanding, social awareness, privacy, bias, transparency, and the ability to make responsible decisions. The most explicit evidence integrating technical and human-centered dimensions comes from [10] who developed the TAICS scale with six dimensions of teacher AI competence: AI knowledge, AI pedagogy, AI assessment, AI ethics, human-centred education, and professional engagement. These dimensions were psychometrically validated among 434 K-12 teachers using the Delphi method and confirmatory factor analysis. The explicit inclusion of "human-centred education" as one of the six dimensions of AI competence provides the strongest evidence that recent literature has moved beyond the efficiency-versus-empathy dichotomy toward a framework that integrates both dimensions as an inseparable and unified set of competencies.

Critically, the integration of AI efficiency and human empathy involves more than combining technical and interpersonal skills. The findings suggest that the benefits of AI depend on how lecturers exercise pedagogical judgment in deciding when automation is appropriate and when direct human engagement is necessary. Although AI can support instructional facilitation, feedback, and assessment, these functions do not automatically strengthen students' trust or perceptions of lecturer expertise. As indicated by [6], the use of generative AI does not necessarily improve perceived teaching effectiveness, particularly when considered alongside the importance of teacher clarity. This suggests that AI efficiency and human empathy are not inherently complementary; their relationship depends on lecturers' ability to use AI purposefully while maintaining clear communication, emotional support, and professional responsibility. Consequently, lecturer competencies must evolve beyond technical AI literacy to include pedagogical-ethical judgment and relational-human competence, enabling lecturers to determine how technological efficiency can serve rather than undermine the human dimensions of higher education.

Redefining Lecturer Competencies within the Human Capital 5.0 Framework

Based on the synthesis above, this study proposes a framework for redefining lecturer competencies that consists of three interrelated layers of competencies, as summarized in Table 2. The first layer is technical-AI competence (technical-AI literacy), which encompasses GenAI literacy, the ability to design prompts, and the integration of AI tools into curricula and assessment, as formulated by [9], [11] and [10]. The second layer is pedagogical-ethical competence (pedagogical-ethical judgment), which encompasses the ability to maintain human oversight and responsibility, ensure transparency, critically evaluate AI-generated outputs, and use AI with clear pedagogical purposes, as emphasized by [13], [15], [14], and [16]. The third layer is relational-human competence (relational-human competence), which encompasses empathy, emotional support, clear communication, lecturer-student rapport, and mentoring, as empirically demonstrated by [7], [8], and [6].

Table 2. Three-Layer Framework for Redefining Lecturer Competencies in the Human Capital 5.0 Era

Competency Layer	Key Indicators	Supporting Empirical References
Technical-AI Literacy	Generative AI literacy; prompt engineering skills; integration of AI into curriculum design, teaching, and assessment; understanding of AI system limitations.	Sun et al. (2026); Biagini (2025); Chiu et al. (2025); Burneo-Arteaga et al. (2025)
Pedagogical-Ethical Judgment	Human oversight; transparency; critical evaluation of AI outputs; professional responsibility; use of AI with clear pedagogical purposes.	Fu & Weng (2024); Rojas Guillén (2026); Castillo-Martínez et al. (2024); Sperling et al. (2024)
Relational-Human Competence	Cognitive and affective empathy; emotional support; clear communication; rapport-building skills; mentoring.	Adlup et al. (2022); Jalilzadeh et al. (2025); Šerć & Garbin Prančević (2026); Baggia et al. (2026)

These three layers of competencies are neither hierarchical nor mutually substitutive; rather, they are interdependent. Technical efficiency without strengthening the relational layer may result in a learning process that is administratively efficient but loses its pedagogical meaning, as indicated by the findings of [6] regarding the negative effects of GenAI use on perceptions of lecturers' expertise when it is not accompanied by clarity and pedagogical purpose. Conversely, strengthening relational competencies without adequate technical AI literacy may cause lecturers to lose relevance amid the widespread adoption of AI by students, as documented by [5], while also limiting opportunities to use AI to strengthen rather than diminish their pedagogical capacity.

The pedagogical-ethical layer serves as a bridge connecting the other two layers. The ability to maintain human oversight and critical judgment ([13]; [16]) ensures that the use of AI in the technical layer is consistently directed toward strengthening, rather than replacing, the relational quality of learning in the relational layer. This three-layer framework is consistent with the principles of Human Capital 5.0, which position technology as an enhancer rather than a replacement for human values [2]. It also directly addresses the conceptual gap identified in previous literature reviews, namely the absence of a lecturer competency redefinition framework that coherently integrates technical AI and human relational dimensions.

Implications for Institutional Policy and Lecturer Professional Development

The findings of this study have several practical implications for higher education institutions. First, lecturer professional development programs need to be redesigned so that they do not focus solely on technical training in the use of AI tools, but also explicitly strengthen pedagogical-ethical and relational-human competencies, in line with the recommendation of [4], which emphasizes the need for institutional support and continuous professional development to ensure that AI is used responsibly. Second, there is a structural gap between the complexity of the competencies required and the duration of training generally available. [15] explicitly identified a mismatch between the structural barriers faced by teachers and lecturers and the short-term training commonly offered by institutions. Therefore, a continuous, contextual, and practice-based professional development model

is needed. Third, institutional policies should encourage lecturers to use generative AI with clear and measurable pedagogical objectives, as the use of AI without clear pedagogical direction may reduce rather than improve students' perceptions of lecturers' expertise and effectiveness, as found by [6].

CONCLUSION

This systematic literature review, conducted in accordance with the PRISMA 2020 guidelines and based on fifteen empirical and review articles indexed in Scopus from 2022 to 2026, identifies three main findings that address the research questions. First, AI efficiency in teaching practices is consistently manifested in instructional facilitation, formative assessment automation, and administrative support. However, AI has not replaced, and conceptually remains unlikely to replace, lecturers' professional judgment in teaching processes that require contextual understanding and ethical consideration ([18]; [3]; [4]). Second, human empathy remains an important factor associated with the quality of lecturer-student interactions, trust, and students' psychosocial outcomes. Furthermore, the use of generative AI without appropriate pedagogical guidance may risk weakening rather than strengthening lecturers' relational competencies ([7]; [8]; [6]). Third, the synthesis of the fifteen studies supports a three-layer framework of lecturer competencies comprising AI-technical, pedagogical-ethical, and human-relational competencies. These dimensions are interdependent and mutually reinforcing, positioning AI as a collaborative instrument that requires human oversight and critical judgment rather than as a replacement for lecturers' pedagogical roles ([13]; [14]; [12]).

The main contribution of this study is the proposed three-layer competency framework, which addresses the conceptual gap concerning the integration of AI-based technical efficiency and human empathy within the Human Capital 5.0 perspective. Rather than treating AI proficiency and empathy as competing priorities, the framework conceptualizes them as complementary dimensions of lecturers' professional competencies. Its contribution lies in explicitly connecting technical capability with pedagogical-ethical judgment and human-relational competence, thereby providing a conceptual basis for understanding how lecturers can use AI efficiently while maintaining human values in higher education. In practical terms, the framework may inform lecturer professional development, curriculum design, and institutional policies on AI integration. Professional development programs could combine AI literacy and practical technology use with ethical decision-making, pedagogical judgment, clear communication, and empathetic engagement with students. Higher education institutions could also use the framework as a reference for developing guidelines that promote responsible AI use while maintaining lecturers' professional accountability and the quality of lecturer-student relationships. These implications should be understood as recommendations derived from the literature synthesis rather than as outcomes already validated through implementation.

Several limitations should also be acknowledged. First, this review was restricted to fifteen empirical and review articles indexed in Scopus and published between 2022 and 2026. Consequently, the findings reflect the scope and characteristics of the selected literature and may not capture all perspectives or institutional contexts in higher education. Second, the proposed three-layer competency framework is a conceptual synthesis and has not yet been empirically validated through direct implementation or evaluation. Future research could examine the framework across different higher education contexts, validate its dimensions, and investigate how the interaction among AI-technical, pedagogical-ethical, and human-relational competencies influences lecturers' teaching practices and students' learning experiences.

RECOMMENDATIONS

Based on the limitations of this study, several recommendations can be proposed. First, future systematic literature reviews should incorporate additional academic databases, publications in different languages, and a larger number of studies to enhance the comprehensiveness of the literature synthesis. Second, appropriate methodological quality appraisal tools should be applied to strengthen the rigor and reliability of future reviews. Third, empirical research should validate the proposed

three-layer lecturer competency framework across diverse institutional, disciplinary, and cultural contexts, particularly in developing countries. Finally, qualitative and mixed-methods studies should explore lecturers' experiences of balancing AI-driven efficiency with the maintenance of human empathy in higher education teaching practices.

ACKNOWLEDGMENTS

The authors would like to express their gratitude to the authors' affiliated institution for the support provided throughout the preparation of this systematic literature review, as well as to the journal editors and reviewers for their constructive feedback in improving this article.

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