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REDEFINING TEACHER COMPETENCIES IN THE AGE OF GENERATIVE AI: A GLOBAL PERSPECTIVE ON PEDAGOGICAL TRANSFORMATION

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Abstract

The global educational transformation triggered by the emergence of generative artificial intelligence has demanded a fundamental redefinition of teacher competencies. This study aims to re-examine the pedagogical competencies needed by teachers in facing the era of generative AI, using a literature review approach to the latest international scientific sources. This study explores how artificial intelligence is changing the traditional role of teachers, highlighting the need for new skills such as advanced digital literacy, ethical use of technology, collaborative creativity, and adaptive abilities to AI-based learning ecosystems. The findings of this study indicate that future teacher competencies must not only include technological skills, but also a deep understanding of the critical, ethical, and contextual integration of AI into teaching practices. This study also identifies global challenges such as the digital divide, lack of continuous professional training, and the need for educational policies that are responsive to technological developments. Thus, the redefinition of teacher competencies is not just a technical demand, but a strategic process in creating a fair, inclusive, and sustainable pedagogical transformation amidst digital disruption.

Keywords: Teacher competency, generative artificial intelligence, pedagogical transformation, digital literacy

INTRODUCTION

The digital transformation accelerated by the presence of generative artificial intelligence has shifted the fundamental foundations of global

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educational practices. In the past, the role of teachers was identical to being the main source of knowledge, the authority in the classroom, and the sole regulator of the learning process (Cabrera, 2024).

However, now, with artificial intelligence capable of generating answers, designing questions, summarizing texts, and providing feedback on student work, the existence of teachers is no longer exclusive in terms of delivering knowledge. The traditional paradigm is shifting towards one that demands the role of teachers as learning designers who facilitate meaningful learning experiences, not just as transmitters of material. This phenomenon has consequences for what is called teacher competence. Competencies that were relevant in the past, such as mastery of teaching materials and the ability to convey information verbally in the classroom, are no longer sufficient in an era where students can easily access various forms of information with just a few text commands to AI (Guerrero, 2024). In fact, the ability to guide students in assessing the credibility of information, forming critical reasoning, and facilitating the reflective process is more important than ever. Teachers must also be able to bridge the use of AI in the teaching and learning process so that it is not merely instructive, but rather transformative, empowering students to become independent, ethical, and adaptive learners.

In addition, in a global context, teacher competency transformation does not occur in a vacuum (Joshi et al., 2025). Each country has a different education system structure, cultural values, level of technological literacy, and institutional readiness. In countries with inclusive and technologically responsive education ecosystems, redefining teacher competencies has become part of the national education policy agenda. However, in developing countries, more fundamental issues such as limited access to digital devices, unequal teacher training, and digital inequality between regions are still barriers to adopting and integrating AI effectively in learning. Therefore, redefining teacher competencies is not only conceptual, but must also consider the global digital divide so that this transformation does not deepen educational inequality between countries and regions (Baskara, 2023). This condition demands a comprehensive and future-oriented global approach in developing a new teacher competency framework. This approach must be cross-sectoral, multidisciplinary, and responsive to technological developments. On the one hand, teachers need to understand how generative AI works fundamentally in order to be able to use it wisely in learning activities. On the other hand, pedagogical and social-emotional competencies also remain the main pillars that cannot be replaced by technology.

Competent teachers in this era are those who are able to balance technological sophistication with a humanistic approach in educating students. Therefore, the competence of future teachers is not only about the skills of using tools, but also about sensitivity to class dynamics, mastery of ethical values, and commitment to humanizing education amidst the rapid wave of automation (Nyaaba, 2024). Furthermore, the use of generative AI in education also brings a complex and challenging ethical dimension. In some cases, the use of AI in learning produces content that is biased, erroneous, or inappropriate to the local cultural context. This emphasizes the importance of the role of teachers as the main filter that ensures that the learning process remains in accordance with the principles of justice, inclusivity, and cultural relevance.

This ethical competence is very important so that teachers can teach students not only how to use AI, but also how to use AI responsibly and wisely. Without adequate ethical provision, the use of AI in education could backfire, reinforcing inequality, undermining academic integrity, or eroding authentic learning processes (Yadav, 2025). This transformation also demands a reorientation in the teacher training and professional development system. Teacher training programs must begin to include specific modules on AI literacy, technology-based learning design, digital assessment, and learning data analysis (Mageswaran et al., 2024). Teachers need to be positioned as lifelong learners who continuously update their knowledge and skills as technology advances. This requires a commitment from the government and educational institutions to build a sustainable and flexible training system, as well as develop a collaborative and participatory teacher learning ecosystem. Without this systemic support, the redefinition of competence will only be an elitist discourse that does not touch on daily educational practices.

In addition to skill development, competency redefinition also touches on the dimensions of teachers' professional identity (Levin et al., 2025). Technological changes often create a sense of uncertainty and concern among teachers regarding the future of their profession. Therefore, competency transformation must also be accompanied by strengthening the identity of teachers as agents of change, not just as users of technology. Teachers must be actively involved in the process of formulating AI-based education policies, so that they feel ownership and empowerment in facing change. This sense of ownership is very important to maintain the spirit of professionalism and encourage more meaningful adoption of technology in teaching practice (Zhai, 2024).

This study takes a global approach because the phenomenon of generative AI knows no geographical boundaries, but its impact is greatly influenced by the local context. By examining how various countries define and develop teacher competencies in the era of generative AI, this study hopes to identify patterns, challenges, and good practices that can be used as references in building an adaptive and relevant global competency framework. The focus is not only on the technology itself, but more on how teachers as key actors in education respond to and manage this change with a vision of responsible and future-oriented pedagogy.

Thus, the urgency to reconstruct teacher competency is not only about adapting to technology, but also about how to maintain the essence of education as a humanization process. Amidst the sophistication of AI that is able to produce text and answers instantly, the presence of teachers as dialogue facilitators, character builders, and moral leaders is increasingly important to maintain and strengthen. This study aims to provide a deep understanding of how teacher competency can be strategically, contextually, and sustainably reorganized so that they remain the main pillars in the transformation of global education that supports humanitarian values and social justice.

RESEARCH METHOD

The research method used in this study is a qualitative and explorative literature review method. This study aims to understand how teacher competencies are redefined in the context of advances in generative technology based on artificial intelligence, and how these changes shape pedagogical transformation globally. This research was conducted by reviewing various relevant scientific sources such as international journals, academic books, reports from global education organizations (such as UNESCO and OECD), and conference papers discussing topics related to teacher competencies and the integration of AI in education.

The data collection process was carried out by searching for scientific publications from 2018 to 2025 using leading databases such as Scopus, Web of Science, SpringerLink, and Google Scholar. The keywords used in the search include "teacher competencies", "generative AI in education", "pedagogical transformation", "digital pedagogy", and "global education trends". The selected articles were evaluated based on their relevance, scientific validity, and contribution to the conceptual understanding of the redefinition of teacher competencies. The synthesis process was carried out through a

thematic approach to identify patterns, challenges, and conceptual frameworks that emerged from various studies.

In analyzing the data, the author uses an interpretive approach by comparing findings from various literatures and integrating them into a comprehensive narrative. This approach allows for an in-depth understanding of the shift in educational paradigms due to the emergence of generative technology, as well as a critical assessment of the global implications for teacher training policies, pedagogical practices, and professional development. The results of this literature review are expected to provide a strong theoretical basis for formulating adaptive and sustainable teacher competency development strategies in the era of generative AI.

RESULT AND DISCUSSION

Characteristics of Generative AI and Its Impact on Teaching Practices

In recent years, generative artificial intelligence technology has become one of the most transformative innovations in education. Generative AI refers to artificial intelligence systems that are able to independently create new content, such as text, images, audio, video, and programming code, based on training on very large data. One of the most well-known examples is a large language model like ChatGPT that is able to interact in natural language, provide relevant answers, and produce writings that resemble human work. The power of generative AI lies in its ability to understand context, synthesize complex information, and create personalized outputs, enabling various forms of new interventions in learning practices. This technology not only brings efficiency, but also opens up opportunities for richer, more interactive pedagogy that is tailored to the needs of each learner.

The presence of generative AI in the classroom directly changes the dynamics of interaction between teachers and students. In the past, the role of teachers as the sole source of information was very dominant. However, with the advancement of AI that can answer students' questions directly, explain complex concepts in easy-to-understand language, or even guide them in compiling assignments, there has been a shift in the role of teachers from conveying information to facilitators of learning. Teachers are now required to focus their role on developing critical thinking skills, empathy, collaboration, and digital ethics, rather than simply memorizing facts and procedures (Lee et al., 2024). Classroom interactions have become more dialogic and exploratory, with students more actively seeking and verifying information from various sources including AI technology, while teachers

provide a framework for understanding and reinforce values that cannot be replaced by machines. This change also shows how generative AI technology is driving a major shift from traditional instructional learning models to more adaptive and personalized approaches (Wood & Moss, 2024). In conventional learning systems, the curriculum tends to be uniform, with one approach applied to all students without considering differences in learning styles, backgrounds, or individual needs. However, with AI's ability to analyze real-time student learning data such as their response to material, speed of understanding concepts, and areas of difficulty, the AI system can adjust the content, level of difficulty, and delivery style to suit each student's profile. Learning becomes more flexible, oriented towards mastery of competencies, and student-centered. This model also allows learning to take place anytime and anywhere, with the AI system continuing to accompany the student's learning process independently or integrated into class activities.

However, this transformation does not come without challenges. The shift to an AI-based adaptive model requires adequate technological infrastructure readiness, intensive teacher training, and a strong understanding of ethics and data security (Chiu, 2024). Teachers need to be given new skills to use AI critically and creatively in learning planning, assessment, and student mentoring.

On the other hand, students must also be equipped with digital literacy and ethical awareness so that they are not only passive users, but also able to assess the reliability of information presented by AI and use it for responsible self-development. Human interaction in learning remains essential, especially in building relationships, instilling values, and creating a positive and inclusive learning climate. Furthermore, the change in the educational paradigm due to generative AI invites deep reflection on the nature of learning and the role of education in shaping whole people. Technology, no matter how sophisticated, cannot replace the affective and moral aspects that are the basis of education (Pesovski et al., 2024). Therefore, the integration of AI in education should not only be oriented towards efficiency or technical sophistication, but should be developed within a humanistic pedagogical framework that places humanity, empathy, and wisdom at the center. By combining the power of technology and pedagogical sensitivity, generative AI can be a strategic partner in building a more inclusive, relevant, and meaningful future of education for future generations.

Conventional Teacher Competence vs. Competence in the Generative AI Era

Teacher competence in the era before the massive emergence of digital technology and artificial intelligence was characterized by the dominance of four main pillars: pedagogical, social, professional, and technological competence within a conventional framework. Pedagogical competence focuses on the ability to design learning, manage classes, and evaluate learning outcomes with an approach that tends to be linear and based on a rigid curriculum (Bower et al., 2024).

Teachers are considered competent if they are able to adapt traditional learning methods well, manage face-to-face classroom dynamics, and guide students within the physical boundaries of the classroom. Within this framework, the teacher-student relationship is hierarchical, with the teacher as the center of knowledge and students as recipients of information. Teacher social competence includes sensitivity to the background of students, involvement in the school community, and the ability to foster healthy communication between individuals. On the other hand, professional competence includes mastery of teaching materials, understanding of the curriculum, and involvement in scientific development through training and research.

Meanwhile, technological competence is still focused on basic skills such as the use of presentation devices, computer operation, and limited use of the internet to support the teaching and learning process. However, the emergence of digital technology and more specifically generative AI, has changed the educational landscape completely. The previously dominant teacher competency model is no longer sufficient to meet the challenges of the times. The transformation is taking place towards deeper and more comprehensive digital competencies, including not only mastery of digital tools, but also a critical understanding of how technology works and its impact on the learning process. In this context, pedagogical competency is no longer just about how to deliver material, but also how to manage adaptive, data-driven, and contextual learning experiences.

Teachers need to understand how algorithms, recommendation systems, and the limitations and potential of AI work to design meaningful learning strategies. Technology ethics is a new dimension that teachers must master. They are required to be able to make ethical decisions regarding the use of student data, the selection of fair learning applications, and be sensitive to algorithmic bias and the social consequences of technology used in the classroom (Kajtazi et al., 2023). In this era, teachers also need to be content

curators, not just creators or deliverers of material. AI-based content curation is a strategic skill because the ocean of information available online is vast and not always accurate or relevant. Generative AI such as ChatGPT, Claude, or Gemini can generate learning materials quickly, but without proper curation, their quality and relevance can be questioned. Teachers are required to sort, filter, adapt, and verify AI-generated content to suit the needs and characteristics of learners. This curation also includes the ability to create a learning experience that is balanced between the use of technology and activities that build critical thinking, empathy, and creativity in students in a humane way. Therefore, the role of teachers shifts from being an information center to being a facilitator and learning partner who is able to bridge the gap between the digital world and holistic educational needs (Lu et al., 2024).

In a global context, this competency transformation also demands data literacy and AI skills as part of the core competencies of teachers. Data literacy refers to the ability to understand, analyze, and use data ethically and meaningfully in the learning process. Teachers not only collect student learning outcome data, but are also able to interpret patterns, design data-based interventions, and evaluate the effectiveness of learning strategies on an ongoing basis. AI skills mean that teachers understand how AI works, what this technology can and cannot do, and how to integrate it into daily teaching practices by considering ethical, pedagogical, and social aspects. In an interconnected world, this competency is important because today's learners are global citizens who will live and work in a world heavily influenced by intelligent technology.

Teachers are required to equip students with 21st-century skills that are not only technical, but also reflective, critical, and responsible. This shift is not only a technical demand, but also a paradigm shift in understanding the role of teachers and education itself. Education is no longer just about transferring knowledge, but about forming humans who are able to live meaningfully in a complex, uncertain, and ever-changing world. Digital competence, technology ethics, AI content curation, data literacy, and AI skills are not optional extras, but rather part of the new foundation of the teaching profession (Moorhouse et al., 2024). Current and future teachers need to be supported by educational policies, ongoing professional training, and collaborative ecosystems that facilitate the systematic transformation of these competencies. Without them, education will lag behind the pace of technological change and fail to prepare a generation that is able to face the future intelligently, ethically, and empowered.

The Role of Teachers as AI Facilitators, Curators, and Moderators

In the digital era marked by the emergence of artificial intelligence technology, the role of teachers has shifted significantly from being the main source of knowledge to being a facilitator of the learning process. This transformation is not just a technical change, but a profound evolution in the dynamics of education. When information is available in abundance and can be accessed in seconds through search engines and generative AI platforms, the authority of teachers as the sole guardians of knowledge begins to shift. The main function of teachers is no longer to convey the content of knowledge in one direction, but to guide students in navigating the ocean of information, verifying its truth, and developing critical, creative, and collaborative thinking skills. Teachers become companions in a learning process that is more dynamic, interactive, and adaptive to the individual needs of students. They facilitate the construction of meaning, not just the transfer of content. This is where the new complexity lies in the teaching profession: managing learning not only with mastery of the material, but with instructional design skills, digital literacy, and pedagogical empathy (Alfaisal et al., 2024).

This change is also reinforced by the development of AI-based content curation technology. Platforms such as ChatGPT, Khanmigo, and intelligent learning management systems allow teachers to access, sort, and combine relevant and developmentally appropriate teaching materials. However, behind this convenience lies an ethical responsibility that cannot be ignored. Curating materials is not just about selecting available content, but also involves considering values, diversity of perspectives, and psychosocial impacts on students. AI technology can suggest content with high speed and accuracy, but does not have the moral sensitivity of humans (Mutiga & Santos, 2025).

Therefore, teachers need to have the competence to evaluate the results of AI curation, ensuring that the materials used are not biased, not misleading, and do not contain discriminatory or manipulative elements. This is where the importance of integrating digital ethical literacy in the teaching profession lies. In curating materials, teachers are required to understand how AI systems work, their limitations, and the potential risks that may arise from the use of machine-generated content. At this point, the role of teachers also extends to the realm of moderating interactions between students and AI-based systems. Educational ecosystems that integrate chatbots, virtual tutors, and intelligent learning platforms require careful supervision so that human-

machine interactions remain conducive and support the development of student character. Interactions that are too intense or without direction can lead to dependency, dehumanization of the learning process, or narrowing of critical thinking (Adhikari & Pandey, 2025).

Teachers must be present as moderators who are able to recognize these dynamics and balance the use of AI within healthy limits. They must be able to guide students in building relationships with technology consciously and responsibly. This moderation does not only include technical use, but also includes the formation of awareness of algorithmic bias, data privacy, and the ability to reject or criticize the results of machine recommendations (Derda & Predescu, n.d.).

Thus, teachers in the AI era are not only learning facilitators in the technical sense, but also guardians of the integrity of the educational process. They take on new roles as ethical content curators and balanced digital interaction moderators. This transformation demands multidimensional competencies that go beyond conventional content knowledge and pedagogy. It requires strengthening technological literacy, understanding the principles of digital ethics, and developing social sensitivity in assisting students to explore the increasingly complex world of learning. In a global context, many countries have begun to prepare teacher training curricula that integrate these aspects. For example, in Finland and Singapore, teacher training includes not only mastery of technology platforms, but also the formation of a reflective mindset in using AI critically and ethically. This shows that the shift in the role of teachers is not optional, but rather an inevitability that needs to be answered with systemic strategies and progressive policy support.

Overall, the changing role of teachers from knowledge centers to facilitators who are able to manage AI-based curation of materials and moderation of human-machine interactions is a response to the rapidly changing educational landscape. Although the challenges are complex, the opportunities available are enormous to build a more personalized, inclusive, and meaningful education system. Teachers are no longer omniscient figures, but learning partners who are able to direct, adjust, and contextualize learning amidst the flow of technology. In this era, the success of education is not only determined by the availability of technology, but by how teachers use it wisely and responsibly. Therefore, the important task of today's education is to ensure that teachers do not lose their most essential role: as guardians of

values, character builders, and inspirations in the learning journey of each individual.

Ethics, Regulation, and Fairness in the Use of AI in Education

In the context of modern, increasingly digitalized education, the use of artificial intelligence has presented both great opportunities and significant ethical challenges. AI not only acts as a learning aid, but also becomes an active actor in processing data, analyzing student behavior, and providing recommendations that influence the direction and outcomes of learning. However, the use of AI in educational settings must be placed within a strict ethical framework, where privacy, transparency, and fairness are fundamental values that must not be ignored. Technology that is not controlled by moral principles can exacerbate educational inequality and create an unfair learning ecosystem, where some students may not get equal opportunities due to biased or non-transparent algorithmic decisions (Memarian & Doleck, 2023).

The privacy aspect is the most pressing issue because AI in education works by collecting, storing, and analyzing students' personal data. This data includes not only identity and academic records, but also learning preferences, online behavior, and emotional expressions in the digital environment. In this case, the risk of privacy violations is very high if there is no clear regulation about who has control over the data, how it is used, and for whose benefit. Without strict data protection, students can be exposed to unethical forms of surveillance and the use of their data for commercial or manipulative purposes. Therefore, there needs to be education regulation that ensures that AI-based data collection is carried out legally, proportionally, and with the informed consent of parents or students themselves, especially at the lower secondary education level (Chinta et al., 2024). Algorithm transparency is also an important element in the ethical application of AI in education. Many AI systems used in assessment processes or learning personalization are black boxes—it is difficult to understand how they make decisions or make recommendations. When decisions made by AI affect students' grades, educational pathways, or access to learning resources, this lack of clarity becomes a major problem. Teachers, students, and parents have the right to know the basic logic and parameters used by AI in making recommendations or assessments. This lack of transparency creates an unequal relationship between users and systems, where humans are subject to technological decisions that cannot be rationally explained or criticized. Therefore, the

principles of explainability and auditability must be an integral part of the design of AI systems in educational settings.

Algorithmic bias is a particularly dangerous form of digital injustice in education. AI learns from data, and data is never completely neutral because it reflects pre-existing preferences, inequalities, and social imbalances. If algorithms are trained on data that is not inclusive or biased by gender, race, language, or socioeconomic status, then the outcomes they produce are potentially discriminatory (Porayska-Pomsta et al., 2023). For example, students from certain groups may receive lower career or learning material recommendations simply because of patterns seen in historical data. When this happens, education is no longer a tool for empowerment, but rather reinforces existing stereotypes and inequalities. Therefore, it is important to have a process of ongoing evaluation and correction of AI systems, including the involvement of education experts, sociologists, and school communities in designing and reviewing the algorithmic models used. In an AI-integrated educational landscape, teachers have a strategic role in keeping technology practices on track with ethics and professionalism. Teachers' professional responsibilities do not stop at teaching, but also include oversight of technology use in the classroom. Teachers must understand how AI systems work, what the potential ethical risks are, and how to integrate technology without replacing the human touch that is at the heart of education itself. Teachers also act as bridges between technology and students, ensuring that decisions or recommendations from AI are not blindly followed, but are responded to critically and contextually. With pedagogical capacity and sensitivity to social dynamics in the classroom, teachers can act as guardians of the values of justice, inclusivity, and empathy in the digital ecosystems they manage (Porayska-Pomsta et al., 2023). More than just technical understanding, it is important for the school community as a whole to develop a critical awareness of technology. This awareness must be built through open discussion, a progressive digital literacy curriculum, and the active involvement of all parties in the education ecosystem, including students, parents, education personnel, and policy makers. Critical awareness will encourage the understanding that AI is not a neutral entity beyond human control, but rather a product of certain values, assumptions, and social structures that can be questioned and changed. Thus, the school community can take an active stance in selecting, adapting, or even rejecting technology that is not in line with the principles of fair and humane education.

In addition to critical awareness, technological empathy is also an important value that must be fostered. This means that in designing and using educational technology, its impact on various groups with different backgrounds and needs must always be considered. AI must be able to adapt to the diversity of cultures, languages, physical and psychological conditions of students, and uphold the dignity of each individual. Technological empathy demands an approach that is not only data-based, but also a deep understanding of humanity. When the school community is able to build this awareness, AI is no longer a threat that eliminates the human dimension in education, but rather a partner that strengthens human values in the teaching and learning process (Alam, 2023).

Overall, the use of AI in education must be framed in strong ethics, regulations, and principles of justice. Privacy, transparency, and the elimination of algorithmic bias are not just technical issues, but the foundation of a civilized education system. Teachers play an important role in maintaining the integrity of technology in the classroom, while the school community must actively build a culture of critical and empathetic digital literacy. With a responsible and holistic approach, AI can be a tool that expands access, improves the quality of learning, and at the same time upholds the values of social justice in education.

Conclusion and Future Direction of Teacher Competence

The conclusion and future direction of teacher competence cannot be separated from the dynamics of the technological revolution, especially advances in the field of artificial intelligence that are actively shaping the global education landscape. Amidst the rapid pace of change, the paradigm of teacher competence that was previously rooted in the ability to manage classes, deliver materials, and evaluate learning outcomes has now shifted significantly towards something more complex and dynamic. The expansion of this paradigm not only includes technical and pedagogical dimensions, but also extends to the realm of digital ethics, data literacy, and skills to foster collaboration between humans and machines. Teacher competence in the era of artificial intelligence must reflect the ability to adapt, think critically about technology, and design humane learning experiences in an ever-evolving digital ecosystem (Sulaiman & Ismail, 2020).

This transformation demands a major reorientation in teacher capacity building, both through pre-service education and ongoing training. Today's teacher education can no longer be trapped in traditional approaches that

emphasize memorizing pedagogical theories or administrative routines alone. On the contrary, capacity building should be directed at empowering teachers as agents of change, who are not only able to use technology functionally but also understand its implications for the learning process, social relations in the classroom, and the development of student character. Teachers need to be equipped with cross-disciplinary knowledge, reflective skills, and innovative instructional design skills so that they can use AI critically and strategically in shaping contextual and meaningful learning.

Practically, the direction of teacher competency development must be structured in a collaborative and adaptive sustainable development model. This model not only involves teachers individually, but also encourages the formation of professional learning communities that support each other and share good practices. Education policies at the national and global levels need to accommodate this need by providing resources, practice-based training, and safe pedagogical experimentation spaces. Teacher capacity building also needs to reach areas that have been left behind in adopting technology, so that there is no competency gap that widens educational inequality. In the future, the role of policy makers, higher education institutions, and technology developers must be interwoven in a synergy that ensures that teacher capacity building is truly sustainable, relevant, and contributive to the challenges of the times.

The hope for global pedagogical transformation lies in the creation of an educational ecosystem that is more equitable, inclusive, and responsive to future needs (Sabbah et al., 2020). On the one hand, AI opens up opportunities to enrich learning with more adaptive and data-driven content, but on the other hand, the potential for algorithmic bias and the reduction of human roles remains a real threat if not balanced with clear ethical controls and regulations. This is where the role of teachers becomes key—as guardians of values, facilitators of empathy, and moral directors in an increasingly complex digital space. Global pedagogical transformation must place teachers at the center of innovation, not just as users of technology, but as architects of the future of education that integrates artificial intelligence with human wisdom.

The future of teacher competence in the AI era will be largely determined by the extent to which the world of education is able to build a new paradigm that positions technology as a tool, not as the main determinant. Teacher competence must go beyond mere technical mastery and include the ability to manage change, read social dynamics, and form

critical thinking patterns among students. Teachers need to be positioned as learning leaders who have pedagogical autonomy, not just implementers of a machine-determined curriculum. In a global context, this means the need for cross-country cooperation, cross-cultural knowledge exchange, and the development of international competency standards that recognize the diversity and complexity of local challenges (Alpaydın & Demirli, 2022). Thus, the future of education depends heavily on how we redesign the role of teachers in this digital era. Expanding the paradigm of teacher competence must be a strategic priority in global education planning. The world does not need teachers who are only able to keep up with technological developments, but teachers who are able to lead change, design relevant learning, and maintain humanity in the education process. True pedagogical transformation lies not in technology itself, but in the values brought and developed by educators around the world. Amidst the ever-growing flow of AI, competent, reflective, and visionary teachers will be at the forefront of ensuring that education remains a space for equitable and dignified growth.

CONCLUSION

The conclusion of this study confirms that redefining teacher competencies in the era of generative artificial intelligence is an urgent need in facing global pedagogical transformation. The sophistication of AI technology not only changes the way knowledge is delivered and accessed, but also requires teachers to have new skills that include digital literacy, ethical understanding of technology, and the ability to collaborate with AI-based systems critically and reflectively. Traditional competencies that focus on knowledge transfer need to be complemented with adaptive, creative, and empathetic capacities so that teachers can remain relevant and effective in dynamic and automated learning environments.

This study shows that global responses to this change are still diverse, depending on the readiness of education policies, digital infrastructure, and the training capacity of educators in each country. However, there is an understanding that the role of teachers remains essential in shaping meaningful learning experiences that are oriented towards human values. AI-based pedagogical transformation positions teachers not as competitors of technology, but as the main directors in responsible technology integration. Therefore, the redefinition of teacher competencies must include strengthening professional characters who are able to manage technology to support inclusive, adaptive, and sustainable learning.

Considering the global context and its multidimensional challenges, this study recommends the need for a holistic and transformative teacher competency framework. This approach should be based on the principles of cross-sector collaboration, continuous professional development, and policy-making that is responsive to technological developments. Through the thoughtful and ethical integration of generative artificial intelligence, education can evolve towards a learning system that is more personal, humane, and relevant to the challenges of the 21st century.

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